

THE UNITED NATIONS AND THE EVOLUTION OF GLOBAL CLIMATE GOVERNANCE: A CRITICAL ANALYSIS OF THE EMERGING CHALLENGES FACING THE UNFCCC, KYOTO PROTOCOL AND PARIS AGREEMENT, 1992–2025

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Abstract

The study examined the evolution of global climate governance under the United Nations, with particular attention to the emerging challenges confronting the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and Paris Agreement between 1992 and 2025. The study was motivated by the persistent gap between the development of increasingly sophisticated international climate institutions and the limited progress in translating international commitments into sufficiently effective, coordinated and equitable climate action. The study adopted a qualitative documentary research design and relied on secondary data obtained from the UNFCCC, Kyoto Protocol, Paris Agreement, Conference of the Parties decisions, climate finance documents, Intergovernmental Panel on Climate Change reports, United Nations publications and relevant peer-reviewed scholarly literature. Data were analyzed using thematic content analysis, guided by Institutional Theory and the institutional effectiveness perspective. The findings revealed that United Nations climate governance had undergone substantial institutional evolution from the framework-based approach of the UNFCCC to the differentiated legally binding commitments of the Kyoto Protocol and subsequently to the universal, nationally determined and transparency-oriented architecture of the Paris Agreement. The study further found that this institutional evolution reflected processes of institutional learning and adaptation, but had not produced commensurate environmental outcomes. Seven major challenges were identified: implementation gaps, inadequate and difficult-to-access climate finance, institutional fragmentation, divergent national interests, weak institutional and technical capacity, technology and knowledge gaps, and limitations in compliance, transparency and accountability. The findings also showed that climate finance constraints

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were particularly consequential for vulnerable developing countries, while technological and institutional limitations weakened their capacity to implement climate commitments. The study concluded that the principal challenge facing global climate governance was no longer the absence of international institutional frameworks, but the persistent difficulty of translating commitments into effective domestic implementation and measurable climate outcomes. It recommended an implementation-centred UN climate governance mechanism, reforms to improve equitable and accessible climate finance, stronger institutional and technical capacity in developing countries, enhanced coordination among climate-governance institutions, expanded technology and innovation cooperation, and strengthened transparency and accountability mechanisms.

Keywords: United Nations, global climate governance, UNFCCC, Kyoto Protocol, Paris Agreement, institutional effectiveness, climate finance, implementation gap.

1. Introduction

Climate change has evolved from an environmental concern into a complex challenge of international cooperation, economic development and public governance. Rising temperatures, changing rainfall patterns, sea-level rise and extreme weather events increasingly affect agriculture, water, health, infrastructure, energy and livelihoods. The challenge is intensified by differences in countries' historical contributions to greenhouse gas emissions and their capacities to respond to climate risks. The IPCC (2023) reports that human activities have unequivocally caused global warming, with global surface temperature reaching approximately 1.1°C above the 1850–1900 average during 2011–2020. Because climate impacts transcend national borders, addressing the problem requires collective international action. However, differing economic interests, energy needs, development priorities and political pressures complicate such cooperation. Keohane and Victor (2016) argue that effective climate mitigation requires deeper international cooperation, although differences in national preferences constrain the organization of such efforts. The United Nations has provided the principal institutional framework for this cooperation. The United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992, established the foundation for international climate governance by seeking to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system (United Nations Framework Convention on Climate Change, 1992). However, its broad obligations did not establish comprehensive, quantified and legally binding emission-reduction targets for all parties. The Kyoto Protocol of 1997 subsequently introduced quantified emission-limitation and reduction commitments for developed countries listed in Annex B, representing a shift towards differentiated binding obligations (United Nations Framework Convention on Climate Change, 1997). Empirically, Aichele and Felbermayr (2013) found that Kyoto ratification was associated with an approximately 10 per cent reduction in carbon dioxide emissions. Nevertheless,

continuing global emissions and uneven participation exposed limitations in the Kyoto approach and encouraged the search for a framework capable of combining wider participation with deeper commitments.

The Paris Agreement of 2015 responded by establishing a more universal system in which all parties formulate nationally determined contributions and participate in common transparency and review arrangements (United Nations Framework Convention on Climate Change, 2015). Its temperature objective is to hold warming well below 2°C while pursuing efforts to limit it to 1.5°C. Unlike Kyoto, Paris places greater emphasis on national determination, transparency, periodic review and progressive ambition. Dimitrov et al. (2019) identify a central institutional challenge involving the balance between broad participation, sufficiently deep commitments and compliance. Thus, the movement from the UNFCCC to Kyoto and Paris reflects an evolving governance architecture: the UNFCCC created the negotiating framework, Kyoto operationalised differentiated binding commitments, and Paris established universal participation through nationally determined contributions and common review mechanisms.

Despite this institutional development, significant gaps remain between international commitments and climate outcomes. UNEP (2024) reports that existing policies and NDCs remain insufficient to place global emissions on a pathway consistent with the Paris temperature goals, while the IPCC (2023) stresses the need for deep, rapid and sustained emission reductions. The effectiveness of international agreements therefore depends substantially on their translation into domestic policies affecting energy, production, investment, land use and transport. Dimitrov et al. (2019) emphasize that participation alone does not guarantee effective implementation. Climate finance constitutes another major challenge. Developing countries require substantial resources for mitigation and adaptation, yet access to international finance remains uneven. Garschagen and Doshi (2022) found that many highly vulnerable countries, particularly least developed countries in Africa, have struggled to access Green Climate Fund resources, with institutional capacity influencing access to funding. Similarly, Stoll et al. (2021) found that mobilizing private adaptation finance remains difficult because of market imperfections, incomplete information and weaknesses in financial markets. Effective climate finance therefore involves not only increasing resources but also ensuring that financial mechanisms reach vulnerable countries and support adaptation and resilient development.

Global climate governance is also characterized by institutional fragmentation. Climate action involves the UN climate regime, development banks, climate funds, specialized agencies, regional organizations, private actors and transnational initiatives. Biermann et al. (2009) identify fragmentation as a major feature of contemporary global governance, while Zelli (2011) specifically highlights fragmentation within the global climate governance architecture. Although institutional plurality can provide additional expertise and resources, it can also produce overlapping mandates and coordination difficulties. Differences in national interests further complicate cooperation because countries vary in their dependence on fossil fuels, energy requirements, development priorities and vulnerability to climate impacts. Keohane and Victor (2016) consequently characterize climate cooperation in terms of both cooperation and discord. Technology and knowledge constraints constitute an additional concern, particularly for developing countries.

Pandey, de Coninck and Sagar (2022) argue that conventional technology transfer has not produced results commensurate with developing countries' needs and advocate greater emphasis on innovation cooperation, learning and local technological capabilities. These constraints are particularly significant in African countries, where climate vulnerability can coincide with limited fiscal resources, institutional capacity and infrastructure, thereby increasing difficulties in accessing finance and implementing climate commitments.

The central problem is therefore that, despite more than three decades of increasingly sophisticated international climate institutions, substantial gaps persist between global commitments and actual climate action. High emissions, implementation difficulties, inadequate finance, technological constraints, institutional fragmentation and divergent national interests continue to challenge the effectiveness of the global climate regime. Although existing scholarship has examined the UNFCCC, Kyoto Protocol and Paris Agreement and their individual dimensions, comparatively less attention has been devoted to examining the three frameworks collectively as successive stages in United Nations-led global climate governance while simultaneously assessing the emerging challenges associated with their evolution. Against this background, the study consequently seeks to provide an integrated explanation of how global climate governance has evolved and why significant gaps remain between international climate commitments and actual climate action.

The research questions were:

- i. How has the United Nations evolved global climate governance through the UNFCCC, Kyoto Protocol and Paris Agreement from 1992 to 2025?
- ii. What are the emerging challenges affecting the implementation and effectiveness of the UNFCCC, Kyoto Protocol and Paris Agreement from 1992 to 2025?

Conceptual Framework

i. Global Climate Governance

Global climate governance refers to the system of institutions, rules, processes and interactions through which climate change is collectively addressed across national boundaries. It extends beyond conventional state-to-state diplomacy because climate action increasingly involves international organizations, national governments, businesses, civil society groups, scientific communities and transnational networks. Biermann et al. (2009) conceptualize governance architecture as the overarching system of public and private institutions operating within a particular area of world politics, while Biermann (2010) observes that climate governance has increasingly moved beyond an exclusively intergovernmental system towards arrangements involving multiple actors and forms of authority. Pattberg and Stripple (2008) similarly argue that the growing involvement of non-state and transnational actors has created a climate governance arena that cannot be adequately explained through the traditional public-private distinction. Global climate governance is therefore understood in this study as a broad institutional system in which governmental and non-governmental actors interact through overlapping rules, initiatives and decision-making processes to influence climate mitigation, adaptation and sustainable development.

The development of this governance system has involved a significant transformation in the institutional architecture of international climate cooperation. Kuyper, Schroeder and Linnér (2018) demonstrate that the UN climate regime has evolved from the relatively top-down and differentiated architecture associated with the Kyoto Protocol towards the more hybrid and broadly participatory structure established under the Paris Agreement. They identify three particularly important changes: the movement from legally binding emission targets directed mainly at industrialized countries towards nationally determined contributions involving all countries; the transition from the Kyoto model towards a hybrid Paris architecture; and the expansion of the regime from a primary focus on mitigation to a broader concern with mitigation, adaptation and finance. This institutional development suggests that global climate governance should be understood as an evolving process rather than a fixed international arrangement. For this study, institutional evolution therefore refers to changes in the principles, rules, commitments, procedures and institutional mechanisms through which climate action has been organized from the adoption of the UNFCCC in 1992 through the Kyoto Protocol, the Paris Agreement and the subsequent implementation and strengthening processes up to 2025.

The institutional evolution of the climate regime can consequently be represented as UNFCCC (1992) → Kyoto Protocol (1997) → Paris Agreement (2015) → implementation and strengthening (2016–2025). The UNFCCC provided the basic institutional and negotiating foundation for international climate cooperation; Kyoto subsequently introduced a more differentiated and legally structured approach to emission commitments; and Paris established a hybrid framework that combines universal participation with nationally determined contributions, transparency and periodic progression in ambition. Kuyper et al. (2018) emphasize that this transition involved not merely changes in legal instruments but also a broader transformation in how responsibility, participation and climate action are organized within the international regime.

Climate governance frameworks, in this study, refer to the institutional rules and mechanisms through which international climate objectives are translated into coordinated action. These include mitigation commitments, adaptation arrangements, climate finance, technology cooperation, capacity building, transparency, reporting, monitoring, review and implementation. Oberthür, Hermwille and Rayner (2021) provide a useful analytical approach by identifying five governance functions through which international and transnational institutional complexes contribute to climate action: providing guidance and signals to actors, establishing rules for collective action, promoting transparency and accountability, providing financial, technological and capacity-building support, and facilitating knowledge and learning. This perspective is particularly relevant because it shifts attention from the mere existence of international agreements to the functions that institutions perform in translating international commitments into practical climate action. Another defining feature of contemporary global climate governance is institutional fragmentation. Zelli (2011) argues that global climate politics is characterized by a high degree of institutional diversity, involving a patchwork of public and private institutions with different constituencies, geographical scopes, objectives and areas of authority. Such fragmentation has produced multiple sites of decision-making and cooperation beyond the central UN climate regime. Biermann et al. (2009) similarly identify fragmentation as a fundamental characteristic of

contemporary global governance and emphasize the importance of examining how different institutions interact within broader governance architectures. Fragmentation is therefore not simply an organizational problem; it has implications for coordination, participation, effectiveness, equity and the distribution of authority within the climate regime.

The increasing participation of non-state actors further demonstrates the changing character of global climate governance. Pattberg and Stripple (2008) note that transnational climate initiatives emerged partly in response to limitations in conventional intergovernmental negotiations, creating new arenas in which businesses, civil society organizations, networks and other actors participate in climate action. This development does not eliminate the central role of states, but it changes the institutional environment within which climate policies are formulated and implemented. Global climate governance is consequently characterized by interactions among governments, international institutions and transnational actors operating at different levels and across different policy sectors. Based on these scholarly perspectives, this study conceptualizes global climate governance through three interconnected dimensions: institutional evolution, governance frameworks and governance challenges. Institutional evolution captures the transformation of the international climate regime from the UNFCCC through Kyoto and Paris; governance frameworks encompass the rules and mechanisms relating to mitigation, adaptation, finance, technology, capacity building, transparency and implementation; while governance challenges encompass fragmentation, coordination difficulties, divergent national interests, financing constraints, technological limitations and weaknesses in implementation. This conceptualization allows the study to examine not only how the United Nations climate regime has changed since 1992 but also how its changing institutional architecture has shaped the possibilities and constraints of international climate action through 2025.

ii. Emerging challenges

Emerging challenges in global climate governance refer to the institutional, political, financial, technological and implementation-related conditions that limit the capacity of international climate arrangements to convert negotiated commitments into measurable climate action. The existence of international agreements does not necessarily guarantee effective implementation because outcomes depend on the interaction between international institutions and domestic political, administrative and economic systems. Keohane and Victor (2016) argue that differences in national preferences continue to complicate sustained climate cooperation, while Dimitrov et al. (2019) emphasize the difficulty of reconciling broad participation, ambitious commitments and compliance within the Paris Agreement. The implementation problem is therefore not simply a question of whether states have accepted international commitments, but whether those commitments are translated into concrete changes in national policies and practices. A major dimension of this challenge is the gap between international commitments and domestic implementation. International climate agreements establish collective expectations, but their practical realization depends substantially on national institutions, administrative capacity, policy coordination and available resources. This creates an implementation chain in which the effectiveness of international commitments is influenced by the capacity of states to incorporate and execute them domestically. Dimitrov et al. (2019) consequently argue that the effectiveness of the Paris Agreement depends on both the ambition of national

commitments and their implementation. The problem is particularly important where domestic institutions lack the financial, technical or administrative capacity required to transform international commitments into mitigation and adaptation programmes.

Climate finance represents a related constraint. Although international finance is intended to support mitigation and adaptation, the governance of climate finance is characterized by multiple institutions, overlapping mandates and competing interests. Pickering, Betzold and Skovgaard (2017) describe international climate finance as a fragmented governance system involving multilateral funds, development banks, bilateral institutions and national financing arrangements. They note that such fragmentation can create coordination problems and administrative burdens for recipient countries. Bracking (2021) similarly argues that the increasing diversity of climate-finance providers does not necessarily resolve questions of power, accessibility and effectiveness, particularly where market-oriented financing mechanisms influence how resources are allocated. These concerns demonstrate that the challenge is not only the quantity of finance available but also the institutional arrangements governing its access, allocation and delivery. Institutional fragmentation constitutes another important challenge. Zelli (2011) describes the global climate governance architecture as a highly diverse institutional landscape involving overlapping public and private institutions, while Biermann et al. (2009) argue that fragmentation can produce both opportunities for institutional specialization and problems of coordination, conflict and accountability. Fragmentation becomes particularly significant when different organizations operate with separate mandates, procedures and constituencies. In such circumstances, the expansion of climate institutions does not automatically produce greater coherence. Instead, institutional proliferation can make it more difficult to determine responsibilities, coordinate action and assess overall performance.

Divergent national interests also constrain collective climate action. States differ in their economic structures, energy systems, development priorities, exposure to climate risks and perceptions of responsibility. Keohane and Victor (2016) demonstrate that climate cooperation is shaped simultaneously by common interests and national differences, making agreement on ambitious collective action difficult. Such differences influence negotiations over emission reductions, finance, technology transfer, energy transition and burden-sharing. The resulting political tensions help explain why international climate governance frequently involves compromises between environmental ambition and the willingness of states to accept particular obligations. Weak compliance and accountability further affect institutional effectiveness. International climate governance generally relies less on coercive enforcement than on transparency, reporting, review, peer pressure and reputational incentives. Dimitrov et al. (2019) identify compliance as one of the central challenges confronting the Paris Agreement because broad participation can be difficult to reconcile with sufficiently strong obligations. Where monitoring and accountability mechanisms are unable to establish whether commitments are being adequately implemented, the distinction between formal participation and substantive climate action becomes increasingly important. Effective governance therefore requires institutions capable of generating reliable information, reviewing implementation and encouraging governments to strengthen their commitments.

Technological and institutional capacity constraints constitute another challenge, particularly for developing countries. International climate action requires access not only to appropriate technologies but also to the skills, institutions and infrastructure necessary to deploy and maintain them. Pandey, de Coninck and Sagar (2022) argue that conventional approaches to technology transfer have been insufficient and emphasize innovation cooperation, learning and the development of local technological capabilities. Consequently, technology constraints cannot be addressed solely through the transfer of equipment; they also require knowledge development, institutional learning and domestic capacity to adapt technologies to local conditions. Coordination difficulties cut across these challenges. Climate governance involves governments, UN institutions, financial organizations, scientific bodies, businesses, civil society and other transnational actors operating across different institutional and geographical levels. Oberthür, Hermwille and Rayner (2021) argue that global climate governance performs several interconnected functions, including rule-making, transparency, financial and technological support, and knowledge creation. Where these functions are distributed across institutions without effective coordination, duplication, conflicting priorities and gaps in responsibility can arise. Coordination is therefore essential for converting the growing institutional density of global climate governance into coherent action.

Equity and climate justice provide a further dimension of the emerging challenges. Climate governance involves significant differences in historical responsibility, vulnerability, financial capacity and access to decision-making. Cipler and Roberts (2017) show that struggles over climate finance and institutional reform are closely connected to questions of power and justice, particularly between developed and developing countries. Climate governance must therefore address not only the effectiveness of mitigation and adaptation measures but also how responsibilities, resources, risks and benefits are distributed. Perceived inequities can affect trust and cooperation, thereby influencing the willingness of states to accept and implement international commitments.

Empirical Literature

Dimitrov, Hovi, Sprinz, Sælen and Underdal (2019) examined the institutional and environmental effectiveness of the Paris Agreement by assessing whether its institutional architecture could reconcile broad participation with sufficiently ambitious commitments and effective implementation. Their analysis identified a central institutional tension involving participation, commitment depth and compliance. The authors argued that a climate agreement that imposes highly demanding obligations may encounter difficulties in maintaining broad participation, while a system designed to accommodate a large number of countries may have difficulty securing sufficiently ambitious commitments. Their findings consequently highlighted the importance of institutional design in determining the effectiveness of the Paris framework. Unlike the Kyoto model, which imposed quantified targets primarily on developed countries, the Paris Agreement established a more universal system in which states formulate nationally determined contributions and are expected to progressively strengthen them. Dimitrov et al. (2019) therefore demonstrated that the expansion of participation under Paris also shifted a significant portion of responsibility for implementation towards national governments. This finding is directly relevant to the present study because it establishes a connection between international institutional design and domestic implementation.

Roelfsema et al. (2020) provided further empirical evidence concerning the implementation of the Paris Agreement by examining national climate policies and their consistency with countries' nationally determined contributions and the temperature objectives of the Agreement. The researchers constructed a comprehensive database of climate policies and employed integrated assessment and energy-system modelling to estimate the implications of existing policies. Their findings indicated a substantial gap between existing national policies, submitted NDCs and emission pathways consistent with the Paris temperature objectives. They estimated an implementation gap of approximately 22.4–28.2 GtCO₂-equivalent by 2030 relative to pathways consistent with the well-below-2°C and 1.5°C objectives. The study therefore demonstrated that the existence of national commitments does not necessarily mean that corresponding policies have been implemented. This evidence is significant because it shifts attention from the formal existence of international commitments to the practical processes through which governments translate those commitments into domestic policies. The findings also reinforce the argument that the effectiveness of the Paris Agreement must be assessed through implementation as well as participation and commitment.

Garschagen and Doshi (2022) empirically examined whether international adaptation finance reaches countries that are most vulnerable to climate change. Their study assessed approximately US\$2.5 billion in Green Climate Fund allocations during its initial funding period and examined the relationship between climate vulnerability, country characteristics, institutional capacity and access to finance. The researchers found that although funding was directed towards several priority groups, including least developed countries, African countries and small island developing states, many highly vulnerable countries experienced difficulties accessing Green Climate Fund resources. Institutional capacity emerged as an important factor affecting access. The study therefore demonstrated that the availability of international climate finance does not necessarily translate into equal access to resources. Countries with weaker administrative and institutional capabilities may encounter difficulties satisfying accreditation, proposal development and implementation requirements. This finding is particularly relevant to the present study because it establishes an empirical connection between institutional capacity and the implementation of international climate commitments. It also demonstrates that climate finance constitutes not merely a resource issue but an institutional governance issue involving accessibility, allocation procedures and administrative capacity.

Stoll, Pauw, Tohme and Grüning (2021) examined the mobilisation of private finance for climate adaptation and drew lessons from the experience of the Green Climate Fund. Their study assessed institutional and procedural barriers affecting the mobilisation of private adaptation finance and found that challenges related to project development, risk, institutional processes and the characteristics of adaptation investments constrained the mobilisation of private resources. The authors demonstrated that adaptation finance presents particular difficulties because adaptation projects frequently generate benefits that are diffuse, long term and difficult to monetise. Their findings indicate that international climate-finance institutions require appropriate mechanisms for identifying, preparing and financing adaptation investments if private resources are to complement public finance. The study is relevant to the present research because it demonstrates that the

effectiveness of international climate governance is influenced not only by the volume of financial commitments but also by the institutional arrangements through which financial resources are mobilised and delivered.

Pandey, de Coninck and Sagar (2022) examined international technology cooperation and challenged the conventional understanding of technology transfer as the simple movement of technologies from developed to developing countries. Through a review of evidence on technology cooperation and innovation in developing countries, the researchers found that effective technology cooperation requires knowledge exchange, learning, institutional support, local adaptation and innovation capabilities. They argued that developing countries need opportunities to develop technological capabilities rather than remaining dependent on imported technologies. The study consequently proposed greater emphasis on innovation cooperation and local capability development. Its findings have important implications for international climate governance because the implementation of mitigation and adaptation commitments increasingly depends on access to appropriate technologies and technical expertise. The evidence suggests that technology cooperation is more likely to contribute to sustained climate action when it strengthens domestic capabilities and institutions rather than merely providing external technological products.

Theoretical Framework

This study is anchored on Institutional Theory, particularly the institutional effectiveness perspective, because it provides an appropriate basis for explaining how international institutions establish rules, norms, procedures and organizational arrangements for addressing collective problems and how these arrangements influence subsequent outcomes. Institutional Theory is concerned with the ways in which formal rules, institutional structures and established procedures shape the behaviour and interactions of actors within a governance system. In the context of international relations, institutions provide frameworks within which states coordinate their interests, exchange information, develop expectations and establish mechanisms for cooperation. Institutions are therefore not merely administrative structures; they constitute arrangements through which collective-action problems are managed and common objectives pursued. The relevance of Institutional Theory to global climate governance derives from the collective-action character of climate change. Greenhouse gas emissions originate from multiple countries, while their consequences transcend national boundaries. Consequently, individual states have limited capacity to address climate change independently, creating a need for rules and institutions capable of facilitating coordinated action. The United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and Paris Agreement represent successive institutional responses to this problem. Each framework established different rules, principles and procedures for organizing international climate cooperation. The UNFCCC established the foundational principles and institutional structure for cooperation; the Kyoto Protocol introduced differentiated and legally binding emission-reduction commitments for participating developed countries; while the Paris Agreement established a more universal framework based on nationally determined contributions, transparency and progressive ambition. The evolution of these arrangements demonstrates how institutions adapt their rules and mechanisms in response to changing international circumstances and limitations identified in earlier arrangements.

The theory also recognizes that institutional cooperation does not eliminate differences in the interests and capabilities of participating states. Keohane and Victor (2016) demonstrate that global climate governance is characterized by both cooperation and discord because states differ in their economic interests, domestic priorities, capabilities and perceptions of responsibility. These differences influence the design of international institutions and the willingness of states to accept, implement and strengthen collective commitments. From an institutional perspective, therefore, the evolution of the UNFCCC, Kyoto Protocol and Paris Agreement reflects continuing attempts to construct arrangements that can secure cooperation among states with different interests and levels of development. This is particularly important to the present study because the transition from Kyoto's differentiated binding commitments to Paris's nationally determined contributions illustrates an institutional response to the difficulties associated with securing broad and sustained participation in international climate cooperation. The institutional effectiveness dimension provides the principal analytical basis for assessing whether these institutional arrangements have achieved their intended purposes. Helm and Sprinz (2000) argue that the effectiveness of international environmental regimes should be assessed in relation to their effects on the environmental problems they were established to address. Mitchell (2008) similarly distinguishes between the existence of institutional arrangements and their actual behavioural and environmental consequences, arguing that evaluation should consider whether institutions influence state behaviour and contribute to environmental problem solving. Young (2011) further explains that institutional effectiveness concerns the extent to which governance arrangements contribute to resolving the problems for which they were established. These perspectives are particularly relevant to this study because the existence of international climate agreements does not in itself demonstrate effective climate governance. The critical issue is whether the rules and mechanisms established through these agreements have contributed to improved implementation, cooperation and climate action.

Applied to the present study, Institutional Theory provides an analytical framework for examining the evolution of global climate governance across three interconnected institutional stages. The first stage concerns the UNFCCC and the establishment of common principles, institutional rules and procedures for international climate cooperation. The second concerns the Kyoto Protocol and the development of more specific and differentiated commitments for reducing greenhouse gas emissions. The third concerns the Paris Agreement and the emergence of a more universal governance architecture based on nationally determined contributions, transparency, reporting and progressive strengthening of climate action. Examining these stages together makes it possible to identify both continuity and institutional change within the international climate regime. The theory further explains why institutional development can occur alongside persistent governance challenges. International institutions do not possess unlimited independent authority; their implementation depends substantially on the willingness and capacity of states to comply with agreed rules, provide financial resources, develop appropriate policies and sustain political cooperation. Consequently, divergent national interests, inadequate institutional capacity, fragmented governance arrangements, insufficient climate finance, technological constraints and weaknesses in coordination and compliance can influence the outcomes generated by international

climate institutions. Institutional effectiveness must therefore be understood in relation to the wider political, economic and administrative conditions within which international rules are implemented.

The application of Institutional Theory in this study consequently establishes a relationship between institutional evolution, governance mechanisms, implementation and climate outcomes. The evolution of the UNFCCC, Kyoto Protocol and Paris Agreement represents changes in institutional rules and mechanisms, while their effectiveness is assessed through the extent to which those arrangements facilitate collective climate action. Finance, institutional capacity, technology, coordination, national interests and compliance constitute important conditions influencing the movement from international commitments to practical implementation. The theory therefore enables the study to move beyond examining what the United Nations and its associated climate institutions have established to examining how these institutional arrangements have functioned, the challenges that have constrained their implementation, and the extent to which they have contributed to addressing the climate problem.

Research Methodology

The study adopted a qualitative documentary research design to examine the evolution, institutional characteristics, governance mechanisms and implementation challenges of global climate governance between 1992 and 2025. The design was appropriate because the study focused on interpreting historical and institutional developments rather than generating primary quantitative data. Documentary evidence constituted the principal source of data and comprised the original texts of the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and Paris Agreement, decisions of the Conference of the Parties, United Nations and UNFCCC reports, IPCC and UNEP publications, climate-finance documents, policy publications, peer-reviewed journal articles, scholarly books and book chapters. Purposive sampling was used to select documents that were authoritative, credible and directly relevant to the research objectives, particularly materials addressing institutional development, climate commitments, implementation, mitigation, adaptation, finance, technology, capacity building, compliance, transparency, coordination and international cooperation. Primary institutional documents were prioritized for establishing the formal evolution of the climate governance framework, while scholarly and empirical literature provided evidence for assessing implementation, institutional effectiveness and emerging challenges.

Data were collected through systematic documentary review. Selected materials were identified, screened, carefully examined and organized according to their relevance to the research questions. Relevant textual evidence was extracted and subjected to qualitative content analysis. The analysis involved familiarization with the documents, identification and coding of relevant evidence, categorization of related issues and interpretation of emerging patterns in relation to the research questions and Institutional Theory. Comparative analysis was also undertaken across the UNFCCC, Kyoto Protocol and Paris Agreement to identify institutional continuity, changes in governance mechanisms and persistent implementation challenges. Particular attention was given to institutional evolution, mitigation and adaptation, climate finance, technology and capacity building, compliance and implementation, transparency and accountability, institutional fragmentation, national interests, coordination and emerging challenges. The approach enabled the

study to examine not only the formal development of international climate institutions but also the extent to which their rules and mechanisms facilitated implementation and collective climate action.

Evaluation of Research

Evaluation of Research Question One which examined the nature and evolution of United Nations-led global climate governance from the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 to the implementation of the Paris Agreement up to 2025. The thematic content analysis of the UNFCCC, Kyoto Protocol, Paris Agreement, Conference of the Parties (COP) decisions and relevant scholarly literature generated three interconnected themes: the transition from framework governance to binding commitments; the movement from differentiated commitments to universal participation; and the increasing institutionalisation of transparency, review and collective assessment. These themes demonstrate that the evolution of United Nations-led climate governance has involved successive adjustments to the institutional rules, participation structure, regulatory mechanisms and procedures through which states collectively respond to climate change.

Theme One: From Framework Governance to Binding Commitments

The first theme emerging from the content analysis was the transition from framework governance under the UNFCCC to more specific and legally structured commitments under the Kyoto Protocol. The analysis of the UNFCCC showed that its principal institutional contribution was the creation of a common multilateral framework within which states could recognise climate change as a collective international problem and negotiate continuing responses. The Convention established broad principles, responsibilities, reporting procedures and institutional arrangements for international cooperation, but did not impose comprehensive quantified emission-reduction targets on all parties. Bodansky (1993) therefore regarded the Convention as an important foundation for international climate cooperation, while Depledge (2005) demonstrated that the climate regime developed incrementally through continuing negotiations, institutional learning and changing state interests.

The thematic evidence further showed that differentiation constituted a central feature of the initial climate governance architecture. The UNFCCC recognised differences in historical responsibility, national circumstances and capabilities through the principle of common but differentiated responsibilities and respective capabilities. Rajamani (2006) argues that differentiation became a fundamental issue in international environmental negotiations because it linked climate obligations to broader questions of equity, development and historical responsibility. The content analysis therefore indicates that the early United Nations climate regime was characterized by a combination of universal recognition of climate change as a common problem and differentiated expectations concerning responsibility for addressing it. A significant institutional shift became evident with the Kyoto Protocol. The thematic analysis identified a movement from general framework commitments towards quantified and legally binding mitigation obligations for developed countries and economies in transition. Kyoto consequently strengthened the regulatory dimension of the climate regime by introducing internationally negotiated targets, emissions accounting, reporting requirements and compliance-related procedures. Oberthür and Ott

(1999) identified this development as a major transformation in international climate policy, while Barrett (2003) situated legally structured commitments and market mechanisms within the broader problem of designing international institutions capable of influencing state behaviour.

The analysis nevertheless revealed that the Kyoto model contained important structural tensions. Its differentiated approach placed binding quantified obligations primarily on developed countries, while developing countries did not assume equivalent mitigation targets. Victor (2001) argued that this arrangement created difficulties for the long-term effectiveness and political sustainability of the Protocol because the global distribution of emissions was changing and major emerging economies were becoming increasingly significant emitters. The thematic evidence therefore suggests that Kyoto strengthened the legal and regulatory character of climate governance but did not resolve the underlying problem of how mitigation responsibilities should be distributed among states with different historical contributions, capabilities and development priorities. The empirical literature also provides evidence that requires a nuanced interpretation of Kyoto's institutional performance. Aichele and Felbermayr (2019) found evidence that the Protocol produced measurable emission reductions among participating industrialized countries relative to a counterfactual scenario without Kyoto. Conversely, Grunewald and Martinez-Zarzoso (2016) reported more limited effects in their assessment of the Protocol's influence on carbon dioxide emissions. These findings indicate that the thematic evidence does not support a simple interpretation of Kyoto either as an institutional success or failure. Rather, its experience demonstrates that the existence of legally binding international commitments does not by itself determine environmental outcomes. Participation, domestic implementation, economic conditions, institutional design and the distribution of obligations also influence regime effectiveness. The first theme therefore demonstrates that the evolution of United Nations climate governance involved an important movement from establishing an institutional framework towards creating more prescriptive international rules. However, the content analysis also indicates that increased legalisation introduced new challenges concerning participation, differentiation and implementation. The transition from UNFCCC to Kyoto consequently represented institutional development, but it also generated pressures for further adaptation of the global climate governance architecture.

Theme Two: From Differentiated Commitments to Universal Participation

The second theme identified through the content analysis was the movement from differentiated commitments under Kyoto towards universal participation under the Paris Agreement. The evidence demonstrated that this represented one of the most significant changes in the institutional evolution of the United Nations climate regime. Whereas Kyoto concentrated legally binding quantified mitigation commitments primarily on developed countries, Paris established a framework in which all parties are expected to formulate, communicate and maintain nationally determined contributions. The thematic analysis suggests that the transition reflected an attempt to address the participation limitations associated with the Kyoto architecture. Falkner (2016) argues that the Paris Agreement introduced a new logic of international climate politics by moving beyond the rigid developed/developing-country differentiation embedded in Kyoto. Rajamani (2016) similarly explains that Paris sought to reconcile universality with differentiation rather than simply abolishing

differentiation. Thus, the content analysis indicates that Paris did not eliminate the principle of differentiated responsibilities; instead, it incorporated differentiation within a broader universal framework that recognised different national circumstances and capabilities. Another important finding from the thematic analysis was the emergence of a hybrid governance architecture. Under Kyoto, internationally negotiated targets constituted a substantial component of the regulatory structure. Under Paris, states determine the substantive content of their NDCs, while international institutions establish common procedural expectations concerning communication, transparency, review and progression. Bodansky (2016) describes this arrangement as a distinctive legal structure combining binding procedural obligations with nationally determined substantive commitments.

Kuyper et al. (2018) similarly identify the transition from Kyoto to Paris as a fundamental transformation in the evolution of the UNFCCC regime. Their analysis shows that the climate regime moved from a predominantly top-down system based on differentiated targets towards a hybrid system combining international coordination with nationally determined contributions. Keohane and Victor (2016) provide a broader explanation for this transition by demonstrating that international climate cooperation is constrained by differences in national interests, domestic political conditions and economic capabilities. The thematic evidence therefore suggests that the Paris architecture emerged partly because a more flexible institutional structure was considered necessary to secure participation across countries with substantially different interests and circumstances. The analysis further revealed that universal participation introduced a new institutional challenge: the relationship between breadth of participation and depth of commitment. Dimitrov et al. (2019) conceptualize this problem as a tension among broad participation, ambitious commitments and satisfactory compliance. The Paris framework succeeded in establishing a common system involving virtually all parties to the Convention, but it gave states considerable discretion over the substantive level of their NDCs. The implication emerging from the thematic analysis is that the expansion of participation shifted part of the effectiveness problem from international treaty negotiation towards domestic implementation.

The second theme also revealed that the evolution from Kyoto to Paris occurred within a wider transformation of global environmental governance. Biermann et al. (2009) describe contemporary global governance as increasingly fragmented across multiple institutions, actors and governance arrangements, while Pattberg and Stripple (2008) emphasize the growing significance of transnational and non-state climate initiatives. Consequently, the Paris Agreement represents not merely a new treaty structure but part of a broader movement towards more decentralised, networked and multi-actor climate governance. The thematic evidence therefore demonstrates that the movement from differentiated commitments to universal participation was both an institutional innovation and a response to the political limitations of the earlier regime. It expanded the geographical and political scope of climate governance, but simultaneously increased the importance of nationally determined action, domestic policy implementation and international transparency. Universal participation thus strengthened the inclusiveness of the climate regime while creating a more complex challenge concerning the ambition and implementation of national commitments.

Theme Three: Increasing Transparency, Review and Collective Assessment

The third theme emerging from the content analysis was the increasing institutionalization of transparency, reporting, review and collective assessment. The evidence showed a gradual movement from the general reporting arrangements associated with the UNFCCC towards more formalized accounting and review under Kyoto and subsequently to the enhanced transparency and global stocktake arrangements under Paris. This development reflects an important change in how the United Nations climate regime seeks to influence state behaviour. The thematic analysis demonstrated that transparency has become increasingly important because the international climate regime operates without a central authority possessing comprehensive enforcement powers over sovereign states. International institutions consequently rely substantially on information, reporting, monitoring, review and reputational mechanisms. Helm and Sprinz (2000) argue that the effectiveness of international environmental regimes should be assessed in terms of their capacity to influence state behaviour and contribute to solving the environmental problem. Mitchell (2008) similarly stresses that the existence of international rules should be distinguished from their actual performance, while Young (2011) emphasizes the importance of institutional design, implementation and environmental outcomes in evaluating international environmental regimes.

Within the Paris framework, the thematic analysis identified transparency and review as mechanisms intended to establish a continuing cycle of reporting, assessment and renewed commitment. The enhanced transparency framework provides information on national climate action, while the global stocktake provides an institutional process for assessing collective progress towards the objectives of the Agreement. The significance of these arrangements lies in their capacity to connect information about implementation with subsequent rounds of international and national climate policy. Young (2016) argues that the Paris Agreement should be understood partly as a dynamic institutional arrangement in which states are expected to progressively strengthen their commitments rather than as a one-time allocation of fixed international obligations. This interpretation is consistent with the thematic evidence, which indicates that Paris relies considerably on iterative governance, transparency, review and progressive ambition. Keohane and Victor (2016) likewise emphasize that international cooperation can develop through institutional arrangements that improve information, coordination and expectations even where strong centralized enforcement is absent.

The analysis, however, revealed a critical distinction between transparency and effectiveness. The creation of stronger reporting and review procedures improves the ability of the international community to identify implementation gaps, but it does not necessarily compel states to close those gaps. Roelfsema et al. (2020) found substantial differences between national climate policies and the level of action required to achieve the objectives of the Paris Agreement. Dimitrov et al. (2019) similarly argue that the institutional effectiveness of Paris depends upon whether its procedures can generate sufficiently ambitious commitments and satisfactory compliance. The third theme therefore demonstrates that United Nations-led climate governance has become increasingly sophisticated in terms of information, monitoring, transparency and collective assessment. However, the thematic evidence indicates that procedural sophistication should not automatically be interpreted as equivalent to environmental effectiveness. Transparency provides the institutional basis for identifying shortcomings and encouraging accountability, but implementation remains

dependent upon national governments, domestic institutions, political interests, financial resources and technological capabilities.

Research Question Two

Research Question Two examined the major challenges confronting the implementation and effectiveness of United Nations-led global climate governance frameworks. The thematic content analysis of the UNFCCC, Kyoto Protocol, Paris Agreement, relevant COP decisions, climate governance literature and empirical studies generated seven interconnected themes: implementation gaps; climate finance constraints; institutional fragmentation; divergent national interests; institutional and technical capacity limitations; technology and knowledge gaps; and challenges of compliance, transparency and accountability. The themes demonstrate that the central difficulties confronting global climate governance are not principally associated with the absence of international institutions. Rather, they concern the ability of existing institutional arrangements to translate internationally negotiated commitments into coordinated, adequately financed, technologically supported and nationally implemented climate action.

Theme One: Implementation Gap

The first and most prominent theme emerging from the content analysis was the persistent gap between international climate commitments and their implementation at national level. The analysis revealed that the evolution of increasingly sophisticated international agreements has not been matched by equivalent levels of domestic policy implementation. The UNFCCC established a framework for cooperation, Kyoto introduced quantified commitments for developed countries, and Paris established nationally determined contributions for all parties; nevertheless, significant differences remain between commitments communicated internationally and the policies and measures actually implemented within countries. Roelfsema et al. (2020) provide strong empirical evidence for this implementation problem. Their assessment of national climate policies found substantial gaps between implemented policies, national pledges and pathways consistent with the temperature objectives of the Paris Agreement. Their findings are particularly important because they demonstrate that the implementation problem occurs even where countries have formally adopted climate targets. In other words, the existence of an NDC does not necessarily indicate that the policies required to achieve it have been fully implemented. This distinction between commitment and implementation is central to evaluating the effectiveness of international environmental institutions.

The institutional effectiveness literature reinforces this finding. Mitchell (2008) argues that evaluating an international environmental institution requires distinguishing between the existence of rules, compliance with those rules and the extent to which institutional arrangements contribute to solving the underlying environmental problem. Young (2011) similarly emphasises that regime effectiveness cannot be inferred simply from the creation of international agreements. It must be assessed in relation to behavioural change and environmental outcomes. The thematic analysis therefore indicates that the principal implementation challenge facing United Nations-led climate governance is the translation of international commitments into domestic legislation, policies, investment decisions and measurable emission reductions. The implementation gap is further

complicated by differences in domestic political institutions and economic structures. Keohane and Victor (2016) demonstrate that climate cooperation is strongly influenced by national preferences, domestic political constraints and economic interests. Consequently, international agreements operate through national institutions rather than independently of them. The effectiveness of the Paris Agreement therefore depends significantly on the willingness and capacity of governments to incorporate international commitments into national development and sectoral policies. The analysis consequently identifies implementation failure not as evidence that international climate institutions are irrelevant, but as evidence of the limits of international institutions operating within a sovereign-state system. The international regime can establish expectations, procedures and coordination mechanisms, but implementation remains substantially dependent on national governments and domestic institutions.

Theme Two: Climate Finance Constraints

The second major theme identified through the content analysis was inadequate and uneven access to climate finance. Finance constitutes an essential component of global climate governance because many developing countries face substantial financial constraints in implementing mitigation, adaptation and resilience measures. The analysis showed that the challenge is not limited to the aggregate availability of climate finance; it also concerns accessibility, institutional requirements, distribution, absorptive capacity and the ability of vulnerable countries to develop bankable projects. Garschagen and Doshi (2022) provide particularly relevant empirical evidence concerning the relationship between institutional capacity and access to adaptation finance. Their assessment of Green Climate Fund allocations found that many highly vulnerable countries, particularly least developed countries in Africa, had difficulty accessing funding, while countries with weaker institutional capacities were particularly disadvantaged. Their findings indicate that competitive and technically demanding funding procedures can unintentionally exclude countries that possess high climate vulnerability but limited administrative and project-development capacity.

This finding has important implications for the effectiveness of United Nations-led climate governance. If countries most exposed to climate impacts are simultaneously those least able to satisfy complex funding requirements, the institutional design of climate finance can reproduce inequalities within the climate governance system. Climate finance therefore represents both a resource problem and an institutional design problem. The content analysis indicates that access procedures, accreditation requirements, project preparation, fiduciary standards and reporting obligations can constitute significant barriers for countries with limited administrative capacity. The finance challenge is also connected to the broader principle of equity within international climate governance. Ciplet and Roberts (2017) argue that struggles over climate finance are closely connected to wider questions of justice concerning who should bear the costs of climate change and who should receive support for adaptation and development. Consequently, the effectiveness of global climate governance cannot be evaluated solely according to the amount of finance mobilized. Consideration must also be given to whether financial resources reach countries and communities facing the greatest climate-related vulnerabilities. The thematic evidence therefore demonstrates that climate finance remains a critical intermediary between international commitments and practical implementation. Without predictable, accessible and adequately distributed finance, the

capacity of developing countries to implement NDCs, strengthen adaptation and undertake low-carbon development remains constrained.

Theme Three: Institutional Fragmentation

The third theme emerging from the analysis was institutional fragmentation. Global climate governance no longer operates through the UNFCCC system alone. Instead, it involves a complex network of international organizations, multilateral development institutions, climate funds, regional organizations, national governments, private actors, non-governmental organizations and transnational initiatives. This institutional diversity has expanded the number of actors contributing to climate governance, but it has also created challenges of coordination, overlap and coherence. Biermann et al. (2009) conceptualize fragmentation as a condition in which global governance is distributed across multiple institutions with different memberships, rules, objectives and procedures. Their analysis demonstrates that fragmentation does not necessarily produce negative outcomes in every circumstance. Institutional diversity can provide opportunities for experimentation, specialisation and additional resources. However, fragmentation can also generate duplication, conflicting priorities, transaction costs and coordination difficulties. Zelli (2011) similarly observes that global climate governance has developed into a complex institutional architecture involving multiple overlapping arrangements rather than a single integrated regime. The thematic content analysis confirms this observation. Climate mitigation, adaptation, finance, technology, capacity-building and sustainable development are addressed through multiple institutional channels, each with distinct procedures and constituencies. This creates opportunities for broader intervention but can make coordination more difficult.

The implications for effectiveness are significant. Where institutions have overlapping mandates, countries may face multiple reporting requirements, different eligibility criteria and competing administrative procedures. Fragmentation can also produce uncertainty about institutional responsibility and weaken coordination between international programmes. Biermann et al. (2009) therefore suggest that the consequences of fragmentation depend on the relationships among institutions and the degree to which their activities are synergistic, cooperative or conflictive. The thematic analysis consequently indicates that fragmentation is not inherently a weakness of global climate governance. Rather, the challenge lies in managing institutional diversity in ways that promote complementarity rather than duplication and competition. The effectiveness of the United Nations climate governance system therefore depends partly on its ability to coordinate the increasingly complex network of institutions operating within and around the UNFCCC framework.

Theme Four: Divergent National Interests

The fourth theme identified through the content analysis was the continuing influence of divergent national interests. Climate change represents a collective global problem, but states differ substantially in their economic structures, energy systems, development priorities, resource endowments and perceptions of responsibility. These differences influence the commitments governments are willing to accept and the policies they are prepared to implement. Keohane and Victor (2016) demonstrate that cooperation and discord in climate governance are closely

associated with differences in national preferences and interests. Countries dependent on fossil-fuel production, for example, may face different transition pressures from countries with diversified economies or substantial renewable-energy potential. Similarly, developing countries may regard climate policy through the additional lens of poverty reduction, industrialisation, energy access and development. This tension was evident throughout the evolution of the UN climate regime. The differentiation debates under Kyoto reflected disagreement concerning historical responsibility and the allocation of mitigation obligations, while the Paris negotiations sought to establish a framework capable of incorporating states with substantially different circumstances. Rajamani (2016) demonstrates that differentiation remained a politically sensitive component of the Paris Agreement because states continued to differ over how equity and responsibility should be interpreted.

The content analysis therefore indicates that divergent national interests constitute a structural challenge rather than a temporary obstacle. International climate governance requires states to cooperate despite differences in the distribution of costs and benefits. The problem is particularly acute where immediate domestic economic interests' conflict with long-term global environmental objectives. International institutions can facilitate negotiation and coordination, but they cannot completely remove these underlying differences. The significance of this theme is that implementation is ultimately filtered through national political and economic systems. Even when governments endorse common international objectives, domestic interests can affect the speed, scale and direction of implementation. The effectiveness of United Nations-led climate governance is therefore partly dependent upon its ability to accommodate legitimate differences while maintaining sufficient collective ambition.

Theme Five: Institutional and Technical Capacity

The fifth theme emerging from the content analysis was inadequate institutional and technical capacity, particularly in developing countries. Effective implementation of international climate commitments requires functioning public institutions capable of policy formulation, data collection, emissions accounting, project development, financial management, monitoring and reporting. Where these capacities are weak, international commitments may be difficult to translate into effective domestic programmes. The findings of Garschagen and Doshi (2022) provide direct evidence of this relationship. Their analysis found that institutional capacity was a major factor influencing countries' ability to access Green Climate Fund resources, with highly vulnerable countries possessing weak institutional systems particularly disadvantaged. This demonstrates that capacity constraints affect not only implementation after resources are obtained but also the ability to access the resources required for implementation. Capacity limitations also affect compliance with transparency and reporting requirements. The Paris Agreement's enhanced transparency architecture requires countries to generate and report increasingly sophisticated information concerning emissions, policies and progress towards NDCs. Countries with limited technical expertise, statistical infrastructure and administrative resources may find these requirements more difficult to satisfy. The analysis therefore shows that institutional capacity operates as a mediating factor between international commitments and implementation outcomes. A country may formally support international climate objectives but lack the personnel, institutions, data systems, financial

management structures or technical expertise required to operationalise those commitments. This reinforces the argument that capacity-building should be regarded as an integral component of climate governance rather than as a peripheral development intervention.

Theme Six: Technology and Knowledge Gaps

The sixth theme concerned limitations in technology transfer, knowledge exchange and domestic innovation capacity. The analysis demonstrated that access to climate-relevant technologies is important for mitigation, adaptation and sustainable development, but the traditional model of transferring technologies from developed to developing countries has not always produced the expected outcomes. Pandey, de Coninck and Sagar (2022) provide important evidence in this regard. Their review found that international efforts focused narrowly on technology transfer have often failed to produce outcomes commensurate with the needs of developing countries. They argue that effective cooperation should move beyond a simple donor-recipient model towards innovation cooperation involving knowledge exchange, local capabilities, supportive institutions and long-term partnerships. The thematic significance of this finding is that technology gaps cannot be addressed simply by transferring physical technologies. Countries require complementary capacities to adapt, operate, maintain and improve those technologies. Local research institutions, technical education, skilled personnel, appropriate regulatory frameworks and innovation systems therefore form part of the technological requirements for effective climate action.

This challenge also reinforces the relationship between technology and institutional capacity. Where countries lack technical institutions capable of absorbing and adapting new technologies, technology transfer may have limited long-term effects. The content analysis consequently indicates that effective technology cooperation requires sustained institutional learning and domestic innovation capacity rather than one-off transfers of equipment or technical products. Pandey et al. (2022) therefore provide a useful conceptual basis for understanding this challenge: international cooperation should be structured around mutually beneficial innovation partnerships and the development of local technological capabilities rather than a narrow conception of technology as a commodity transferred from one country to another.

Theme Seven: Compliance, Transparency and Accountability

The seventh theme identified through the thematic analysis was the continuing challenge of ensuring that international commitments are translated into credible domestic action. The Paris Agreement strengthened transparency and review mechanisms considerably, but the analysis indicates that transparency should not be confused with enforcement. Reporting information and reviewing national actions can expose implementation gaps, but the international regime has limited direct authority to compel governments to adopt particular domestic policies. Dimitrov et al. (2019) identify this problem as part of the institutional effectiveness challenge confronting the Paris Agreement. Their analysis highlights the tension between broad participation, the depth of commitments and satisfactory compliance. The Paris architecture deliberately prioritises universal participation and nationally determined contributions, but this design also means that international institutions have limited control over the substantive content and domestic implementation of national commitments. Helm and Sprinz (2000) similarly argue that regime effectiveness involves

more than formal institutional existence, while Mitchell (2008) emphasises the importance of distinguishing between institutional outputs, behavioural effects and environmental outcomes. The thematic evidence supports this distinction.

International agreements, COP decisions, NDCs, reports and review procedures represent institutional outputs. Actual changes in national policies and emissions constitute behavioural and environmental outcomes. A governance framework can therefore produce extensive institutional activity without necessarily producing proportional environmental improvement. Roelfsema et al. (2020) provide empirical evidence of this distinction by demonstrating that existing national policies were insufficient to fully realise pledged contributions and the broader Paris temperature objectives. The finding indicates that the central accountability problem is not simply whether states submit commitments, but whether those commitments are translated into sufficiently ambitious and effectively implemented national policies. The thematic analysis therefore suggests that the Paris Agreement's transparency architecture represents an important institutional mechanism for accountability, but its effectiveness depends on the political willingness and institutional capacity of states to respond to the information generated through the process. Transparency can reveal gaps; it cannot independently eliminate the political and economic interests that produce them.

Discussion of Findings

The findings demonstrated that global climate governance under the United Nations had undergone substantial institutional development, adaptation and learning, although this evolution had not translated proportionately into climate outcomes. The UNFCCC established the foundational framework for international cooperation, Kyoto introduced differentiated and legally binding commitments, while Paris adopted a more universal and flexible architecture based on nationally determined contributions, transparency and progressive ambition. This institutional progression supported Institutional Theory by demonstrating how international institutions adapted to changing political interests, problem structures and implementation challenges. The transition from UNFCCC to Kyoto and Paris also reinforced Kuyper et al.'s (2018) argument that the climate regime evolved from a predominantly top-down system towards a more hybrid arrangement combining international rules with nationally determined action.

The findings on Kyoto showed that institutional effectiveness could not be reduced to a simple success-or-failure judgement. Aichele and Felbermayr (2019) found evidence of emission reductions associated with Kyoto participation, while Grunewald and Martinez-Zarzoso (2016) demonstrated the importance of methodological approaches and counterfactuals in assessing the Protocol's effects. The findings therefore supported the view that environmental effectiveness was contextual and should be assessed through the relationship between institutional intervention and actual outcomes. This was consistent with Helm and Sprinz (2000) and Mitchell (2008), who distinguished institutional outputs from outcomes and impacts. While treaties, reporting mechanisms and negotiations represented institutional outputs, actual emission reductions, adaptation and progress towards temperature objectives represented substantive outcomes. The findings concerning Paris further demonstrated this institutional dilemma. Its universal participation model addressed some limitations of Kyoto but increased reliance on nationally determined commitments, creating challenges concerning ambition, consistency and implementation. Dimitrov

et al. (2019) conceptualized this as a trilemma involving participation, commitment and compliance. Similarly, Roelfsema et al. (2020) identified continuing implementation and ambition gaps between national policies, commitments and the pathways required to achieve Paris temperature objectives. The findings therefore indicated that the principal challenge was increasingly the conversion of international commitments into effective domestic policies and measurable environmental outcomes. This supported Young's (2011) argument that international regime effectiveness depended on the interaction between international institutions and the political, economic and institutional environments in which they operated.

Climate finance emerged as another important constraint. Garschagen and Doshi (2022) found that highly vulnerable developing countries, particularly least developed countries, experienced difficulties accessing adaptation finance because of institutional and procedural constraints. The present findings similarly demonstrated that financial commitments alone were insufficient where countries lacked the institutional capacity to access and utilise resources effectively. The finance challenge therefore had an important equity dimension because differences in financial and institutional capacity affected the ability of states to implement international climate commitments. Institutional fragmentation also emerged as a significant challenge. The expansion of climate institutions, funds, programmes and partnerships created opportunities for specialised expertise and additional resources but simultaneously increased coordination requirements, overlapping mandates and implementation complexities. This supported Biermann et al.'s (2009) argument that fragmentation could generate both cooperative opportunities and governance costs. It also reinforced Zelli's (2011) observation that global climate governance had become increasingly characterised by multiple public and private institutions operating across different levels and with different objectives. The UN therefore operated within a wider and increasingly complex governance architecture rather than as the sole centre of climate governance.

The findings on adaptation governance further demonstrated that institutional expansion did not automatically produce effective cooperation or resource allocation. Research on international organisations showed that although climate adaptation had increasingly been incorporated into development, food, health and related policy areas, concrete collaboration, policy change and financial allocation could lag behind institutional recognition. Institutional complexity and funding constraints therefore remained important determinants of organisational responses. This reinforced the present finding that institutional diversification created both additional opportunities for climate action and greater requirements for coordination. Divergent national interests constituted another fundamental constraint. Climate governance involves contested questions concerning responsibility for emission reductions, climate finance, adaptation costs and the distribution of transition burdens. Differences in economic structures, development levels, energy systems and national priorities therefore influenced international cooperation. Keohane and Victor (2016) similarly argued that deep climate cooperation was difficult because states possessed different preferences and interests. The transition from Kyoto to Paris reflected this political reality: Paris increased flexibility and participation by allowing states to determine their own contributions, but this also shifted a substantial part of the effectiveness problem towards domestic implementation.

The findings further established that institutional and technical capacity was essential to climate-governance effectiveness. Effective implementation required technical expertise, reliable emissions data, policy institutions, monitoring systems, financial-management capacity and inter-ministerial coordination. Where such capacities were weak, international commitments were less likely to produce effective domestic action. Technology and knowledge gaps reinforced this challenge. Pandey et al. (2022) argued that conventional technology-transfer approaches were insufficient and that greater emphasis was required on innovation cooperation and local technological capabilities. The findings similarly showed that technology gaps were interconnected with financial, institutional and knowledge constraints. Transparency, compliance and accountability were also important dimensions of institutional effectiveness. The movement from Kyoto to Paris increased the importance of reporting, review, transparency and collective assessment because Paris relied more heavily on nationally determined action. These mechanisms could improve information, trust and accountability, although transparency alone did not necessarily compel states to close identified performance gaps. The findings therefore suggested that the effectiveness of the Paris Agreement depended on the interaction of transparency mechanisms, domestic implementation and progressive increases in national ambition.

Taken together, the findings provided substantial support for Institutional Theory. The evolution of the UN climate regime reflected institutional learning and incremental adaptation in response to political and implementation limitations. Kyoto attempted to strengthen commitments through legally defined targets, while Paris adapted towards universal participation and nationally determined action. However, institutional evolution alone did not guarantee environmental effectiveness. As emphasised by Helm and Sprinz (2000), Mitchell (2008) and Young (2011), institutional performance remained dependent on the wider political, financial, administrative and technological conditions within which institutions operated.

Conclusion

The study examined the United Nations and the evolution of global climate governance through a critical analysis of the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and Paris Agreement from 1992 to 2025. The study established that global climate governance underwent substantial institutional evolution during the period. The UNFCCC provided the foundational framework and principles for international climate cooperation; the Kyoto Protocol subsequently introduced differentiated and legally binding emission-reduction commitments; while the Paris Agreement developed a more universal and nationally determined architecture based on nationally determined contributions, transparency, periodic review and progressive ambition. The study further established that this institutional evolution represented an important process of institutional learning and adaptation. Changes from the UNFCCC to Kyoto and subsequently to Paris reflected attempts to respond to limitations encountered within earlier institutional arrangements, changing patterns of global emissions, divergent national interests and difficulties associated with implementation and compliance. The evolution therefore demonstrated that international climate institutions were capable of adapting their rules, procedures and governance mechanisms to changing political and environmental circumstances. Despite this institutional development, the study found a persistent gap between institutional commitments and substantive

climate outcomes. The existence of international agreements, nationally determined contributions, reporting mechanisms and financial institutions had not, by itself, produced reductions and adaptation outcomes commensurate with the scale and urgency of the climate challenge. The findings consequently established an important distinction between institutional output and institutional effectiveness. The former was evident in the proliferation of agreements, commitments, institutions and procedures, while the latter remained constrained by weaknesses in implementation, finance, capacity, coordination, technology and accountability.

The study also established that climate finance represented a critical determinant of the effectiveness and equity of global climate governance. The availability of financial mechanisms did not automatically ensure that vulnerable developing countries could access and effectively utilise climate finance. Institutional and technical capacity, complex procedures and uneven national capabilities influenced access to international support. Similarly, institutional fragmentation expanded the range of actors and resources involved in climate governance but increased the requirements for coordination and coherence. The study further found that divergent national interests remained a fundamental constraint on collective climate action. States continued to differ in their economic structures, development priorities, energy systems, financial capacities and perceptions of responsibility. These differences affected the ambition and implementation of international commitments. Technology and knowledge gaps, particularly in developing countries, compounded these challenges by limiting the capacity of some states to translate international commitments into practical mitigation and adaptation measures.

Recommendations

I. Establish an implementation-centred UN climate governance mechanism

The UNFCCC should strengthen the implementation dimension of the Paris Agreement by establishing clearer and more systematic mechanisms for tracking the translation of nationally determined contributions, adaptation plans and climate-finance commitments into domestic action. Periodic assessments should distinguish between commitments made, policies adopted, resources mobilised and outcomes achieved. Such an approach would enable persistent implementation gaps to be identified and addressed through technical assistance, institutional support and subsequent review.

II. Reform climate-finance access and strengthen institutional capacity in developing countries

The UN climate-finance architecture should simplify access procedures and expand direct-access arrangements for vulnerable developing countries while strengthening long-term institutional capacity for project preparation, financial management, monitoring, reporting and evaluation. Climate-finance institutions should also provide sustained technical assistance alongside financial resources so that countries with limited administrative capacity are better positioned to convert available finance into implementable mitigation and adaptation programmes. This would address the finding that financial commitments alone do not guarantee effective or equitable climate action.

III. Strengthen coordination, technology cooperation and accountability across the climate governance system

The UNFCCC should promote stronger coordination among UN agencies, climate funds, multilateral development banks, national governments, research institutions and other relevant climate-governance actors. Coordination should be complemented by long-term technology and innovation partnerships that support local research capacity, technical skills, maintenance capabilities and knowledge development in developing countries. At the same time, transparency and reporting mechanisms should increasingly connect international commitments with measurable implementation indicators. This integrated approach would reduce institutional duplication, strengthen domestic capabilities and improve accountability for actual climate outcomes rather than focusing primarily on the adoption of commitments.

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