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Fiscal Federalism and Climate Change: Building the Institutional Framework in India

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Abstract

This paper examines India's evolving climate change governance framework, emphasizing the role of its federal structure in shaping national and subnational climate action. Given India's commitment to ambitious climate goals like achieving net-zero emissions by 2070 and aligning with the Paris Agreement, the study underscores the need for a cohesive, multi-level governance approach to effectively implement these targets. It critically assesses the current institutional landscape, identifying gaps in coordination and sectoral integration of climate action. India's reliance on sector-specific laws and policies, coupled with the absence of overarching climate legislation, highlights the urgent need for a unified legal framework to mainstream climate considerations into governance. Drawing on international experience, it explores how fiscal federalism principles can strengthen India's climate governance by empowering state governments and decentralizing climate action, while maintaining national coherence. The paper proposes strategies to optimize institutional support, enhance financial mechanisms, and foster cross-sectoral coordination. It outlines a roadmap for strengthening India's climate governance, focusing on establishing national climate laws, integrating climate change into fiscal and policy planning, and improving coordination between central and state authorities. By offering a pathway for scaling up climate action in India, the paper aims to ensure equity and sustainability in India's transition to a low-carbon, resilient economy.

Keywords: climate change governance, fiscal federalism, climate legislation, net zero, framework law, carbon pricing.

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"Despite governmental policy and rules and regulations recognising the adverse effects of climate change and seeking to combat it, there is no single or umbrella legislation in India which relates to climate change and the attendant concerns." [1]

1. India's Global Commitments

India has made critical and relatively ambitious global commitments to achieving net-zero by 2070, with milestones for the path toward this target, including to enhance renewable energy use and decrease carbon intensity by 2030.[2] India has committed to balancing economic growth with environmental sustainability, focusing on phased transitions across various sectors.

- **Net Zero Emissions by 2070:**
  - **Goal:** India aims to reach net-zero greenhouse gas emissions by 2070, balancing emissions with removals.
  - **Alignment with Global Goals:** This commitment aligns with the Paris Agreement, aiming to limit global temperature rise to well below 2°C, with efforts towards 1.5°C.

- **Intermediate Targets for 2030:**
  - **Carbon Intensity reduction:** India plans to reduce its emissions intensity (emissions per unit of GDP) by 45% from 2005 levels by 2030. This includes improving efficiency, and reducing overall carbon output relative to GDP.
  - **Renewable Energy Capacity:** India aims to achieve 500 GW of non-fossil fuel-based installed power capacity by 2030. This includes solar, wind, hydro, and nuclear power expansion (*Asian Development Bank, 2024*; *Grantham Research Institute, 2019*).
  - **Energy Demand from Renewables:** By 2030, India intends to meet 50% of its energy requirements from renewable sources. This will further advance the transition to a low-carbon economy.
  - **Carbon Emission Reduction:** Lower cumulative projected carbon emissions by approximately 1 billion tonnes by 2030.

- **Sustainable Development Goals:**
  - **Energy Transition:** India's strategy involves gradually reducing its coal dependence and increasing investments in renewable energy, electric mobility, and energy efficiency (*Thomas, 2023*).

- **Afforestation and Carbon Sequestration:** Increase carbon sinks through reforestation and forest management, contributing to its net-zero targets by increasing natural carbon sequestration.
- **Support for Green Technologies:** Invest in green technologies, including hydrogen, battery storage, and carbon capture, to facilitate the transition.

- **Mobilizing Climate Finance:**
  - **Domestic and International Investments:** Achieving net zero will require substantial investments in clean energy infrastructure. India is actively seeking both domestic and international climate finance to support these efforts.
  - **Private Sector Participation:** India seeks to leverage public-private partnerships to drive innovation and scale renewable energy projects.

- **Enhanced Resilience and Adaptation:**
  - **Climate Adaptation Initiatives**: India's net-zero objectives also include strengthening resilience to climate impacts through adaptation initiatives, particularly in vulnerable sectors such as agriculture, water resources, and coastal areas.
  - **Community and Ecosystem-Based Adaptation**: Efforts are being made to integrate community-led and ecosystem-based approaches to enhance local resilience and protect.

These international commitments need to be complemented by a comprehensive domestic climate policy framework to drive action. In its absence, the lack of enforceable legal mandates across the levels of government is a significant gap (*Dubash et al., 2024*). A driver for change in this direction should come from the recent Supreme Court formulation of a new constitutional right to be free from the adverse effects of climate change (*Kumar & Naik, 2024*).

2. India's Federal Structure for Climate Change

India's federal structure presents unique challenges for climate governance, as it is highly centralized, with the federal government holding significant fiscal, bureaucratic, and jurisdictional powers compared to more decentralized federations. However, the reality is that Indian states effectively bear responsibility for critical areas tied to climate action, such as water management, healthcare, and the electricity sector, which is heavily reliant on fossil fuels. This duality necessitates careful building of mechanisms for cooperation between the federal and state levels that recognize regional differences while ensuring cohesive governance for national climate goals.

2.1 Evolving but Uncoordinated Climate Institutions

The federal system has gradually created certain institutions and practices to respond to climate demands. However, these efforts still lack coordination and long-term strategic alignment. As Pillai and Dubash (2023) emphasize, in this situation, policies tend to be transient without clear links to overarching climate goals, which reflects a broader issue of central-level dominance in Indian climate federalism.

One such institution is the **Prime Minister's Council on Climate Change (PMCCC)**, established in 2008. The PMCCC was designed to oversee India's climate agenda at the highest level, providing direction for national programs and ensuring the integration of climate considerations into the broader development agenda:

- **Role in Overseeing the NAPCC and SAPCCs**: The PMCCC supervises the National Action Plan on Climate Change (NAPCC) and its eight flagship missions, including the National Solar Mission, National Mission for Enhanced Energy Efficiency, and National Water Mission. It ensures that these missions align with India's long-term goals for climate resilience and sustainable development. It also serves as an important mechanism for linking national policies to State Action Plans on Climate Change (SAPCCs), by providing financial and technical guidance to align state and central priorities (Dubash et al., 2021).
- **Inter-Ministerial Coordination**: Chaired by the Prime Minister, the PMCCC includes senior cabinet ministers, academics, and domain experts, making it a critical platform for inter-ministerial coordination on climate policy. Members include the Ministers of Power, Environment, Agriculture, and others, ensuring collaboration across key sectors to address the multifaceted challenges of climate change (Government of India, 2021).
- **International and National Climate Strategy**: The PMCCC has played an important role in shaping India's positions in international climate negotiations, including its commitments under the Paris Agreement. At the national level, it has sought to balance climate priorities with developmental imperatives, emphasizing the co-benefits approach in areas like renewable energy, forest management, and disaster resilience.

Despite its significant mandate, the PMCCC has suffered from irregular meetings, lack of consistent follow-up mechanisms, and limited state-level engagement. To address these challenges, it is necessary to institutionalize more regular interactions, strengthen its monitoring and evaluation role, and create platforms for better inclusion of state governments and civil society.

Another pivotal institution is the **Ministry of Environment, Forest and Climate Change (MoEFCC)**, which acts as the nodal agency for formulating and implementing India's climate policies. The MoEFCC is responsible for coordinating the country's compliance with international climate commitments, including the Paris Agreement, and managing domestic frameworks such as the NAPCC.

- **Policy Formulation and Oversight**: The MoEFCC oversees key programs like the NAPCC, the Green India Mission, and the National Adaptation Fund on Climate Change (NAFCC).

It also plays a vital role in framing state-level guidance for SAPCCs, ensuring alignment between national and subnational climate action strategies (Ahluwalia & Patel, 2023).

- **International Negotiations**: The MoEFCC represents India in global climate forums such as the United Nations Framework Convention on Climate Change (UNFCCC) and provides technical and legal inputs for negotiating international agreements. It is also central to tracking and reporting India's Nationally Determined Contributions (NDCs) (Chen et al., 2022).
- **Capacity Building and Awareness**: Through initiatives like the Climate Change Knowledge Network and collaboration with academic institutions, the MoEFCC fosters research, knowledge sharing, and capacity building at all levels of government. It has also engaged with stakeholders to promote climate awareness and innovation, particularly in renewable energy and biodiversity conservation (Government of India, 2021).

While the MoEFCC has made notable strides in advancing India's climate agenda, its limited budgetary allocation, understaffing, and challenges in engaging effectively with states hinder its ability to scale up its initiatives. Strengthening the MoEFCC's institutional capacity and expanding its mandate to address emerging climate risks are critical steps for improving India's climate governance framework.

The **Apex Committee for the Implementation of the Paris Agreement (AIPA)** is relatively new, and plays a more specific role, focusing on implementing India's Nationally Determined Contributions (NDCs) under the Paris Agreement. While it coordinates across ministries at the national level, AIPA does not currently have a strong framework for state-level coordination, a key gap in India's federal structure for climate governance.

2.2 Absence of Formal Climate Legislation

India currently lacks formal climate legislation at both federal and state levels. Significant political milestones, such as the ratification of the Paris Agreement, have not catalysed substantial legislative changes, either by enacting new laws or amending existing ones to incorporate climate considerations (Dubash, 2024). Climate action has instead been pursued within existing legislative frameworks, including the Electricity Act of 2003 and the Energy Conservation Act of 2001 (Dubash & Ghosh, 2019).

As Dubash (2024) notes, this reliance on sector-specific laws leads to inconsistencies and gaps in governance. A comprehensive climate framework law, similar to those in Germany and Canada, could integrate climate considerations across all sectors and levels of government (Grantham Research Institute, 2019).

2.3 Constitutional Division of Powers in Climate Governance

The division of powers outlined in the Constitution (particularly in Schedule VII) assigns significant roles in climate governance to both the Centre and the states. The central government has

authority over key sectors relevant to climate action, such as mining, petroleum, industry, and interstate waters; the 42nd Constitutional Amendment moved forests and wildlife to the Concurrent List, allowing both levels of government to legislate on these matters.

Local governance, agriculture, and water resources remain primarily within the states' jurisdiction. As Pillai and Dubash (2023) have pointed out, national schemes and legislations have frequently influenced state actions in these areas.

The electricity sector, which accounts for a significant portion of India's emissions, is an area of concurrent jurisdiction, with the federal government setting broad frameworks. and states exercising discretion within those parameters. In summary, while states play a major role in adaptation and mitigation, the overarching structure of Indian federalism often reinforces central dominance in climate governance.

2.4 Need for Institutional Coordination and Deliberation

This asymmetry in legal and fiscal powers underscores the importance of institutional forums for consensus-building on climate governance. Current climate-specific interactions are primarily mediated by the National Steering Committee on Climate Change (NSCCC), a body comprising senior bureaucrats from the Centre and some state representatives. As Pillai and Dubash (2023) have pointed out, the NSCCC serves more as a mechanism for ensuring "uniformity and coherence" in State Action Plans on Climate Change (SAPCCs), guiding individual projects, and approving funding allocations.

In addition to the NSCCC, there are other forums (not climate-specific) whose decisions could influence climate outcomes. These include the annual meeting of energy ministers, the Forum of Regulators for electricity policy, and the Inter-State Council – which, while currently relatively inactive, could play a significant role in addressing interstate climate challenges. However, the lack of a dedicated platform for climate policies limits the potential for strategic climate governance across the levels of government (Dubash & Pillai, 2023).

3. International Evidence

India can draw lessons from several countries that have effectively used fiscal federalism to coordinate climate action across government levels. Each of these countries has unique strategies and institutions suited to its federal structure, helping to manage the complex interaction of national, regional, and local climate policies. The Climate Action Tracker provides key insights into the successes and challenges of global climate governance frameworks.[3]

As highlighted by the Grantham Research Institute (2019), there is a clear need for countries to adopt an overarching "framework law" on climate change, which aims at being both comprehensive

and unifying. Such a framework law would set the legal context for other laws and policies, and provide the basis for local government, business, and community action on climate change.[4] #

To be effective, such framework climate laws need to be carefully tailored to the national context. Further, international experience also suggests that having a dedicated climate ministry does not necessarily resolve coordination challenges.[5] In many countries with climate-specific ministries, such as Germany, Canada, and South Africa, there remain difficulties in aligning national and subnational priorities, coordinating across economic sectors, and integrating climate targets within broader development plans.

For instance, Canada's federal climate ministry, Environment and Climate Change Canada (ECCC), has struggled with provincial opposition to national carbon pricing, while South Africa's Department of Forestry, Fisheries and the Environment (DFFE) faces gaps in financial support and inter-agency coordination. Even Germany, which has one of the most structured climate ministries (Federal Ministry for Economic Affairs and Climate Action – BMWK), faces challenges in aligning state (Länder) policies with federal emissions targets, particularly in energy and transportation.

Thus, while a dedicated climate ministry can provide institutional focus, its effectiveness is dependent on how well it integrates with other ministries, state and local governments, and national planning bodies. Countries that have improved coordination, such as New Zealand and Switzerland, have done so through strong intergovernmental councils and independent oversight institutions. These lessons can help India design a governance structure that maximizes efficiency while avoiding coordination pitfalls.

Assessments like the Climate Action Tracker (2023; Table 1) offer additional insights into the performance of countries in meeting their Paris Agreement goal of limiting global warming to 1.5°C. The Tracker categorizes countries into five performance levels: "compatible," "almost sufficient," "insufficient," "highly insufficient," and "critically insufficient." (Table 1). These ratings emphasize the importance of aligning domestic action with international commitments. Notably, countries with advanced climate frameworks and coordinated subnational action tend to perform better, while others (including India) require ambitious reforms to bridge the gap.

This section reviews the approach and experience of key comparator countries' climate policy and institutional framework.

Table 1. International Experience: Climate Action Tracker (CAT) Ratings

Country	CAT Rating	Key Challenges	Key Opportunities
Germany	Insufficient	Coal reliance, sectoral decarbonization	Strong renewable energy investments
Canada	Insufficient	Federal-provincial alignment issues	Dual carbon pricing system
Australia	Highly Insufficient	Federal inertia, fossil fuel exports	State-level initiatives
United States	Insufficient	Federal-state policy gaps	Inflation Reduction Act[6]
Switzerland	Almost Sufficient	Transport and agriculture emissions	Decentralized governance
Brazil	Highly Insufficient	Deforestation, weak enforcement	Potential for Amazon reforestation
Indonesia	Highly Insufficient	Limited carbon pricing coverage	Recent carbon tax introduction
South Africa	Insufficient	Subnational funding gaps	Just Energy Transition Partnership
China	Highly Insufficient	Coal dependency, lack of absolute caps	Leading renewable energy deployment
New Zealand	Almost Sufficient	Transport emissions	Innovative methane reduction policies

3.1 Climate Policies of Key Comparator Countries

3.1.1 Germany

Germany has a central framework law, the Federal Climate Protection Act (Klimaschutzgesetz), enacted in 2019. This law sets legally binding emission reduction targets for various sectors, and mandates annual emissions budgets, holding federal and state governments accountable for climate goals.[7] The Lander (states) play a significant role in implementing regional climate strategies aligned with federal goals.

- **Renewable Energy Sources Act** (EEG): This Act incentivizes renewable energy through feed-in tariffs, enabling Länder to pursue renewable projects that suit their regional energy capacities.
- **Energy Transition** (Energiewende): Germany's federal strategy is closely linked to its long-term energy targets and is implemented with cross-governmental cooperation, allowing states to adapt initiatives to local contexts while aligning with federal emissions targets.
- **Federal Ministry for Economic Affairs and Climate Action** (BMWK): Oversees the Energiewende, collaborating with states to guide renewable energy growth. However, BMWK

faces significant coordination challenges, particularly in balancing its dual mandate of economic growth and climate action. Conflicts between energy security concerns, industrial competitiveness, and emissions reduction targets have slowed Germany's phase-out of coal and its transition to cleaner energy sources. The interplay between federal and state-level policies—where some Länder prioritize industrial jobs tied to fossil fuels—further complicates efforts to meet national emissions targets.

- **Regional Climate Initiatives**: German states develop individual climate action plans aligned with federal targets. The Federal Environment Agency (UBA) provides data and policy advice to support state-level planning. However, state-level energy policies sometimes diverge from national climate goals, contributing to delays in emissions reductions.
- **National Climate Initiative** (NKI): Provides funding for local projects to reduce greenhouse gas emissions, with financial support extended to states and municipalities to achieve emissions targets and promote sustainable infrastructure.

CAT assessment: Germany is rated as "insufficient." While its legal frameworks and renewable energy investments are strong, reliance on coal and slow progress in decarbonizing certain sectors, exacerbated by coordination challenges between federal and state governments, hinder its ability to meet the Paris Agreement's 1.5°C target.

3.1.2 Canada

Canada has a central framework law, the Canadian Net-Zero Emissions Accountability Act, which was passed in 2021. This act mandates national targets to reach net-zero emissions by 2050, and requires annual progress reports, creating accountability measures at the national level.

- **Pan-Canadian Framework on Clean Growth and Climate Change**: This framework allows provinces and territories flexibility in designing carbon pricing systems that meet or exceed national benchmarks. A federal backstop applies if provincial systems do not meet these standards.
- **Output-Based Pricing System** (OBPS): This is a performance standard for industrial emitters, applying a price on emissions while offering flexibility for trade-exposed, heavy-emitting industries. Emitters pay only for emissions that exceed a baseline threshold, allowing them to remain competitive while contributing to emissions reductions.
- **Green Infrastructure Fund**: Supports provinces and territories in building climate-resilient infrastructure, promoting green projects across diverse regions, and works with the Net Zero Accelerator Fund in this regard.
- **Environment and Climate Change Canada** (ECCC): Sets national climate goals and coordinates with provinces to align provincial and federal efforts toward emissions reduction.

- **Equalization Payments and Low Carbon Economy Fund**: These funding mechanisms help less wealthy regions invest in climate initiatives, ensuring that all provinces can participate in achieving national goals.

CAT assessment: Canada is rated "insufficient," reflecting the need to strengthen policies for heavy emitters and ensure better provincial alignment. Canada's dual carbon pricing mechanism (OBPS and consumer-facing pricing) is a globally noted model but requires deeper integration across provinces to ensure uniform emissions reductions.

3.1.3 Australia

Australia does not have a central framework law on climate change. Instead, it relies on federal oversight with state-driven initiatives, allowing adaptation to unique regional needs, such as drought and bushfire management.

- **Emissions Reduction Fund** (ERF): Provides funding for local adaptation projects, such as reforestation and energy efficiency, managed by the Department of Industry, Science, Energy and Resources, and was updated in 2020 with the Climate Solutions Fund which provides additional funding in this regard.
- **Clean Energy Finance Corporation** (CEFC): A government-owned green bank that collaborates with state governments and the private sector to finance renewable energy projects and other green initiatives.
- **National-Regional Coordination**: Federal and state governments share responsibilities for environmental issues, encouraging region-specific adaptation strategies. States can set climate goals suited to their unique environmental and economic conditions.
- **State-Led Climate Initiatives**: States like New South Wales and Victoria have developed their own emissions reduction and renewable energy targets, furthering climate action within a flexible federal framework.

CAT assessment: Australia is rated "insufficient," with its reliance on state initiatives highlighting the need for stronger federal leadership and targets. Federal inertia and continued investment in fossil fuels remain major concerns.

3.1.4 United States

The United States does not have a single federal framework law on climate change. Instead, climate policy is governed by a combination of sector-specific regulations, state-led programs, and federal initiatives that may change under the new Administration.

- **Clean Air Act and State Programs:** The Clean Air Act enables the Environmental Protection Agency (EPA) to set national emissions standards, while states can implement their own climate policies.

- **Regional Greenhouse Gas Initiative (RGGI):** A collaboration among northeastern states that caps carbon emissions and reinvests proceeds into renewable energy.
- **(California's) Cap-and-Trade Program:** Demonstrates the potential of state-led climate policy, supported by federal tax credits and funding initiatives.
- **Infrastructure Investment and Jobs Act:** Provides federal funding to support state-led renewable energy and resilience projects, ensuring resources are available for climate adaptation.
- **Inflation Reduction Act (IRA):** The most comprehensive federal climate law to date, allocating significant funds for clean energy incentives, electric vehicles, and climate adaptation projects. However, its future implementation remains uncertain amid shifting political dynamics.

CAT assessment: The U.S. is rated "insufficient" due to policy volatility and lack of a comprehensive federal framework. While the Inflation Reduction Act (IRA) represents a major step forward, its viability faces significant uncertainty, particularly in light of a Trump administration that has signalled a rollback of climate commitments, potential weakening of EPA authority, and renewed support for fossil fuels. This raises concerns about inconsistencies in federal climate leadership and the continued reliance on state-level initiatives to drive progress. The absence of legally binding federal climate targets leaves the U.S. vulnerable to frequent shifts in policy direction depending on electoral outcomes.

3.1.5 Switzerland

Switzerland has a central framework law, the CO_2 Act, which establishes national CO_2 emissions targets and mandates measures across sectors, setting binding emissions reductions for the country. The CO_2 Act was updated and expanded in 2023 by the Federal Act on Climate Protection Goals, Innovation, and Strengthening Energy Security, with enhanced funding for innovation and green technology.

- **Federal Office for the Environment** (FOEN): Coordinates climate policies at the national level, ensuring alignment with cantonal initiatives.
- **Decentralized Governance**: Cantons create local climate action plans supported by national funding to achieve Switzerland's climate goals.
- **National Funding Support**: Regular funding from the federal government assists cantons in implementing regional climate strategies, promoting emissions reduction and resilience initiatives at the local level.

CAT assessment: Switzerland is rated "almost sufficient," reflecting leadership in integrating climate goals into decentralized governance, but requires additional measures to enhance renewable energy deployment and emissions reduction in transportation and agriculture for full alignment with 1.5°C goals.

3.1.6 Brazil

Brazil does not have a single comprehensive framework law on climate change. Instead, it uses a combination of fiscal transfers and high-level environmental policies to incentivize conservation and support climate resilience across states.

- **National Policy on Climate Change** (PNMC): While Brazil lacks a binding framework law, the PNMC provides high-level emissions reduction targets and climate goals for states to follow, with sectoral targets for regions.
- **ICMS Ecológico**: A fiscal mechanism linking state tax revenue distribution to environmental conservation, incentivizing sustainable practices.
- **Amazon Fund**: Recently strengthened to channel resources to reduce deforestation and support reforestation in the Amazon region.
- **Ministry of Environment** (MMA): Oversees national policies and coordinates with states on environmental and renewable energy initiatives.
- **National Development Bank** (BNDES): Finances green infrastructure, ensuring regional governments have access to funds for sustainable development.

CAT assessment: Brazil is rated "highly insufficient," highlighting the fact that deforestation in the Amazon remains a critical issue, undermining Brazil's global climate commitments, and that substantial reforms are needed to address illegal logging and land use.

3.1.7 Indonesia

Indonesia does not have a single framework law, and relies on multiple policies and decentralized financing mechanisms to promote climate resilience and adaptation.

- **National Action Plan on Climate Change Adaptation**: Provides a high-level policy framework for addressing climate resilience across sectors.
- **Dana Alokasi Khusus (DAK) Lingkungan Hidup (Special Allocation Fund for Environmental Affairs)**: Allocates resources to regional governments for reforestation, waste management, and other sustainable practices.
- **Ministry of Environment and Forestry**: Sets environmental standards and supports local climate resilience initiatives.
- **Village Fund** (Dana Desa): Originally focused on rural development, now includes climate resilience, encouraging local adaptation strategies.
- **Carbon Tax Revenue Distribution**: Distributes revenue from carbon taxes, promoting sustainable practices across localities.

CAT assessment: Indonesia is rated "highly insufficient," underscoring the need to expand policy ambition and strengthen implementation at the local level. Limited sectoral coverage and weak enforcement mechanisms remain significant barriers to progress.

3.1.8 South Africa

South Africa has recently enacted a central framework law, the Climate Change Bill, which will be the country's first comprehensive climate legislation, setting legally binding emissions targets and establishing a framework for resilience and sustainable development.

- **Adaptation Framework and Climate Resilience Funds**: National adaptation plans allocate grants to provinces based on climate risk, enabling tailored regional responses.
- **Department of Environment, Forestry and Fisheries** (DEFF): Coordinates climate policy across national, provincial, and local levels, ensuring cohesive efforts.
- **South African National Biodiversity Institute** (SANBI): Focuses on integrating climate resilience into biodiversity conservation.
- **Green Fund**: Managed by the Development Bank of Southern Africa, this fund finances regional projects in renewable energy and water management, supporting climate goals across provinces.
- **Just Energy Transition Partnership (JETP)**: Launched in 2021, the JETP mobilized $8.5 billion in international finance from countries to support South Africa's transition away from coal. The partnership focuses on decommissioning coal plants, developing renewable energy, and addressing the socio-economic impacts on coal-dependent communities. While promising, its success depends on effective utilization of funds, robust governance mechanisms, and coordination between national and provincial levels.

CAT assessment: South Africa is rated "insufficient," reflecting progress but highlighting gaps in implementation and funding for subnational initiatives. The JETP represents a significant opportunity for South Africa to address these gaps, but its outcomes will rely heavily on the government's ability to integrate international finance into its broader climate strategy.

3.1.9 China

China does not have a single, central framework law for climate change. Instead, it employs a centrally coordinated, multi-sectoral strategy, integrated within broader national development and regional green development plans. Recent legislative efforts, including the new Energy Law, aim to provide a cohesive framework to support China's energy transition, enhance energy security, and achieve climate targets.

- **Five-Year Plans and Climate Goals**: Climate objectives are embedded within China's Five-Year Plans, with the 14th Plan targeting peak carbon emissions by 2030 and carbon neutrality by 2060. These plans serve as roadmaps for sustainable development across sectors.
- **Renewable Energy Law and Subsidies**: China's Renewable Energy Law promotes solar, wind, and hydropower development, providing subsidies and incentives that enable provinces to leverage local renewable resources according to their geographic advantages.

- **New Energy Law** (Effective January 1, 2025): This recently-adopted law establishes a comprehensive framework for energy management and is central to China's emissions targets. Key provisions include:
    - Development and use of renewable energy, such as wind, solar, biomass, geothermal, and hydrogen.
    - Construction of a modernized power grid capable of supporting high levels of renewable integration.
    - Energy security measures, emergency management protocols, and a unified electricity market by 2030 to facilitate renewable energy integration.
- **National Carbon Market**: China's Emissions Trading System (ETS), launched in 2021, initially covers the power sector and allows for regional flexibility, supporting tailored emissions reduction approaches across provinces.
- **Ministry of Ecology and Environment (MEE)**: The MEE oversees climate policy at a national level, working with regional governments to implement and monitor policies that align with national climate objectives, ensuring coordinated action across sectors.
- **Green Development Funds**: Established in 2020, the National Green Development Fund finances regional adaptation and emissions reduction projects, demonstrating China's approach to government-led green financing in support of sustainable development goals.
- **Integrated approach**: Strengthened by the new Energy Law, China's climate governance framework tries to align economic development with sustainable practices, emphasizing renewable expansion, regional adaptability, and green financing to meet its long-term climate goals.

CAT assessment: China is rated "highly insufficient," with significant progress in renewable energy but continued reliance on coal-fired power plants and lack of stringent absolute emission caps as major barriers to 1.5°C alignment.

3.1.10 New Zealand

New Zealand offers a well-structured and comprehensive approach to climate governance, underpinned by its Climate Change Response (Zero Carbon) Amendment Act of 2019. This legislation sets legally binding targets and institutionalizes oversight mechanisms, ensuring accountability and consistency in climate action.

- **Climate Change Response (Zero Carbon) Amendment Act:**
    - The Act mandates net-zero carbon emissions by 2050, with specific provisions for biogenic methane reductions (10% by 2030 and 24-47% by 2050, compared to 2017 levels).

- Establishes a system of five-year emissions budgets, providing a clear and incremental pathway to achieve climate targets.
- Requires the preparation of National Adaptation Plans to address vulnerabilities and climate risks.

- **Climate Change Commission (CCC):**
  - The CCC is an independent advisory body that provides evidence-based recommendations to the government on setting emissions budgets and policies.
  - It monitors progress and publishes regular reports, ensuring government accountability.
  - Facilitates public and stakeholder engagement, including indigenous Māori communities, to ensure inclusivity.
- **Emissions Trading Scheme (ETS):**
  - New Zealand operates a cap-and-trade ETS, covering multiple sectors such as energy, waste, forestry, and agriculture.
  - Revenue generated from the ETS is reinvested in climate adaptation, renewable energy, and other green projects.
- **Sector-Specific Focus on Agriculture:**
  - Recognizing that agriculture accounts for nearly half of its total emissions, New Zealand has adopted a unique approach to reduce biogenic methane emissions while providing transitional support to farmers.
  - Financial incentives encourage the adoption of sustainable farming practices and technological innovations.
- **Community and Māori Involvement:**
  - New Zealand's approach emphasizes collaboration with Māori communities, incorporating traditional ecological knowledge into climate policies.
  - Specific programs address the socio-economic impacts of climate change on indigenous groups, ensuring equitable participation in climate action.

CAT Assessment: New Zealand is rated "almost sufficient," reflecting robust frameworks but needing additional measures to achieve net-zero by 2050 in particular the need for greater ambition in reducing emissions from transport and other high-emission sectors.

3.2 Key Takeaways for India:

These international examples provide a range of fiscal federalism models India could adapt to enhance its climate governance framework:

I. Decentralized Financial Incentives

India could follow the lead of countries like Germany, Canada, and New Zealand, which have established mechanisms that provide autonomy and incentives to subnational governments based on climate performance.

- **Germany**: Sector-specific emission budgets and the integration of climate targets within states' plans align national and subnational goals effectively. India could adopt a similar approach, setting emission budgets across sectors and rewarding states for performance.
- **New Zealand**: The system of five-year emissions budgets, combined with legal mandates for net-zero by 2050, offers a structured, decentralized model to drive state-level action. India could develop state-specific targets aligned with broader national objectives.
- **China**: Integration of climate objectives in its Five-Year Plans demonstrates how aligning climate policies with economic growth can incentivize states to actively participate in achieving national goals. India's own development plans could embed climate goals more comprehensively to encourage state compliance and integration.

II. Public-Private Partnerships and Capacity Building

Countries such as Brazil, Australia, and New Zealand demonstrate the importance of leveraging public-private partnerships and building technical capacity:

- **Brazil**: Fiscal mechanisms incentivize sustainable practices by linking state-level revenue with conservation outcomes, particularly through the ICMS Ecológico and Amazon Fund. India could emulate this model to mobilize resources for climate resilience.
- **New Zealand**: Sector-specific focus on agriculture and investment in sustainable farming practices highlight the importance of targeting high-emission sectors with tailored solutions. India could support similar efforts in agriculture by creating dedicated funds and providing technical support to high-emission states.
- **Australia**: The Clean Energy Finance Corporation (CEFC) model demonstrates how green banks can partner with the private sector to fund renewable energy projects. Establishing such institutions could boost India's clean energy transition.

III. Targeted Environmental Funds

Inspired by Indonesia's and Switzerland's models, India could establish funds based on state-specific climate needs, enabling more effective local adaptation strategies:

- **Indonesia**: The Carbon Tax Revenue Distribution showcases how revenues from carbon pricing can be reinvested in state-level climate initiatives.
- **New Zealand**: Reinvestment of emissions trading revenue into renewable energy and adaptation projects demonstrates how targeted funds can support region-specific priorities while ensuring financial sustainability.

• **South Africa**: The Just Energy Transition Partnership (JETP) offers an innovative funding model for coal-dependent regions transitioning to renewable energy. India could explore similar financing for its coal-intensive states like Jharkhand and Chhattisgarh.

IV. Carbon Pricing with Revenue Sharing

Similar to Canada and Indonesia, India could implement flexible carbon pricing, with revenue shared back to states to support regional climate initiatives (Thomas, 2023):

• **Canada**: The Output-Based Pricing System (OBPS) ensures industrial competitiveness while incentivizing emissions reductions. India could adopt a similar mechanism for energy-intensive industries (Box 1).

• **New Zealand**: The cap-and-trade emissions trading scheme (ETS), covering multiple sectors, provides a robust framework for India to develop its own sector-specific ETS, with revenues reinvested in climate resilience.

• **China**: The National Carbon Market highlights the potential of piloting regional carbon markets for India's energy and heavy industries.

• **Germany** (EU ETS): The EU's absolute carbon pricing through auction-based systems offers a clear, predictable model India could adapt to set stronger market signals while minimizing loopholes.

Box 1. Canada's Carbon Pricing Model: Lessons for India

Canada's dual carbon pricing model—combining an Output-Based Pricing System (OBPS) for industries with consumer-facing carbon pricing—offers valuable insights for India's carbon pricing strategy. This framework balances flexibility, equity, and emissions reductions across sectors, providing a pathway that can be tailored to India's diverse economic landscape and federal structure.

1. Output-Based Pricing System (OBPS):

- **Mechanism:** Sets emissions intensity benchmarks for high-emission, trade-exposed industries like steel, cement, and chemicals. Firms pay only for emissions exceeding these benchmarks, with those below the threshold receiving credits or allowances.
- **Relevance to India:** The OBPS approach can help India balance industrial growth and emissions reductions. With a rising manufacturing sector, particularly in energy-intensive industries, India can adopt an intensity-based pricing system to encourage cleaner production. However, transitioning to absolute carbon pricing over time—especially in trade-exposed industries—would offer more consistent, predictable market signals, encouraging deeper decarbonization. A phased approach would allow industries in coal-dependent regions to transition without hindering economic growth.

2. Consumer-Facing Carbon Pricing:

- **Mechanism:** Applies to fuels and carbon-intensive products, directly engaging individuals and small businesses. Revenue from this pricing is often recycled back into the economy through rebates, tax credits, or investments in green projects.
- **Relevance to India:** Ensures broader participation and public acceptance by redistributing revenues to vulnerable communities, such as coal-dependent regions and low-income households.

Adapting Canada's Model to India's Federal Structure

India's federal structure, marked by significant regional disparities, requires a tailored carbon pricing approach. Canada's fiscal federalism model provides a blueprint:

1. Federal Framework with State Flexibility:

- A national system with minimum benchmarks allows states to innovate based on their unique contexts. For instance, Gujarat could pursue ambitious renewable energy goals, while coal-dependent states like Jharkhand might require phased implementation.

2. Revenue Recycling and Redistribution:

- Carbon pricing revenues should return to states for investments in local priorities, such as renewable energy, climate-resilient infrastructure, and disaster management.
- Equitable redistribution can address regional disparities and foster public support, mirroring Canada's rebate system for households.

3. Integration of the Power Sector:

- OBPS-like mechanisms can set intensity benchmarks for power generators, encouraging cleaner energy production without increasing costs for consumers.
- Addressing financial losses in electricity distribution companies (discoms) is critical. Discom reforms—subsidy rationalization, linking payments to performance metrics, and debt restructuring—could improve their finances, enabling investments in renewable energy integration and emissions reductions.

4. Incentives for Innovation:

- States achieving emissions targets or implementing innovative carbon pricing mechanisms can be rewarded with additional funding to promote healthy competition and ambition.

5. Complementary Mechanisms:

- Feebates (fees for above-average emissions and rebates for below-average emissions) could complement carbon pricing, offering flexibility while reducing administrative complexity, and it could be applied in specific sectors like transportation and manufacturing.

Challenges and Considerations

- **Economic Disparities:** A tiered pricing approach can balance growth and emissions reductions in less-developed states.

- **Discom Financial Challenges:** Financially viable discoms are essential for integrating carbon pricing in the power sector. Revenues from carbon pricing could help alleviate discom losses and fund modernization efforts.
- **Public Awareness:** Transparent communication and equitable revenue recycling are crucial to gaining public acceptance and ensuring the system's success.

Conclusion Adopting Canada's dual carbon pricing model offers India a structured yet flexible pathway to achieving its emissions goals while addressing developmental needs. Integrating revenue recycling, regional flexibility, discom reforms, and complementary mechanisms like feebates – along with a shift toward absolute carbon pricing for trade-auctioned sectors – could enable India's transition to a sustainable, low-carbon economy without compromising economic growth.

V. Institutional Support for Local Adaptation

India could establish an independent Climate Commission, modeled after South Africa's and New Zealand's frameworks:

• **South Africa**: The Climate Change Act aligns national goals with localized adaptation efforts, offering lessons for India in integrating state-level priorities into federal strategies.
• **New Zealand**: The Climate Change Commission (CCC) ensures independent oversight and monitoring of climate policies. India could establish a similar institution to depoliticize climate action and provide technical and financial guidance to states.

VI. Strengthening the State Finance Commissions (SFCs)

While the Finance Commission plays a role in national-level fiscal transfers, as discussed later in this paper, India's State Finance Commissions (SFCs) could be leveraged to allocate climate funds at the local level—an approach similar to Switzerland's cantonal system. This would ensure that local bodies (municipalities, panchayats) have direct access to climate-responsive fiscal transfers.

VII. Coordination and Accountability Challenges

Ensuring transparency in climate finance and accountability in achieving targets is critical:

• **Germany**: While Germany's Federal Ministry for Economic Affairs and Climate Action (BMWK) plays a key role in Energiewende, coordination challenges exist between federal and state governments, leading to inconsistent implementation of policies. India must ensure vertical integration across government levels to avoid similar bottlenecks.

• **United States**: Given the potential for political shifts, U.S. climate policies are highly dependent on electoral cycles. India must avoid this instability by ensuring legislative backing for climate actions at all levels.

• **Canada**: Progress reports and independent audits ensure compliance and alignment. India could implement similar mechanisms, involving institutions like the Comptroller and Auditor General (CAG), to ensure state-led climate projects are aligned with national objectives and provide value for money

3.3 Adapting Global Models to India's Context

India's diversity in climate vulnerabilities and socio-economic conditions necessitates a flexible yet robust approach. Lessons from international experiences (Table 2) can be tailored to India's needs at every level of governance by:

- Embedding climate goals in national and state plans: This would ensure alignment between economic development and climate resilience, similar to China's integration of climate objectives in its Five-Year Plans.
- Establishing targeted funds for vulnerable states and regions: Following models like Indonesia's carbon tax revenue distribution, India could direct funds where they are most needed.
- Providing fiscal incentives for achieving state-level climate targets: Drawing from Brazil's ICMS Ecológico, fiscal transfers could reward states that show measurable climate performance.
- Encouraging innovation through public-private partnerships and capacity building: Supporting green financing models, as demonstrated by Australia's Clean Energy Finance Corporation, could help India attract private investment and foster clean technology solutions.

Drawing from the international experiences discussed, India must focus on creating a cohesive yet decentralized framework for climate governance. The country can adapt successful models by integrating sector-specific targets, financial incentives, and accountability mechanisms that support states' diverse needs. A comprehensive, structured approach will ensure that both national and regional climate goals are met, and that India's transition to a low-carbon economy is just and inclusive.

As well documented in the literature, a central, legally-binding climate framework, paired with decentralized adaptation strategies and targeted financial mechanisms, will be critical to help India achieve its ambitious climate goals while addressing regional disparities. This balanced approach, fostering innovation and ensuring transparency, will pave the way for India's successful climate governance transformation.

Additionally, India should explore a centralized regulatory approach for mitigation—where uniform standards prevent free-ridership—while enabling decentralized adaptation measures to address regional vulnerabilities effectively.

By adapting these models to its unique federal structure, India can create a cohesive yet decentralized framework for climate governance. A strong institutional backbone, coupled with financial incentives and transparency mechanisms, will be essential to achieving India's climate goals while ensuring sustainable development.

The following table summarizes the experiences of 10 countries with comprehensive climate frameworks, with lessons for India.

Table 2. Analysis: Lessons from Key Countries

Country	Key Features	Lessons for India
Germany	Federal Climate Protection Act (Klimaschutzgesetz) mandates legally binding sector-specific emission budgets and annual targets. The National Climate Initiative funds subnational projects.	India could adopt sector-specific emission budgets across industries and create a National Climate Fund for subnational projects, ensuring that states align with national goals.
Canada	Net-Zero Emissions Accountability Act (2021) mandates national net-zero targets by 2050 and uses flexible carbon pricing (OBPS).	Flexible carbon pricing systems with fiscal incentives for states to ensure compliance and equity.
Australia	State-led initiatives dominate, complemented by the federal Emissions Reduction Fund and Clean Energy Finance Corporation, which support renewable projects and adaptation measures.	Decentralized climate initiatives allow for state-specific solutions; India can establish a Green Bank at the national level, while empowering states to implement specific climate policies tailored to their needs (e.g. coastal, agriculture- focused, etc.)
United States	No federal framework law; states lead with individual policies like California's cap-and-trade program and the Regional Greenhouse Gas Initiative (RGGI).	Allow states to set their own ambitious targets, supported by federal funding mechanisms, while aligning national policies like renewable energy promotion.
Switzerland	The CO_2 Act (2023) integrates federal and cantonal policies, supported by decentralized governance and national funding.	Decentralized climate action with federal funding can empower Indian states while maintaining national oversight.
Brazil	National Policy on Climate Change (PNMC) establishes high-level emissions targets. Incentives like the ICMS Ecológico link fiscal transfers to environmental conservation, while the Amazon Fund supports reforestation efforts.	Incentivize state conservation efforts by linking fiscal transfers to environmental outcomes and creating dedicated funds.
Indonesia	Decentralized funding mechanisms like Carbon Tax Revenue Distribution and Dana Desa support local adaptation.	Establish state-specific funds for local climate adaptation strategies. A decentralized framework, like Indonesia's, could address India's diverse climate challenges.
South Africa	The Climate Change Bill sets national adaptation frameworks and legally binding mitigation targets, supported by targeted funds like the Green Fund for regional initiatives.	Targeted regional funds for adaptation can address the diverse needs of India's states and national coordination.

Country	Key Features	Lessons for India
China	Centralized, sector-specific targets embedded in Five-Year Plans. The National Carbon Market covers the power sector and promotes regional flexibility.	Embed climate goals within India's development plans and pilot regional carbon markets for energy and heavy industries.
New Zealand	Zero Carbon Act (2019) establishes legally binding targets for net-zero emissions and emission budgets. Independent Climate Change Commission ensures oversight and accountability.	India can benefit from an independent oversight body to depoliticize climate action and ensure continuity across government administrations.

4. Specific Proposals for India's Institutional Structure

India's institutional framework for addressing climate change requires significant enhancements to ensure cohesive and effective action across governance levels. Drawing on successful international and domestic models, these proposals aim to establish a stronger foundation for climate governance in India, fostering collaboration and capacity-building while addressing local developmental priorities. However, these proposals will, of course, need to be carefully developed for their full consistency with India's needs.

I. Establish a Clear Legal Framework for Climate Action

As Pillai and Dubash (2023) have emphasised, a robust legal framework is the foundation for effective climate action, providing clear mandates, timelines, and enforcement mechanisms.

- **Comprehensive National Climate Law**: A unified national climate law carefully tailored to India's federal context and diversity is needed. It would provide the necessary legal backbone to climate action across India, clarifying roles, timelines, and sectoral targets to ensure cohesive and enforceable measures. This should include clear mechanisms for implementation, enforcement, and review, ensuring states know their obligations and timelines. As Dubash et al. (2020) and Pillai and Dubash (2023) highlight, the absence of a single, overarching climate law in India has led to fragmented policy implementation across states, with climate action being pursued through sector-specific policies that lack legal enforceability and long-term coordination
- **Inclusive Approach**: This law should not only regulate emissions but also guide development choices, ensuring that all new policies, infrastructure, and planning decisions align with low-carbon and climate-resilient goals. It must provide enforceable mandates, sectoral targets, and institutional structures for review and enforcement. Additionally, the law must embed principles of social equity, ensuring vulnerable populations are prioritized in adaptation and resilience measures. According to a number of studies, such laws must also include social equity measures, to address the impacts on marginalized groups.

Current Challenges: India does not yet have a comprehensive climate law, which means climate policies are often pursued through sector-specific laws that were not initially designed with climate change in mind. This leads to fragmented and reactive approaches that lack enforceability and fail to promote cohesive climate governance across sectors. Without a dedicated climate law, it is challenging to establish long-term strategies that align with both national and state priorities. Moreover, addressing the environmental goals in the (now dated) Environment (Protection) Act, 1986, requires a modernized approach. The challenge is for India's law to carefully balance a regulatory approach (focused on emissions reduction) with an enabling approach (integrating climate resilience into broader development goals) while aligning climate policy with India's developmental priorities.

II. Strengthen the Role of State Governments

Empowering state governments is crucial for tailoring climate action to local conditions and fostering innovative, region-specific solutions:

- **Decentralized Implementation**: Empower states with greater fiscal and legal autonomy to tailor climate actions to local conditions. Decentralization should include mandates for local adaptation plans at the district and municipal levels to address region-specific vulnerabilities, such as urban flooding or rural drought. Pillai (2023) argues that decentralization promotes better-targeted climate solutions and enhances local responsiveness.
- **State-Level Climate Action Plans (CAPs)**: Each state must develop dynamic CAPs, regularly updated with new data and climate projections. These plans should address both emissions reductions and adaptation needs, integrating inputs from local communities and experts to ensure equitable development. Dubash (2019) highlights that while many states have made significant strides, their plans remain insufficiently aligned with national targets and often lack the institutional capacity for implementation. (Box 2 summarizes lessons from the past CAPs).
- **State Climate Commissions**: Establish state-level climate commissions that coordinate between local governments, industries, and civil society. These commissions should align state efforts with national goals while fostering innovation and best practices within the state. They should work closely with a newly established national low-carbon development commission to ensure coherence across India.
- **State Finance Commissions** (SFCs): SFCs should be tasked with allocating climate finance equitably across local governments, ensuring that resources are directed towards climate adaptation and mitigation projects at the grassroots level. Integrating SFCs into climate finance allocation will promote efficient fiscal federalism and improve local accountability.

Box 2: Lessons from State Action Plans on Climate Change (SAPCCs)

Since their inception in 2010-11 as part of the National Action Plan on Climate Change (NAPCC), State Action Plans on Climate Change (SAPCCs) have offered critical lessons for improving state-level climate governance in India:

- **Strengths:**
  - Enhanced awareness and action at the state level, especially in sectors like water, agriculture, and forestry.
  - Some states, like Odisha and Tamil Nadu, have integrated climate adaptation into disaster management (MoEFCC, 2022)
- **Challenges:**
  - SAPCCs often lack alignment with the NAPCC and national policies.
  - Insufficient funding and capacity hamper implementation (Rao, 2021).
  - Limited stakeholder engagement at the local level reduces effectiveness (Singh and Sharma, 2020).
- **Lessons Learned:**
  - Strengthen vertical and horizontal coordination to ensure SAPCCs complement national goals.
  - Enhance funding and technical support from the central government (Dubash et al., 2020),
  - Periodically revise SAPCCs to integrate updated climate data and science (ICRIER, 2021)

Implications for Future Policy:

To address these challenges, India must institutionalize mechanisms to ensure greater integration and provide states with financial and technical resources to update and implement SAPCCs effectively.

Current Challenges: India's current centralized structure restricts the ability of states to implement localized climate solutions effectively. States have limited fiscal and legal autonomy to drive their own climate agendas, resulting in a top-down dominance that stifles local innovation and responsiveness to specific climate vulnerabilities. Expanding state roles is critical to fostering more effective and context-specific climate responses, particularly in addressing regionally distinct vulnerabilities such as drought-prone agriculture or coastal resilience planning. Greater fiscal and legal autonomy would enable states to innovate and implement locally tailored climate strategies while ensuring accountability mechanisms align with national goals.

III. Enhance Coordination Mechanisms

Effective intergovernmental coordination is essential for aligning national, state, and local climate actions. Among these, Pillai and Dubash (2023) highlight the need for institutional platforms to resolve conflicts, align goals, and share best practices.

- **Intergovernmental Coordination Council**: Form a permanent climate-focused council comprising central, state, and local government representatives. This body should ensure inter-

ministerial and inter-state collaboration on climate action. For instance, it should address cross-border challenges such as shared water resources, air pollution, and energy grids. The Council would provide a formal platform for dialogue, coordination, and conflict resolution.

- **Integrated Planning**: Embed climate considerations into all national and state development plans. Require joint ministerial accountability for meeting climate goals, particularly in energy, agriculture, transport, and urban planning. A climate resilience framework should be integrated into urban master plans, emphasizing sustainable transport, flood defences, and green infrastructure.

Current Challenges: The existing National Steering Committee on Climate Change (NSCCC) and other intergovernmental forums discussed earlier in the paper (such as the PMCCC or AIPA) are not equipped to handle comprehensive climate coordination across states. They often focus on ensuring uniformity rather than facilitating deep collaboration. Lack of a dedicated climate platform prevents states from jointly addressing cross-border issues like river basin management and air pollution,

IV. Legal Mandates for Financial Mechanisms

Dedicated financial mechanisms are essential to sustain climate action across governance levels.

- **Climate Finance Allocation**: Introduce budget tagging to track and report climate-related expenditures across all levels of government. Establish a dedicated Climate Fund to support state and local initiatives, prioritizing high-impact projects and innovations. World Bank, 2022 advocates performance-based incentives to reward states that exceed climate targets or lead in adaptation and mitigation measures.
- **Incentives for States**: Channel part of the climate finance to fund R&D in renewable energy, sustainable farming practices, and urban resilience technologies. Legal provisions for performance-based financial incentives would reward states that demonstrate leadership and effectiveness in climate action.

Current Challenges: India's current climate finance mechanisms are insufficient to meet the vast investment needs of climate resilience and mitigation. The lack of a dedicated and consistent funding mechanism limits long-term planning and restricts states' ability to initiate impactful projects. Additionally, central government funding often comes with restrictive criteria that may not align with local priorities (IMF, 2021).

V. Accountability and Transparency

A robust accountability framework ensures that climate funds are used effectively and achieve intended outcomes.

- **Mandatory Reporting**: Implement a national climate reporting framework that requires states to submit periodic progress reports. Reports should include metrics on emissions reductions, adaptation progress, and financial expenditures. Make all climate progress reports publicly available to enhance accountability. Leverage digital platforms to engage citizens in monitoring and reporting on local climate initiatives (CAG, 2022).
- **Independent Audits**: Pillai and Dubash, 2023 argue that regular, independent audits by India's Comptroller and Auditor General (CAG) would verify that funds are being used appropriately, strengthening domestic and international confidence in India's climate policies.

VI. Public Participation and Rights-Based Approach

Public engagement and the protection of environmental rights are vital for ensuring equitable and effective climate action.

- **Public Involvement:** Grassroots consultations in climate planning can strengthen resilience by aligning policies with community needs. Kenya's bottom-up adaptation approach offers a model, engaging local bodies in climate initiatives to ensure equitable policy implementation (Wanjiru, 2021). Successful models in India, such as Tamil Nadu's Climate-Sharp Village Project and Maharashtra's Jalyut Shivar Abhiyan should be well integrated (Sharma, 2020).
- **Environmental Rights:** Strengthening environmental rights would help citizens hold governments accountable. Mechanisms such as the National Green Tribunal (NGT) play a critical role in adjudicating environmental disputes, and expanding legal pathways for climate-related grievances would reinforce India's commitment to sustainable development (Pillai and Dubash, 2023; CSE, 2021).

Current Challenges: While India's institutional structure includes some mechanisms for public engagement, these are often limited to high-level consultations. There is a need for greater inclusion of local stakeholders, particularly vulnerable communities, in decision-making processes to ensure that climate policies are equitable and reflective of on-the-ground realities.

Successful Practices at States: As mentioned above and as Annex 2 highlights, there are already many successful climate-change practices in states with greater community-led initiatives and public engagement—in areas like renewable energy adoption, water conservation, and sustainable farming practices. These practices provide good models to be used across India to build community and public engagement in implementing climate change policies.

VII. Legal Support for Mitigation and Adaptation

Tailored sectoral regulations can ensure effective mitigation and adaptation efforts.

- **Sectoral Regulations:** Tailoring climate regulations for key sectors would provide clear and enforceable standards, ensuring sectors like energy and transport contribute effectively to

mitigation and adaptation goals. This could include specific mandates for renewable energy adoption, green building standards, and waste management reforms.

- **Climate-Resilient Infrastructure:** Enforcing standards for climate-resilient infrastructure would mitigate the risks of climate impacts on public assets, enhancing long-term sustainability and reducing future costs related to climate damage and adaptation.

Current Challenges: India's focus has been predominantly on mitigation through renewable energy targets, while adaptation efforts are less emphasized and often lack dedicated institutional support. There is a need for regulations that specifically address climate resilience across sectors, especially those heavily affected by climate impacts such as agriculture and water resources.

VIII. Capacity Building and Knowledge Sharing

Capacity building is critical for enabling subnational governments and institutions to implement effective climate strategies.

- **Formal Capacity Building Mandates:** Create a national technical assistance program to strengthen subnational governments' ability to implement climate initiatives. Training programs should focus on building local expertise in renewable energy, climate-smart agriculture, and urban resilience.
- **Research and Innovation:** By encouraging state-level research and innovation, India can also tap into localized knowledge and foster innovations suited to regional climate challenges—including the timing of reductions in methane and nitrous oxide. Providing tax incentives or grants would stimulate investment in climate technology and solutions.

Current Challenges: India's subnational governments often lack the technical capacity to implement climate adaptation and resilience initiatives effectively. This is recognized internationally as a key constraint. The federal government can play a crucial role by establishing units with the necessary capacity and then transferring this expertise to the states. The capacity gap hampers the ability to plan and respond to climate threats and limits access to data and expertise needed for local-level innovation.

IX. Legal Mechanisms for Conflict Resolution

Effective dispute resolution mechanisms are essential for addressing inter-state and state-centre disagreements over climate resources, governance, and funding allocations.

- **Dispute Resolution:** Establish climate arbitration panels to resolve disputes between states or between states and the central government. These panels should address resource-sharing conflicts (e.g., river basins) and disagreements over climate-related funding allocations. Given India's federal structure, strengthening intergovernmental conflict resolution mechanisms is

essential to ensuring that states can pursue coordinated climate policies without unnecessary legal or political gridlock (Pillai and Dubash, 2023).

Current Challenges: India's existing dispute resolution mechanisms, such as the Inter-State Council, are not fully utilized for climate-related issues. Many climate-related conflicts—including disputes over water resources, forest conservation, and energy policy—remain unresolved due to the absence of a climate-specific arbitration mechanism. ICRIER (2021) highlights that many of India's climate disputes, such as those concerning river basin management, remain politically sensitive and lack structured mechanisms for resolution. Sharma and Rao (2020)argue that arbitration could provide a neutral and systematic approach to addressing disagreements on funding allocations and responsibilities among different levels of government.

Structured climate arbitration could facilitate smoother conflict resolution, particularly for contentious issues like river basin management and shared resources, which are likely to intensify as climate impacts worsen. Dubash et al. (2020) emphasize the need for institutional mechanisms to prevent climate-related disputes from derailing policy progress.

X. Long-Term Monitoring and Legislative Review

Monitoring and periodic review of climate policies are critical for ensuring long-term success and adaptability.

- **Monitoring Framework:** A long-term monitoring framework would provide a consistent, data-driven basis for tracking climate impacts and policy effectiveness. Establishing climate observatories at the national and state levels would enable systematic data collection and analysis to inform decision-making. MoEFCC (2022) highlights the importance of real-time climate data for ensuring that policies remain adaptive to changing environmental conditions.

  The framework should incorporate independent climate assessments conducted by research bodies, such as ICRIER, NIPFP, and CSE, to provide unbiased evaluations of India's climate strategies (ICRIER, 2021). Additionally, ensuring that state-level climate monitoring units align with national goals would help in aggregating climate data across regions.

- **Periodic Legislative Review:** Regular reviews of climate legislation would ensure that laws remain relevant and responsive to scientific advancements, technology developments, and shifting climate realities. This adaptive approach would keep India's climate policy agile and effective.

  Pillai and Dubash (2023) argue that India's legal framework must be periodically reviewed and updated to remain in line with international climate commitments, such as those under the Paris Agreement. Additionally, Dubash et al. (2020) highlight that periodic legislative reviews help maintain alignment between climate goals and India's socio-economic priorities.

Current Challenges: India lacks a centralized framework for monitoring and reviewing climate policies, which limits the ability to adapt and refine strategies based on progress and emerging data.

The absence of standardized indicators for emissions reductions, adaptation efforts, and financial expenditures has made it difficult to track national and state performance in a meaningful way (Pillai and Dubash, 2023).

CAG (2022) recommends that climate expenditure tracking should be integrated into India's budgetary processes to ensure transparency and accountability in climate-related financial flows. IMF (2021) similarly emphasizes the importance of climate finance audits in strengthening governance and attracting international climate investments.

Summary: A Framework for Federal Response

By implementing these proposals and addressing the identified challenges, India can establish a more effective institutional framework for climate action. This would:

- Empower state governments with the autonomy and capacity to lead climate initiatives.
- Ensure transparent and accountable financial flows, improving climate finance governance.
- Foster intergovernmental collaboration for coordinated policy implementation.
- Develop structured mechanisms for climate dispute resolution between states and the central government.
- Institutionalize long-term monitoring mechanisms for policy evaluation and adaptation.

Through a decentralized approach that aligns national and state efforts, India can leverage its federal structure to drive meaningful progress on climate goals. By drawing from international best practices and adapting lessons from other federal systems, India can design an institutional climate framework that is both legally robust and socio-economically inclusive.

5. Role of the Finance Commission in India

India's Finance Commission has increasingly recognized the importance of environmental conservation in fiscal planning. In recent years, it has incorporated ecological criteria into its horizontal resource allocation framework to encourage sustainable practices at the state level.

The 14th Finance Commission (2015–20) made a notable step by including forest cover as a criterion for resource allocation, assigning it a 7.5% weight among other criteria. The 15th Finance Commission (2021–26) increased this weight to 10%, further incentivizing states to maintain and expand forest cover. Both Commissions took a straightforward approach by using net forest cover as the ecological indicator within the devolution formula, alongside non-ecological factors like population, area, and income distance.

By integrating forest cover into fiscal transfers, these Commissions incentivized states to protect and grow forested areas. They argued that states should be compensated for the opportunity costs associated with maintaining forests, a consideration that helps create political space for pro-forest

policies. The 15th Commission's interim report also noted that both state and central governments advocated for a stronger focus on environmental and climate change issues during consultations.

Empirical evidence suggests that these ecological criteria in intergovernmental fiscal transfers (IGFT) have had mixed results on net forest cover in India. While some econometric studies (Busch & Mukherjee, 2017; TERI, 2019; Busch et al., 2020) show a positive correlation between IGFT and increases in net forest cover, others highlight the absence of earmarking and uncertainty about continued fiscal incentives as limiting factors. This has important implications for the 16th Finance Commission in India as it will likely look to expand its approach to climate and environmental criteria.

Looking ahead, India's climate change framework should work in tandem with the Finance Commission to ensure that climate policies are effectively implemented and incentivized across states, with a focus on financial resources, incentives, and accountability mechanisms. Considering the vastly different climate risks, resources, and capacities across India's states, and with equity in resource allocation and public service delivery already being a major plank of their mandate, the Finance Commission should be part of the process of implementing overlapping climate responsibilities in India. This approach is part of a global trend where fiscal commissions and intergovernmental bodies in federal systems come together to play a central role in climate policy and environmental governance.

5.1 Strengthening the Forest Cover Criterion in Fiscal Transfers

As of February 2025, the 16th Finance Commission has been constituted under the chairmanship of Arvind Panagariya, with its recommendations expected to cover the period from 2026 to 2031. While the specific criteria for the devolution formula are yet to be finalized, discussions are underway on expanding the ecological parameters within this framework.

Several options exist for enhancing the role of forest cover in fiscal transfers:

a) **Dynamic Forest Cover Assessment**: Instead of relying solely on static forest cover data, the Commission could implement a system that rewards states for year-on-year improvements in forest density and quality. This would encourage not only the preservation of existing forests but also active afforestation and reforestation efforts.

b) **Biodiversity and Ecosystem Services Index**: Develop an index that accounts for biodiversity richness and the provision of ecosystem services, such as carbon sequestration and water purification. States with higher scores on this index could receive greater fiscal incentives, promoting the conservation of diverse and ecologically valuable forest ecosystems.

c) **Community-Based Forest Management Incentives**: Allocate additional funds to states that successfully implement community-based forest management programs. Empowering local communities in forest conservation has been shown to enhance forest cover and health, and recognizing these efforts fiscally could strengthen participatory governance models.

d) **Integration of Climate Resilience Metrics**: Incorporate metrics that assess the role of forests in enhancing climate resilience, such as their capacity to prevent soil erosion, mitigate floods,

and maintain groundwater levels. States that effectively leverage their forests for climate resilience could be rewarded, aligning fiscal incentives with broader environmental and societal benefits.

5.2 A Legislative Mandate for Climate Action

Future climate change legislation in India could explicitly require the Finance Commission to consider climate action as a core criterion in its recommendations. This would involve integrating factors such as climate vulnerability, adaptation needs, and mitigation efforts into the criteria for distributing central funds to states.

5.2.1 International Experience

The experiences of Finance Commissions and similar bodies in other federations—such as Brazil, South Africa, and Indonesia—offer valuable insights that could help India enhance climate policy implementation through its Finance Commission:

I. Brazil: Leveraging Fiscal Transfers for Conservation

- Brazil's fiscal federalism includes environmental performance in fiscal transfers through mechanisms like the ICMS Ecológico, which links financial incentives to conservation efforts. Municipalities that protect natural resources and biodiversity receive rewards, promoting ecological stewardship.
- *Lesson for India*: Adopting a similar model could expand India's ecological fiscal transfers to support a wider range of climate actions, including reforestation, emission reductions, and climate-resilient infrastructure. The Finance Commission could structure incentives for states and local bodies that demonstrate measurable climate benefits.

II. South Africa: Targeted Funds for Climate Adaptation

- South Africa's adaptation framework emphasizes resilience, with the national government providing targeted grants to provinces and municipalities based on climate vulnerability. This decentralized approach enables tailored responses to local climate challenges.
- *Lesson for India*: The Finance Commission could create climate-resilience funds specifically for regions highly vulnerable to climate impacts, such as coastal, drought-prone, and flood-prone areas. These funds would be allocated based on vulnerability assessments, supporting adaptation initiatives across India.

III. Indonesia: Performance-Based Transfers and Local Empowerment

- Indonesia's fiscal framework includes performance-based grants that incentivize subnational governments to achieve environmental targets. Localities are rewarded for milestones like reducing deforestation or improving waste management.
- *Lesson for India*: The Finance Commission could implement performance-based funding mechanisms for states and local bodies in India, focusing on key climate indicators such as renewable energy adoption, pollution reduction, and sustainable land use. This approach would encourage accountability and progress toward national climate goals.

5.3 The Future Role of India's Finance Commission

To become a central player in climate policy implementation, and act as a bridge between policy and funding gaps, India's Finance Commission could expand its mandate to integrate environmental considerations into fiscal policy more comprehensively:

a) **Integrating with National Institutions** (e.g., NITI Aayog, Inter-State Council, RBI, MoEFCC)

b) **Expanding Ecological Fiscal Transfers to Drive Climate Goals** (e.g., carbon sequestration, renewable energy, water conservation, urban greening)

c) **Engaging with State Finance Commissions and Local Bodies for Ground-Level Implementation** (e.g., targeted grants, capacity-building programs)

d) **Institutionalizing Climate Performance Grants and Incentives** (e.g., rewards for emissions reduction, renewable energy installation, climate-resilient infrastructure)

e) **Promoting Transparency and Accountability in Climate Spending** (e.g., regular reporting, audits, public expenditure tracking)

Through strategic collaboration, targeted funding mechanisms, and adopting international best practices, India's Finance Commission can evolve into a key institution for climate action. Expanding its mandate to incorporate ecological and climate-based criteria can help drive ambitious environmental policies, ensuring effective allocation of resources and incentivizing climate leadership among states. Collaborating across federal, state, and local levels, and aligning with institutions like NITI Aayog, the Inter-State Council, and the RBI, the Finance Commission can become a unifying force in India's journey toward a sustainable and resilient future.

6. Summary and Conclusions

India's commitment to achieving net-zero emissions by 2070, as announced at COP26 in 2021, underscores the need for a robust legislative framework to guide its ecological transition. This

framework must clarify roles, enhance coordination, provide financial mechanisms, and ensure accountability across all levels of government to effectively implement climate policies.

A well-designed climate governance framework will balance adaptation and mitigation needs, ensuring that while states take the lead in resilience-building, national oversight maintains consistency in emissions reductions and regulatory coherence. By integrating fiscal federalism, transparent governance, and grassroots engagement, India can align national climate goals with regional implementation strategies.

6.1 Elements of a Legislative Framework for Climate Action in India

1. Clarification of Roles and Responsibilities

A clear delineation of duties among federal, state, and local governments is essential to prevent overlaps, foster collaboration, and ensure efficiency. The framework should specify responsibilities at each level, from setting national climate goals to implementing localized projects.

- The central government should focus on national targets, carbon pricing mechanisms, and international commitments.
- State governments should develop tailored action plans, addressing regional vulnerabilities and sectoral priorities.
- Local bodies, such as municipalities and Panchayats, should lead in community-driven initiatives, including urban greening, waste management, and disaster preparedness.

Drawing from Germany's sector-specific emission budgets and South Africa's Climate Change Bill, India could set legally binding targets for emissions reductions and introduce accountability mechanisms for states.

2. Enhanced Coordination Mechanisms

Effective climate action requires seamless coordination across ministries, departments, and states. Establishing permanent mechanisms, such as intergovernmental councils and joint committees, can help align climate policies and facilitate cross-sectoral collaboration.

- State-level climate commissions should align with a national oversight body, such as a reformed Prime Minister's Council on Climate Change or a new independent Climate Commission, modelled on New Zealand's Climate Change Commission.
- This structure can also help manage transboundary environmental issues, such as river basin management, shared forest resources, and regional air pollution control.

3. Provision of Financial Mechanisms

A comprehensive climate framework must be financially sustainable, incorporating dedicated climate funds, performance-based incentives, and long-term investment strategies.

- The Finance Commission should expand ecological fiscal transfers to reward states for broader climate actions, such as renewable energy adoption, carbon sequestration, and climate-resilient infrastructure.
- State Finance Commissions (SFCs) should be mandated to allocate climate finance equitably across local governments, ensuring that climate funds reach urban and rural local bodies.
- Carbon pricing mechanisms should incorporate absolute pricing models, such as those used in the EU's Emissions Trading System, to generate revenue for climate projects.
- Climate-responsive budgeting should be institutionalized, drawing from the Philippines' mandatory climate tagging model to track climate-related expenditures systematically.

4. Transparency and Accountability

To build public trust and ensure the efficient use of climate funds, the legislative framework must prioritize transparency in spending and policy outcomes.

- Annual climate action reports should be mandatory for states, linking progress with funding incentives.
- The Comptroller and Auditor General (CAG) should conduct climate-specific audits to ensure efficient use of resources and track climate-related expenditures.
- A national climate finance dashboard should be created to publicly track financial flows, allocations, and climate project outcomes in real-time, ensuring accessibility for policymakers, investors, and civil society.

5. Local-Level Engagement and Empowerment

Local governments play a critical role in implementing adaptation and mitigation projects. The framework should empower municipalities and Panchayats through technical assistance, financial resources, and regulatory autonomy.

- Targeted climate funds should support projects such as flood control, sustainable farming, and renewable energy adoption.
- Local capacity-building programs, in collaboration with the Ministry of Panchayati Raj, should train local officials in climate adaptation, risk assessment, and sustainable infrastructure.

6. Adaptability and Responsiveness to Scientific Advancements

Given the rapid evolution of climate science and technology, the framework must be dynamic, allowing periodic updates.

- Inspired by New Zealand's Climate Change Response Act, India could mandate five-year reviews of its climate legislation and policies to reflect new scientific findings and technological advancements.
- States should be encouraged to pilot region-specific initiatives, scaling successful approaches nationally.

7. Conclusion

India must institutionalize a comprehensive legislative framework that integrates climate finance, legal mandates, and federal cooperation while ensuring state and local-level empowerment.

A balanced approach will allow states to lead in adaptation efforts while maintaining central oversight for emissions reductions and regulatory uniformity. Carbon pricing mechanisms, particularly absolute pricing through trade-auctioned benchmarks, can serve as a financial backbone for both mitigation and adaptation efforts.

Drawing from international best practices, such as New Zealand's Climate Commission (for policy accountability), South Africa's targeted resilience funds (for climate adaptation), and Brazil's fiscal incentives for conservation (for ecological fiscal transfers), India can create a flexible, yet binding climate governance structure that supports its diverse regional needs.

Through national leadership, regional innovation, and local engagement, India has the opportunity to become a global leader in climate governance. A clear legal framework, empowered institutions, and sustainable financial mechanisms will enable India to achieve its net-zero ambitions while ensuring equitable and inclusive development for all citizens.

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Annex 1. Countries with Climate Framework Laws

This list reflects countries that have enacted comprehensive climate change framework laws, specifying national policies and legally binding targets for reducing greenhouse gas emissions. The years indicate when each law was adopted or enacted. Some laws have been amended or updated since their original adoption.

Country	Framework Climate Law	Year Adopted
Albania	Law No. 155/2020 on Climate Change	2020
Andorra	Law 21/2018 on the Promotion of the Energy Transition and Climate Change	2018
Argentina	Law 27,520 on Minimum Budgets for Adaptation and Mitigation to Global Climate Change	2019
Australia	Climate Change Act	2022
Austria	Climate Protection Act	2011
Bahamas	Climate Change and Carbon Market Initiatives Act	2022
Benin	Law No. 2018-18 Regulating Climate Change Actions	2018
Brazil	Law No. 12,187 Establishing the National Policy on Climate Change	2009
Bulgaria	Climate Change Mitigation Act	2014
Canada	Canadian Net-Zero Emissions Accountability Act	2021
Chile	Framework Law on Climate Change	2022
China	Energy Law	2024
Colombia	Law 1931 Establishing Guidelines for the Management of Climate Change	2018
Croatia	Law on Climate Change and Ozone Layer Protection	2019
Denmark	Climate Act	2014 (Revised in 2020)
European Union	European Climate Law (Regulation (EU) 2021/1119) Establishing the Framework for Achieving Climate Neutrality	2021
Fiji	Climate Change Act	2021
Finland	Climate Change Act	2015 (Amended in 2022)
France	Law No. 2021-1104 on Climate and Resilience	2021
Germany	Federal Climate Protection Act (Bundes-Klimaschutzgesetz)	2019 (Amended in 2021)

Country	Framework Climate Law	Year Adopted
Ireland	Climate Action and Low Carbon Development (Amendment) Act	2021
Kenya	Climate Change Act	2016
Mexico	General Law on Climate Change	2012
Netherlands	Climate Act (Klimaatwet)	2019
New Zealand	Climate Change Response (Zero Carbon) Amendment Act	2019
Nigeria	Climate Change Act	2021
Norway	Climate Change Act	2017
Pakistan	Pakistan Climate Change Act	2017
Peru	Framework Law on Climate Change	2018
Philippines	Climate Change Act	2009
South Africa	Climate Change Act	2024
South Korea	Framework Act on Carbon Neutrality and Green Growth to Respond to the Climate Crisis	2021
Spain	Law 7/2021 on Climate Change and Energy Transition	2021
Sweden	Climate Act	2017
Switzerland	Federal Act on Climate Protection Goals, Innovation, and Strengthening Energy Security	2023
Uganda	National Climate Change Act	2021
United Kingdom	Climate Change Act	2008

Notes:

- Belgium: While Belgium has multiple laws related to climate change, it does not have a single comprehensive climate framework law. Climate policy is coordinated through various federal and regional legislations.
- Switzerland: In June 2023, Swiss voters approved the Federal Act on Climate Protection Goals, Innovation, and Strengthening Energy Security, aiming for net-zero emissions by 2050.

Source: Climate Change Laws of the World database maintained by the Grantham Research Institute on Climate Change and the Environment.

Annex 2. India's Case Studies of Community-Led State Climate Action Plans

State	Project	Type	Primary Focus	Model	Success Highlights
Maharashtra	Jalyukt Shivar Abhiyan	Water Conservation	Groundwater recharge and drought resilience	Community-led water management	Improved water availability, reduced reliance on tankers; strong community ownership.
Maharashtra	Climate-Resilient Agriculture in Marathwada	Climate-Resilient Farming	Drought-tolerant crops and water-efficient farming	Grassroots training in climate-smart farming	Increased crop resilience, reduced water dependency, sustainable irrigation practices.
Maharashtra	Solar Microgrids	Renewable Energy	Rural electrification through solar power	Community-managed microgrids	Affordable and reliable power access for remote areas; locally managed for sustainability.
Tamil Nadu	Climate-Smart Village Project	Climate-Resilient Farming	Organic farming, water efficiency, crop diversification	Farmer training, cooperative planning	Enhanced resilience to climate variability, scalability to other regions.
Tamil Nadu	Mangrove Restoration	Nature-Based Solution	Coastal resilience and biodiversity conservation	Community-driven mangrove replanting	Increased coastal protection, biodiversity gains, new income through ecotourism.
Tamil Nadu	Tamil Nadu Green Climate Company (TNGCC)	Integrated Climate Action	Renewable energy, afforestation, water resource management	Public-private partnerships, decentralized renewables	Advanced renewable energy goals, effective collaboration across sectors.
Gujarat	Charanka Solar Park	Renewable Energy	Large-scale solar power generation	Centralized solar park with community employment	Enhanced energy security, job creation, and rapid renewable expansion.
Rajasthan	Bhadla Solar Park	Renewable Energy	Large-scale solar power generation	Public-private partnerships	World's largest solar park, significant renewable energy capacity, and job creation.
Rajasthan	Traditional Water Harvesting (Johads)	Water Conservation	Groundwater recharge using traditional methods	Revival of traditional methods and community involvement	Improved water availability, revitalized traditional knowledge, engaged local communities.

State	Project	Type	Primary Focus	Model	Success Highlights
Kerala	Community-Led Flood Management	Disaster Resilience	Proactive flood forecasting and disaster response	Local disaster committees and decentralized planning	Reduced flood damage, high community engagement, enhanced early warning systems.
Kerala	Food Waste Management	Waste Management	Reduction and recycling of food waste	Urban-local partnerships and community involvement	Minimized food waste, improved waste management infrastructure, and community benefits.
Sikkim	100% Organic Farming	Sustainable Agriculture	Organic farming practices across the state	State-led organic policy with grassroots training	First fully organic state, improved soil health, increased rural incomes.
Odisha	Joint Forest Management (JFM)	Forest Conservation	Sustainable forest management and livelihoods	Government-community partnership	Increased forest cover, sustainable incomes, and community stewardship.
Andhra Pradesh	Zero Budget Natural Farming (ZBNF)	Climate-Resilient Farming	Chemical-free, low-cost farming	State-supported natural farming model	Reduced farming costs, enhanced soil fertility, high adoption rates.
Bihar	Off-Grid Solar Projects	Renewable Energy	Electrification for remote communities	Community-owned solar microgrids	Improved quality of life, community-managed systems ensuring sustainability.
West Bengal	Sundarbans Coastal Resilience	Disaster Resilience	Mangrove restoration and cyclone protection	Community-led mangrove restoration	Enhanced coastal resilience, biodiversity recovery, and reduced disaster vulnerability.

Notes

[1] The Supreme Court of India's judgement on climate change and human rights in M.K. Ranjitsinh and Others v. Union of India and Others on March 21, 2024.
[2] These goals listed in this section are contained in a number of official documents, notably in Government of India 2021, Ministry of Power 2022, Ministry of Environment, Forest and Climate Change 2023, Ministry of Finance 2022, and in international reports such as United Nations 2021, International Energy Agency 2022, United Nations Framework Convention on Climate Change 2021, International Renewable Energy Agency 2023, and United Nations Development Programme 2022.
[3] https://climateactiontracker.org/
[4] The Intergovernmental Panel on Climate Change (IPCC) reports that by 2020, 56 countries had passed laws with the objective of limiting greenhouse gases, covering 53% of emissions. Since then, the number of countries has substantially increased (Annex 1).
[5] Thomas, 2023 discusses the challenges of coordinating climate action across different levels of government, particularly in federal systems. He points out that even countries with dedicated climate ministries, such as Germany and Canada, discussed further below, face difficulties in aligning national and subnational priorities.
[6] The Inflation Reduction Act represents a significant federal initiative by the United States to address climate change. However, the effectiveness of this act may be influenced by the election of Donald Trump, which could impact the implementation of climate policies by the United States.
[7] The Federal Climate Protection Act was amended in 2021 to increase emission reduction targets.