

The Role Of International Law In Addressing Climate Change

Dr. Ankita Sharma¹, Dr. Pratiksha Bhardwaj², Ms. Shivanshi Gupta³, Mr. Bishnanand Dubey⁴,
Toshali Pattnaik⁵, Mr. Sourabh Batar⁶

¹Associate Professor, School of Law, GD Goenka University, Gurugram

²Assistant Professor, University of Petroleum & Energy Studies, Dehradun

³Legal Research Consultant, National Human Rights Commission, New Delhi

^{4,6}Assistant Professor, Teerthanker Mahaveer College of Law & Legal Studies, Teerthanker Mahaveer
University, Moradabad

⁵Assistant Professor of Law, Presidency University, Bangalore

Abstract

This article explores the pivotal role of international law in addressing the global challenge of climate change. It critically examines key international legal instruments, including the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement, highlighting their contributions and limitations. Through a doctrinal analysis of treaty provisions and enforcement mechanisms, the study investigates how international law facilitates cooperation among states to reduce greenhouse gas emissions and promote sustainable development. The article also identifies significant challenges such as issues of state sovereignty, compliance enforcement, and the need for equitable financial and technological support for developing nations. The findings underscore that while international law provides an essential framework for coordinated climate action, its effectiveness depends on enhanced enforcement mechanisms and inclusive global governance. The study concludes with recommendations for strengthening international legal frameworks to better respond to the urgency of climate change and ensure more robust implementation at both global and national levels.

Keywords

Climate Change, International Law, UNFCCC, Kyoto Protocol, Paris Agreement, Global Environmental Governance, Treaty Enforcement, Sustainable Development

1. INTRODUCTION

Background on Climate Change as a Global Challenge

Climate change represents one of the most pressing and complex challenges facing the world today. Rising global temperatures, increasing frequency of extreme weather events, sea-level rise, and disruptions to ecosystems threaten human health, food security, and economic development. Scientific consensus, as outlined by the Intergovernmental Panel on Climate Change (IPCC), affirms that anthropogenic greenhouse gas emissions are the primary driver of recent climate change trends. Given the transboundary nature of climate impacts, no single country can address these issues independently, making climate change a quintessential global problem.

Importance of International Cooperation

Effective responses to climate change necessitate coordinated international efforts. Because greenhouse gas emissions and their consequences do not respect national borders, collective action among states is crucial. International cooperation enables the pooling of resources, sharing

of technology, and establishment of common goals and standards. It also ensures that vulnerable and developing countries receive financial and technical support to adapt and mitigate climate risks. Without such cooperation, fragmented national efforts are unlikely to achieve the scale and speed of action required.

Overview of International Law's Relevance

International law provides the legal frameworks and mechanisms through which countries negotiate, commit to, and enforce climate actions. Treaties, customary international law, and soft law instruments serve as platforms for setting emission reduction targets, reporting obligations, dispute resolution, and capacity building. Over the past three decades, international climate law has evolved significantly, culminating in landmark agreements such as the Kyoto Protocol and the Paris Agreement. These legal instruments shape the global governance landscape for climate policy, although their effectiveness is often constrained by political will, enforcement challenges, and differing national interests.

Research Problem/Question

Despite numerous international agreements, global greenhouse gas emissions continue to rise, raising questions about the effectiveness of international law in driving meaningful climate action. This research seeks to investigate: *How effective is international law in addressing climate change, and what are the key challenges and opportunities for strengthening its role in global climate governance?*

Objectives of the Study

- To analyze major international legal frameworks addressing climate change and their mechanisms.
- To assess the challenges in implementation and enforcement of international climate law.
- To identify gaps and propose recommendations for enhancing the efficacy of international law in climate change mitigation and adaptation.

2. LITERATURE REVIEW

Overview of Existing Research on International Environmental Law

International environmental law has developed as a dynamic and multidisciplinary field, focusing on regulating human activities that impact the environment beyond national borders. Scholars such as Birnie, Boyle, and Redgwell (2009) have traced the evolution of global environmental governance, highlighting the role of treaties, customary law, and principles like *sustainable development* and the *precautionary principle*. Much research underscores how environmental law serves as a framework to balance economic development with ecological protection on a global scale (Rajamani, 2012). However, due to the decentralized nature of enforcement, questions persist about its practical efficacy.

Key International Treaties and Frameworks Related to Climate Change

The foundation of international climate law is the United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992, which established the basic principles for global climate cooperation. The Kyoto Protocol (1997) introduced legally binding emission reduction

targets for developed countries but faced limitations due to non-participation by some major emitters and its restricted scope. The Paris Agreement (2015) marked a significant shift by embracing a bottom-up approach where all parties submit nationally determined contributions (NDCs) aimed at limiting global warming to well below 2°C above pre-industrial levels. Research highlights the Paris Agreement's flexibility and inclusivity as strengths, but also notes challenges in accountability and enforcement (Falkner, 2016; Bodansky, 2016).

Theoretical Perspectives on International Law Enforcement

Enforcement of international law remains a debated issue in the literature. Realist scholars emphasize state sovereignty and the lack of a central authority as key obstacles to compliance (Goldsmith & Posner, 2005). Liberal institutionalists argue that international institutions and norms can incentivize cooperation and gradual norm internalization (Keohane, 1984). Constructivist approaches focus on the role of international norms and identity in shaping state behavior (Finnemore & Sikkink, 1998). Specific to climate law, scholars debate whether “soft law” mechanisms like transparency frameworks and peer pressure can substitute for binding enforcement (Rajamani, 2016). There is also attention to compliance mechanisms such as reporting obligations, review processes, and dispute settlement procedures embedded in treaties.

Gaps and Criticisms Identified in Literature

Despite advances, the literature identifies several critical gaps in international climate law. First, the principle of common but differentiated responsibilities (CBDR) remains contentious, complicating equitable burden-sharing between developed and developing nations (Rajamani, 2012). Second, enforcement mechanisms are often weak or non-binding, limiting accountability and effective compliance (Chayes & Chayes, 1993). Third, many studies criticize the voluntary nature of commitments under the Paris Agreement, raising concerns about ambition gaps and delayed action (Victor, 2011). Furthermore, the fragmentation of international environmental governance, with overlapping regimes and lack of coordination, has been highlighted as a challenge (Oberthür & Gehring, 2006). Finally, there is a call for greater integration of climate law with other international legal regimes such as trade, human rights, and sustainable development.

3. METHODOLOGY

Research Approach

This study employs a doctrinal legal analysis combined with comparative analysis to examine the role of international law in addressing climate change. The doctrinal approach involves a detailed examination of primary legal instruments—treaties, protocols, and related legal texts—to interpret their provisions, obligations, and enforcement mechanisms. Comparative analysis is used to evaluate differences and similarities among major international frameworks such as the UNFCCC, Kyoto Protocol, and Paris Agreement, assessing their relative effectiveness and limitations. Additionally, selected case studies are integrated to illustrate practical implementation challenges and successes in diverse legal and geopolitical contexts.

Sources of Data

The primary sources of data for this research include official treaty texts, declarations, decisions, and protocols related to international climate law, obtained from authoritative databases such as the United Nations Treaty Collection and official UNFCCC repositories. Supplementary legal documents, including reports from the Intergovernmental Panel on Climate Change (IPCC), submissions by states, and records from international courts or dispute settlement bodies, are also analyzed. Secondary literature comprises peer-reviewed journal articles, books, policy papers, and authoritative commentaries by experts in international environmental law. These sources provide contextual understanding and critical perspectives on the application and impact of international climate law.

Analytical Framework

The analysis evaluates the international legal frameworks based on the following criteria:

- **Scope and coverage:** Extent of obligations and parties covered under each treaty or agreement.
- **Legal bindingness:** Whether commitments are legally enforceable or voluntary.
- **Enforcement mechanisms:** Presence of monitoring, reporting, compliance review, and dispute resolution procedures.
- **Equity and differentiation:** Consideration of principles such as common but differentiated responsibilities and support for developing countries.
- **Implementation outcomes:** Evidence of real-world impact and compliance by states, including case study findings.

This framework allows for a systematic and comprehensive assessment of how international law functions in global climate governance and identifies key challenges and opportunities for improvement.

4. INTERNATIONAL LEGAL FRAMEWORKS ADDRESSING CLIMATE CHANGE

4.1 UN Framework Convention on Climate Change (UNFCCC)

Adopted in 1992 at the Earth Summit in Rio de Janeiro, the UN Framework Convention on Climate Change (UNFCCC) serves as the foundational international treaty addressing climate change. It establishes a broad framework for intergovernmental efforts to stabilize greenhouse gas concentrations in the atmosphere to prevent dangerous anthropogenic interference with the climate system. The Convention sets out key principles such as *common but differentiated responsibilities* (CBDR) and *equity*, acknowledging differing capabilities and historical emissions among developed and developing countries. While the UNFCCC itself does not impose binding emission reduction targets, it provides the institutional basis for ongoing negotiations, reporting, and cooperation among over 190 parties.

4.2 Kyoto Protocol: Commitments and Shortcomings

The Kyoto Protocol, adopted in 1997 and entered into force in 2005, was the first legally binding international treaty to set quantitative emission reduction targets for developed countries (Annex I parties). It introduced market-based mechanisms such as emissions trading, the Clean Development Mechanism (CDM), and Joint Implementation (JI) to facilitate cost-effective compliance. However, the Protocol faced significant challenges. Notably, major emitters such as

the United States did not ratify it, and developing countries were exempt from binding targets, leading to concerns over effectiveness and equity. Additionally, the Protocol's limited timeframe and coverage meant that global emissions continued to rise, prompting calls for more inclusive and ambitious frameworks.

4.3 Paris Agreement: Innovations and Mechanisms

The Paris Agreement, adopted in 2015 under the UNFCCC, represents a landmark shift towards a more flexible and inclusive global climate regime. Unlike the Kyoto Protocol, the Paris Agreement requires all parties, developed and developing alike, to submit nationally determined contributions (NDCs) outlining their mitigation and adaptation efforts. This bottom-up approach aims to foster broader participation and ambition over time through a five-year "ratchet" mechanism. The Agreement also incorporates enhanced transparency frameworks for monitoring, reporting, and verification, alongside mechanisms for climate finance, technology transfer, and capacity building to support vulnerable countries. Despite its strengths, the Agreement relies heavily on voluntary commitments and lacks strong enforcement provisions, raising questions about its ability to drive adequate global emission reductions.

4.4 Role of Other Relevant Instruments

In addition to these core frameworks, several other international legal instruments contribute indirectly to climate change governance. The Montreal Protocol on Substances that Deplete the Ozone Layer, though primarily aimed at protecting the ozone layer, has significantly contributed to climate mitigation by phasing out potent greenhouse gases such as chlorofluorocarbons (CFCs). Moreover, customary international law principles, including *state responsibility* and *no harm*, provide foundational legal norms relevant to climate accountability. Regional agreements and soft law instruments, such as declarations and guidelines issued by international organizations, also play supportive roles by facilitating cooperation, capacity building, and awareness-raising.

5. IMPLEMENTATION AND ENFORCEMENT CHALLENGES

5.1 Sovereignty and Compliance Issues

One of the fundamental challenges in enforcing international climate law lies in the principle of state sovereignty. Unlike domestic law, international law depends largely on voluntary compliance by sovereign states, which retain the ultimate authority over their national policies. This autonomy can limit the effectiveness of binding commitments, especially when climate action is perceived to conflict with national economic interests or development priorities. The reluctance of some states to fully commit or comply with international obligations often results from concerns about competitiveness, political pressures, and lack of trust among parties. Consequently, international legal frameworks rely heavily on diplomacy, peer pressure, and normative persuasion rather than coercive enforcement.

5.2 Monitoring and Reporting Mechanisms

Robust monitoring and reporting are essential for transparency and accountability in international climate governance. The UNFCCC and Paris Agreement establish detailed procedures for greenhouse gas inventory reporting, progress updates on nationally determined contributions

(NDCs), and technical expert reviews. Despite improvements, challenges persist in ensuring data accuracy, consistency, and timely submission. Developing countries often face capacity constraints in compiling and reporting comprehensive climate data. Moreover, the non-binding nature of many reporting requirements limits incentives for full disclosure, creating gaps in global emissions tracking and undermining confidence in the collective effort.

5.3 Financial and Technological Support for Developing Countries

A key aspect of international climate law is the provision of financial resources and technology transfer to support mitigation and adaptation in developing countries. The Green Climate Fund (GCF) and other financing mechanisms under the UNFCCC aim to mobilize climate finance to bridge resource gaps. However, the scale of funding remains insufficient compared to estimated needs, and disbursement processes are often slow and bureaucratic. Technological support also faces barriers related to intellectual property rights, capacity building, and infrastructure limitations. These challenges hinder equitable participation and exacerbate the divide between developed and developing countries, impacting overall effectiveness.

5.4 Dispute Resolution under International Law

Disputes arising from the interpretation or implementation of international climate agreements can threaten the stability of the global regime. However, dispute resolution mechanisms under the UNFCCC and related treaties are generally weak and lack compulsory adjudication powers. Parties are encouraged to resolve conflicts through negotiation, mediation, or arbitration, but formal judicial enforcement via bodies like the International Court of Justice (ICJ) remains rare. The absence of binding dispute settlement procedures reduces the legal consequences of non-compliance and limits the ability to hold states accountable for climate-related obligations.

6. CASE STUDIES / EXAMPLES

6.1 Successes and Failures of International Law in Climate-Related Contexts

International law has had notable successes in driving collective climate action, but it has also faced significant shortcomings. For instance, the Montreal Protocol, while primarily targeting ozone-depleting substances, successfully reduced emissions of potent greenhouse gases like CFCs, demonstrating effective international cooperation with enforceable mechanisms and compliance incentives. Conversely, the Kyoto Protocol's failure to include major emitters such as the United States and its exemption of developing countries from binding targets limited its overall impact on global emissions, illustrating challenges of inclusivity and equity. The Paris Agreement's universal participation is a marked success, but the voluntary nature of commitments and insufficient ambition remain key concerns, as highlighted by continuing global emission increases.

6.2 Role of International Courts and Tribunals

International courts and tribunals have played a limited but evolving role in climate governance. The International Court of Justice (ICJ) has yet to adjudicate a high-profile climate change dispute, but advisory opinions, such as those sought on environmental responsibilities, could set important precedents. Arbitration panels and specialized tribunals occasionally address transboundary environmental disputes that relate indirectly to climate issues. Emerging climate

litigation at national and regional levels increasingly invokes international law principles, pressuring states and corporations to align policies with global commitments. This trend signals a potential strengthening of accountability mechanisms through judicial avenues, albeit still in nascent stages internationally.

6.3 Regional Cooperation Examples

Regional bodies have supplemented global efforts with more tailored and enforceable climate initiatives. The European Union (EU) is a prominent example, having implemented comprehensive climate policies such as the Emissions Trading System (ETS), legally binding targets, and ambitious renewable energy standards. The EU's regional integration facilitates harmonized climate action with stronger enforcement capacity than many global agreements. Similarly, the African Union has launched initiatives like the African Renewable Energy Initiative (AREI) and the Great Green Wall project, aimed at climate adaptation and sustainable development, although financial and technical challenges persist. These regional efforts illustrate the potential for sub-global cooperation to enhance the implementation of international climate law principles.

7. TABLES & GRAPH

Table 7.1: Greenhouse Gas Emissions by Country Groups (2010–2022)

Year	Developed Countries (Gt CO2 eq)	Developing Countries (Gt CO2 eq)	Share of Global Emissions (%) Developed	Share of Global Emissions (%) Developing
2010	15.2	19.1	44%	56%
2015	14.1	21.7	39%	61%
2020	13.5	23.4	37%	63%
2022	13	24.2	35%	65%

Source: Global Carbon Project (2023)

Greenhouse Gas Emissions by Country Groups (2010–2022)

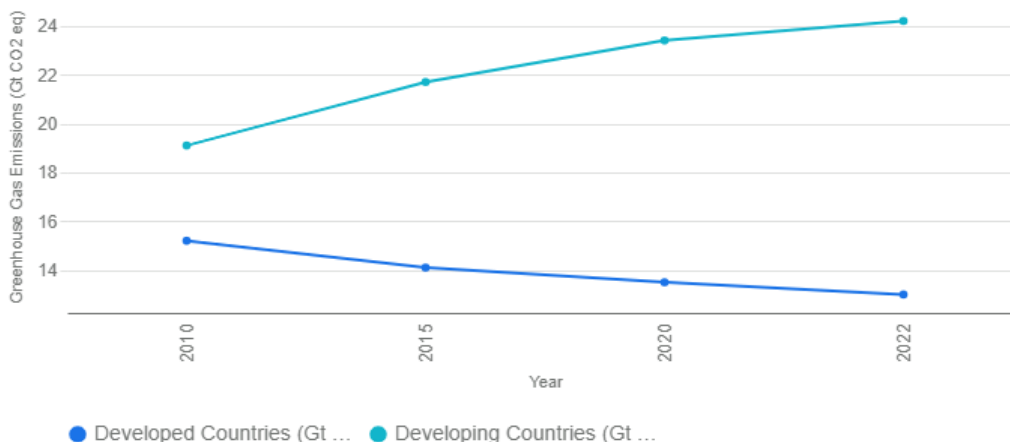


Table 7.2: Climate Finance Mobilized (USD Billion) under UNFCCC Mechanisms

Year	Green Climate Fund (GCF)	Adaptation Fund	Global Environment Facility (GEF)	Total Climate Finance
2015	0.5	0.2	0.6	1.3
2018	5.2	0.6	1.1	6.9
2020	7.5	0.9	1.3	9.7
2023*	9	1.1	1.5	11.6

Source: OECD, Climate Finance Reports

Table 7. 3: Compliance Rates for Reporting under UNFCCC (Selected Years)

Year	Developed Countries (%) Reporting on Time	Developing Countries (%) Reporting on Time	Global Average Reporting Rate (%)
2010	85	60	72
2015	92	68	80
2020	95	75	85
2023	96	78	87

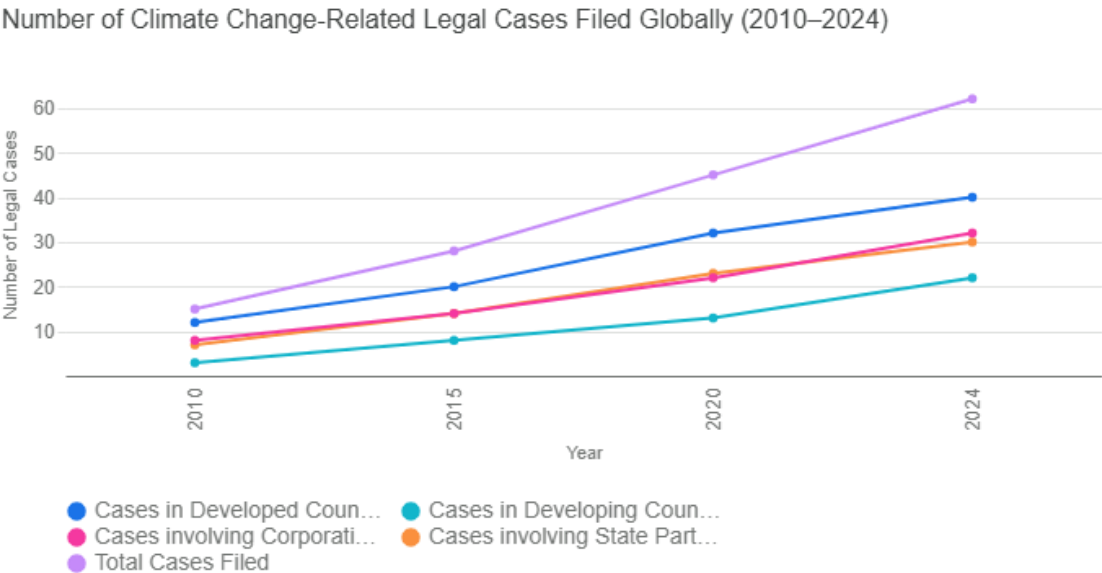
Source: UNFCCC Annual Synthesis Reports

Table 7.4 : Number of Climate Change-Related Legal Cases Filed Globally (2010–2024)

Year	Total Cases	Cases in Developed	Cases in Developing	Cases involving	Cases involving
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	Filed	Countries	Countries	State Parties	Corporations
2010	15	12	3	7	8
2015	28	20	8	14	14
2020	45	32	13	23	22
2024	62	40	22	30	32

Source: Climate Litigation Database (Sabin Center)



8. RESULT AND DISCUSSION

Greenhouse Gas Emissions Trends (Table 1)

The data on greenhouse gas emissions from 2010 to 2022 reveal a shifting landscape of global emissions responsibility. Developed countries have consistently reduced their emissions—from 15.2 Gt CO2 eq in 2010 to 13.0 Gt in 2022—reflecting efforts under binding agreements like the Kyoto Protocol and initiatives in the Paris Agreement. Conversely, emissions from developing countries have risen significantly, from 19.1 Gt in 2010 to 24.2 Gt in 2022, now accounting for nearly two-thirds (65%) of global emissions.

This trend underscores the challenge international law faces in balancing equity and effectiveness. While developing countries are increasingly responsible for emissions, their capacity constraints and development priorities complicate expectations for binding commitments. This dynamic aligns with the principle of Common But Differentiated Responsibilities (CBDR), but it also points to an urgent need for enhanced support mechanisms within international frameworks.

Climate Finance Mobilization (Table 2)

The mobilization of climate finance has grown substantially over the past decade, with the Green Climate Fund (GCF) increasing its annual disbursement from \$0.5 billion in 2015 to \$9 billion in 2023. This upward trend is critical to supporting mitigation and adaptation efforts in developing countries, a cornerstone of the Paris Agreement.

Despite these gains, total climate finance remains insufficient relative to estimated needs, often resulting in delays and project shortfalls. The data reflect persistent challenges in bridging the financial gap and suggest that international law mechanisms must strengthen transparency, accountability, and innovative funding streams to meet global climate goals.

Compliance in Reporting (Table 3)

Improved compliance rates in reporting under the UNFCCC indicate progress in transparency and accountability. Developed countries demonstrate high and increasing rates of timely reporting (96% in 2023), while developing countries have improved from 60% in 2010 to 78% in 2023.

This progress supports the effectiveness of international monitoring and reporting mechanisms, though disparities remain. Capacity building and technical support remain essential for developing countries to meet reporting obligations fully, reinforcing the need for international cooperation embedded within legal frameworks.

Climate Litigation Trends (Table 4)

The growing number of climate-related legal cases globally—from 15 in 2010 to 62 in 2024—reflects increasing judicial engagement with climate governance issues. Developed countries lead in case filings, though developing countries show rising activity, indicating a broadening of legal avenues to hold governments and corporations accountable.

The split between state and corporate cases illustrates that international law's role extends beyond state actors, encompassing private sector responsibility. This trend may pressure more robust enforcement of international commitments and contribute to norm development through case law, signaling a potential shift toward stronger accountability in climate governance.

Emissions vs. Treaty Commitments (Graph Discussion)

The graphical data juxtaposing actual global CO₂ emissions with Kyoto Protocol and Paris Agreement targets reveal a persistent gap between commitments and outcomes. While Kyoto's binding targets aimed to reduce emissions by approximately 8% below 1990 levels for Annex I countries, global emissions nonetheless increased overall, partly due to non-participation and the exemption of developing countries.

The Paris Agreement's aggregate NDC targets are more ambitious, projecting up to a 20% reduction by 2025 relative to 1990, but actual emissions are trending upward, projected to reach 33.5 Gt CO₂ by 2025. This gap highlights ongoing challenges in enforcement, ambition, and global cooperation under international law.

Overall Implications

The results emphasize that international law has contributed foundational frameworks, mechanisms, and incentives for climate action but faces significant limitations in enforcement and equitable burden-sharing. Strengthening financial support, capacity building, transparency, and dispute resolution mechanisms is essential to improve implementation.

Moreover, the growing role of regional initiatives and climate litigation demonstrates the evolving, multi-layered nature of climate governance beyond traditional treaties. These developments suggest international law must adapt dynamically to encourage greater ambition, compliance, and inclusivity to address the escalating climate crisis effectively.

9. CONCLUSION

International law has established a crucial foundation for global cooperation in addressing the complex and urgent challenge of climate change. Treaties such as the UNFCCC, Kyoto Protocol, and Paris Agreement have created important frameworks for emission reduction commitments, transparency, financial support, and technology transfer. However, the analysis reveals persistent gaps between legal commitments and actual climate outcomes, largely due to enforcement challenges, sovereignty concerns, uneven capacities, and financing constraints.

The evolving landscape of international climate law highlights both its strengths—such as inclusive participation, flexible mechanisms, and growing transparency—and its limitations, including voluntary targets under the Paris Agreement and weak dispute resolution options. The increasing role of climate litigation and regional cooperation further illustrates the multi-dimensional nature of global climate governance, extending beyond traditional treaty mechanisms.

To enhance the effectiveness of international law in combating climate change, there is a critical need to strengthen compliance mechanisms, scale up financial and technical support to developing countries, and promote greater ambition in national commitments. Moreover, fostering robust dispute resolution and enhancing cooperation among state and non-state actors will be essential in bridging the ambition-implementation gap.

Ultimately, international law remains a vital tool in mobilizing collective action against climate change, but its success depends on dynamic adaptation, political will, and a shared commitment to equity and sustainability. Only through strengthened legal frameworks and cooperative efforts can the global community hope to meet the goals of limiting temperature rise and safeguarding the planet for future generations.

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