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The Implications of the Kyoto Protocol for COP: Why Is Global Environmental Governance Political? A Study in Environmental Anthropology

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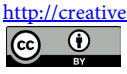

Abstract

The issue of climate change has become a critical concern for the international community, prompting the establishment of various frameworks for environmental governance. One such milestone was the adoption of the Kyoto Protocol in 1997 under the United Nations Framework Convention on Climate Change (UNFCCC). The protocol introduced legally binding emission reduction targets for industrialized nations, which are primarily responsible for greenhouse gas (GHG) emissions during the first commitment period. While supporters praised the protocol as a significant step forward, critics have raised concerns about its effectiveness, particularly regarding the rigid targets and timelines imposed without accounting for disparities in national capabilities and interests. This paper offers a critical assessment of the Kyoto Protocol's performance and the Paris Agreement (COP), highlighting both its achievements and limitations. It also proposes potential amendments to improve the protocol's efficiency and adaptability in future climate agreements. Furthermore, the study investigates the political nature of global environmental governance, exploring why institutions often struggle to implement environmental policies effectively and address the vulnerabilities of climate-affected populations. Drawing on empirical insights from environmental anthropology, this research reveals how power dynamics, institutional constraints, and socio-political factors influence the governance of global climate initiatives.

Keywords

Environmental Governance, Kyoto Protocol, Political Nature, Environmental

Policies, Environmental Anthropology, Power Dynamics

1. Introduction

Climate change is often described as a ticking clock; each incremental rise in greenhouse gas (GHG) emissions leads to long-term, potentially irreversible alterations in the Earth's climate system. Greenhouse gases, such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and sulfur hexafluoride (SF_6), absorb infrared radiation, thereby trapping heat in the atmosphere. While a certain concentration of these gases is necessary to sustain life by maintaining the planet's temperature, human activities, particularly fossil fuel combustion, deforestation, and industrial processes, have significantly increased their levels, causing global surface temperatures to rise at an alarming rate.

To address this growing environmental crisis, the international community has taken collective action through various climate agreements, most notably the Kyoto Protocol, adopted in 1997 under the United Nations Framework Convention on Climate Change (UNFCCC). Entering into force on 16 February 2005, the Kyoto Protocol was the first international treaty to impose legally binding emission reduction targets on industrialized countries (referred to as Annex I countries), which are largely responsible for historical GHG emissions. The first commitment period covered the years 2008 to 2012, requiring developed nations to reduce their emissions to an average of 5.2% below 1990 levels.

The Protocol introduced market-based mechanisms to provide flexibility in achieving emission targets, including:

- Joint Implementation (JI).
- International Emissions Trading (IET).
- Clean Development Mechanism (CDM).

Under the CDM, defined in Article 12, Annex B countries (those with binding targets) could invest in emission-reduction projects in developing countries (non-Annex I) and earn Certified Emission Reduction (CER) credits, each equivalent to one ton of CO_2. These credits could be traded or used to meet part of their emission reduction targets, enabling both cost-effective mitigation and sustainable development support for Global South. The Kyoto framework placed the primary responsibility for climate action on developed nations based on the principle of "common but differentiated responsibilities" (CBDR). This classification divides countries into:

- Annex I: Industrialized countries and economies in transition (e.g., OECD nations and former Soviet states).
- Annex II: The wealthiest countries, responsible for providing financial and technological support to developing nations.
- Non-Annex I: Developing countries, with no mandatory emission reduction obligations.

Although the Kyoto Protocol marked a significant milestone in global environmental governance, its effectiveness and political relevance have been subject to criticism. Some major emitters, including the United States, did not ratify the protocol, and others, like Canada, withdrew. Moreover, the agreement's scope did not include binding commitments for emerging economies like China and India, whose emissions have increased rapidly in recent years.

In response to these challenges, a more inclusive and flexible agreement, the Paris Agreement, was adopted in 2015 and came into force in 2016. Unlike Kyoto, the Paris Agreement includes both developed and developing countries under its framework, encouraging voluntary Nationally Determined Contributions (NDCs) to achieve the long-term goal of limiting global warming to well below 2˚C above pre-industrial levels. As of 2025, global environmental governance continues to evolve amid complex geopolitical, economic, and ecological challenges. The legacy of the Kyoto Protocol remains important for understanding how international environmental policies have developed, why some governance mechanisms succeed or fail, and how political interests shape the global climate agenda.

This paper aims to critically analyze the performance and implications of the Kyoto Protocol, explore the political nature of global environmental governance, and evaluate the structural and anthropological challenges in enforcing environmental policies, particularly in the context of climate vulnerability and global inequality.

2. Background of the Study

The Kyoto Protocol, adopted in 1997 and entered into force on 16 February 2005, was the first major international treaty that sought to legally bind industrialized nations to reduce their greenhouse gas (GHG) emissions. Its overarching vision was twofold: 1) to reduce emissions in developed countries to levels 5% below their 1990 emissions during the first commitment period (2008-2012), and 2) to support climate mitigation and adaptation efforts in developing countries through mechanisms such as Joint Implementation (JI), the Clean Development Mechanism (CDM), and International Emissions Trading (IET).

Under this agreement, 37 industrialized countries and the European Union committed to specific reduction targets, covering key greenhouse gases including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons (HFCs). To meet these goals, many countries required an 18% reduction in emissions from business-as-usual (BAU) trajectories by 2008. The Kyoto Protocol was hailed by many proponents as a landmark achievement in climate diplomacy for several reasons:

- It established binding emission reduction targets for industrialized nations.
- It laid the groundwork for market-based mechanisms like carbon trading.
- It initiated a global dialogue about climate justice and historical responsibility, recognizing that the majority of emissions originated from the Global North.

However, criticism soon followed, especially from economists and political an-

alysts. Some argued that the Protocol was:

- Economically inefficient: Lacking flexibility for countries to meet targets without harming growth.
- Politically impractical: Due to a lack of universal participation and enforcement mechanisms.
- Environmentally ineffective: Because it did not include binding targets for emerging economies like China and India, whose emissions were rapidly growing.

A major blow to the Protocol's legitimacy came when the United States, the world's largest emitter at the time, refused to ratify it, citing economic disadvantages and exclusion of major developing nations. Additionally, Russia's delayed ratification kept the agreement from entering into force for several years. Although Russia eventually ratified the treaty in 2004, enabling the treaty to become legally binding in 2005, the overall enthusiasm was dampened. Another critical issue emerged from the over-allocation of emission allowances (especially to the former Soviet Bloc), which led to what many experts described as "hot air" trading—the trading of surplus allowances not resulting from genuine reductions, but from economic decline and industry collapse. Despite its flaws, Kyoto set the foundation for international climate cooperation. It highlighted the principle of "common but differentiated responsibilities" (CBDR), which has remained central to all subsequent climate agreements. However, Kyoto's narrow focus on legally binding emission targets for developed countries made it unsustainable as a long-term global solution.

3. Post-Kyoto Developments and the Transition to the Paris Agreement

Emphasized the Post-Kyoto Developments and the Transition to the Paris Agreement: In recognition of Kyoto's shortcomings, the international community shifted toward a more inclusive, flexible approach. This culminated in the adoption of the Paris Agreement in 2015, which:

- Replaced Kyoto's top-down model with a bottom-up approach based on Nationally Determined Contributions (NDCs).
- Included both developed and developing countries, emphasizing global cooperation.
- Set a more ambitious long-term goal to limit global warming to well below 2˚C, with efforts to limit it to 1.5˚C above pre-industrial levels.
- Avoided rigid enforcement in favor of transparency, peer pressure, and iterative improvement.

As of 2025, the Paris Agreement remains the cornerstone of global climate governance. However, the legacy of the Kyoto Protocol continues to shape climate diplomacy debates, particularly around accountability, carbon markets, financial support, and equity. The need to re-evaluate and enhance global environmental governance institutions has become urgent in the face of rising emissions, worsening climate-related disasters, and increasing pressure on climate-vulnerable pop-

ulations. There is also a growing push for reparative climate justice, addressing the disproportionate suffering of those least responsible for climate change.

4. Objective of the Study

Climate change has exposed a deep inequality in global responsibility and vulnerability. The world's poorest populations—particularly the bottom one billion people—contribute only around 3% of the global carbon footprint, yet they bear the brunt of climate-related threats. These individuals often reside in high-risk rural areas or informal urban settlements, where adaptive capacities are low, and state protections are limited. This inverse relationship between carbon emissions and climate vulnerability raises complex questions about justice, responsibility, and governance in a world where national borders are no longer sufficient to define obligations or action (Vanderheiden, 2008).

This study focuses on evaluating the global climate policy framework, especially within the context of the Kyoto Protocol and its legacy. It examines three key policy mechanisms currently deployed in climate governance:

1) Carbon Trading Mechanism—A market-based system where countries with emission credits trade with those that exceed their carbon limits. A key example is the European Emissions Trading System (EU ETS), a cap-and-trade approach that enables countries to meet emission targets cost-effectively. Under Kyoto, carbon trading only became operational once ratifying nations accounted for at least 55% of global CO_2 emissions, a threshold reached after Russia's ratification in 2005.

2) REDD+ (Reducing Emissions from Deforestation and Forest Degradation)—This mechanism addresses the fact that approximately 18% of anthropogenic emissions come from deforestation. REDD+ incentivizes developing countries to conserve forests by offering financial support from developed nations in exchange for verifiable reductions in emissions.

3) Forest Conservation and Sustainable Management—This includes strategies to enhance carbon stocks in forests and promote long-term sustainable use of forest ecosystems. It reinforces environmental diplomacy and sustainable development goals in carbon-sensitive regions.

Based on three policy mechanisms, the objectives of the study are:

- To critically assess the effectiveness and equity of global climate diplomacy, particularly focusing on the structural limitations and potential reforms of the carbon trading mechanism under the Kyoto Protocol and its successors.
- To strengthen and intensify the role of global environmental governance institutions, with a focus on improving compliance, transparency, and policy enforcement across both developed and developing countries.
- To address the disparity in global environmental power dynamics, reduce the influence gap between industrialized and vulnerable nations, and ensure marginalized voices are included in international climate negotiations.
- To contribute to the creation of a more robust and inclusive international climate regime, one that transcends traditional state-centric models and incor-

porates ethical, anthropological, and ecological considerations.

- To propose a new securitization framework for climate-affected populations, focusing on protecting the rights, livelihoods, and dignity of climate victims, especially those in the Global South, through both legal and policy innovations.

5. Research Questions

Based on the objective of the study and the problems identified, here are some clear and focused research questions.

1) How effective are current international climate mechanisms, such as the Kyoto Protocol's carbon trading system, in achieving actual emission reductions?

2) What are the limitations and challenges faced by global environmental governance institutions in enforcing climate policies and supporting vulnerable populations?

3) How can carbon trading and other market-based mechanisms be modified to better align with equitable and sustainable climate goals?

4) What role do power imbalances and inequalities among countries play in shaping global environmental governance and climate diplomacy?

5) How can stronger international regimes and new procedural frameworks be developed to securitize and protect climate-vulnerable populations?

6) What policy measures are necessary to bridge the gap between economic interests and climate justice in global environmental governance?

6. Literature Review

The Recent peer-reviewed studies have expanded our understanding of the Paris Agreement's performance and post-Kyoto carbon markets: Chen, Zhang, & Sun (2022) find that carbon markets are effective under stringent institutional designs, with China's national ETS showing early promise. In another study, Klenert, Funke, Mattauch, & O'Callaghan (2021) argue for integrating green recovery mechanisms into NDCs under the Paris framework. In addition, Kartha, Athanasiou, Kemp-Benedict, & Baer (2023) emphasize equity-based carbon budgeting, proposing differentiated national trajectories for emerging economies. Moreover, Michaelowa, Hermwille, & Lazarus (2024) warn of green washing risks unless offset mechanisms under Article 6 are tightly regulated. These studies demonstrate evolving global approaches toward more inclusive, flexible, and equity-conscious climate regimes after Kyoto.

Effective climate protection policy requires a rational decision-making framework that balances the costs of greenhouse gas (GHG) emission reductions against the benefits of avoiding the adverse consequences of global warming. Classical cost-benefit analysis (Pearce, 1998) provides a framework for quantifying both negative and positive impacts of climate policies in monetary terms, aiming to optimize resource allocation. However, critics of the Kyoto Protocol argue that its limited environmental effectiveness stems from a fundamentally flawed architec-

ture. McKibbin and Wilcoxen (2002) dismiss Kyoto as an impractical policy focused on unrealistic targets, citing its inability to enforce meaningful global emissions reductions.

Maurice Bertrand highlights a common paradox faced by international organizations: they are often credited with responsibilities they do not possess, blamed for failures beyond their control, and their real achievements go unrecognized. This observation applies to institutions like the United Nations Environment Programme (UNEP), which, despite being the UN's principal environmental body, cannot singularly coordinate sustainable development policies given the cross-sectoral nature of environmental issues.

The Intergovernmental Panel on Climate Change (IPCC) played a critical role in elevating climate change to a global security and policy concern, particularly with its Fourth Assessment Report (2007) and subsequent reports. The IPCC's scientific consensus underscored the urgency of mitigating human-induced climate change, reinforcing the United Nations' broader sustainable development agenda (Ban, 2007; WCED, 1987). Despite this, global environmental governance remains fragmented. The ongoing debate often overemphasizes creating a superior global environmental organization (GEO or WEO), diverting attention from the root causes of environmental degradation and the challenges of international cooperation. As scholars argue, confusion between institutions and their mandates can hinder effective governance (UNEP Charter; GEO4 Report).

A key dimension of climate vulnerability relates to human security, understood as freedom from fear, harm, and environmental risks (Füssel, 2007). Vulnerable populations—often the poorest billion—contribute minimally to GHG emissions but face disproportionate climate risks, particularly in rural and urban slum areas (Vanderheiden, 2008). Scholars like Giroux (2006) and Graham (2006) emphasize how disaster governance and social policies often marginalize vulnerable communities, framing them as threats rather than victims deserving protection. In response, initiatives like the Climate Vulnerable Forum (CVF), founded by the Maldives and other vulnerable nations in 2009, have elevated the voices of those most threatened by climate change. The CVF exemplifies how politically marginalized countries can exert influence in global negotiations by framing climate vulnerability as a critical security and diplomatic issue.

Meanwhile, the international humanitarian response system has evolved with increasing funding for disaster relief and emergency interventions, often at the expense of sustainable development programs (USAID, 1990s-2000s). This shift reflects a global governance challenge: balancing urgent humanitarian needs with long-term environmental sustainability (Hornborg et al., 2007). The concept of "Intervention Ecology" and the "Responsibility to Protect" (R2P) framework have emerged as important, though contested, paradigms for legitimizing international interventions to prevent environmental disasters. These raise complex geopolitical questions about sovereignty, security, and the legitimacy of climate diplomacy (Giroux, 2006; Vanderheiden, 2008).

6.1. The Changing Role of Emerging Markets in Climate Agreements

India and China have transitioned from peripheral actors under the Kyoto Protocol to pivotal players in the Paris Agreement. In 1997, neither country was assigned binding targets due to the principle of common but differentiated responsibilities (CBDR). However, their rapid economic growth and associated emissions have forced a re-evaluation of their roles. China is now the world's largest emitter, with India in the top five. Both countries have submitted increasingly ambitious NDCs under the Paris Agreement. China aims to peak CO_2 emissions before 2030 and achieve carbon neutrality by 2060, while India has pledged to reach net-zero emissions by 2070 and increase non-fossil fuel capacity to 500 GW by 2030. Their inclusion reflects a shift toward differentiated yet universal commitments, balancing development needs with climate responsibility. However, international criticism persists over the adequacy of their domestic policies and the transparency of emissions data. These nations increasingly shape global negotiations, demanding climate finance, technology transfers, and recognition of historical injustices. Their growing emissions are now integral to global policy modeling, carbon budgeting, and Article 6 market mechanisms.

6.2. Recent Challenges and Policy Debates

The Kyoto Protocol's emphasis on carbon trading and market mechanisms has faced criticism for privileging countries with excess carbon allowances, enabling them to purchase credits rather than reduce emissions. Classical cost-benefit analysis by industrialized countries often incentivizes buying allowances over making costly emissions cuts, undermining climate goals. However, recent scientific consensus underscores that no credible "bottom-up" voluntary commitments alone will achieve the Paris Agreement's target of limiting warming to below 2˚C (IPCC Sixth Assessment Report, 2021). A robust "top-down" binding regime is necessary to send clear political signals to investors and businesses, reducing risks associated with high-carbon investments and accelerating the transition to low-carbon economies. The ratification of Kyoto and subsequent agreements, including the Paris Agreement (2015), remain critical as part of the evolving international policy process for climate protection. They underscore the necessity of:

- Strengthening global environmental institutions to enforce climate commitments.
- Addressing power imbalances that marginalize vulnerable populations.
- Creating mechanisms for securitizing climate victims to ensure their protection and adaptation support.

The literature highlights an evolving but still fragmented global environmental governance landscape. While Kyoto was a pioneering effort, its limitations exposed the need for more inclusive, flexible, and enforceable mechanisms. Today's climate diplomacy focuses increasingly on justice, vulnerability, and binding commitments to meet ambitious global climate targets, requiring continuous adapta-

tion of governance frameworks and policy instruments.

6.3. Problems with the Statement

- Kyoto Protocol's Market-Based Loopholes Favor Carbon Overshoot Countries:
- The current Kyoto mechanism privileges countries that exceed their emission targets ("carbon overshoot countries") by allowing them to buy carbon credits rather than making substantial domestic emission reductions. This carbon trading system creates a financial incentive for industrialized countries to purchase allowances instead of investing in real emission cuts, undermining the protocol's environmental goals.
- Cost-Benefit Analysis Encourages Buying Allowances over Cutting Emissions:
- Classical cost-benefit approaches used by industrialized countries suggest that it is economically preferable to buy carbon allowances than to reduce emissions at source. This market-driven logic often delays necessary climate action and favors short-term economic benefits over long-term sustainability.
- Lack of Credible Bottom-Up Solutions to Limit Global Warming Below 2˚C:
- Voluntary, decentralized efforts by individual countries or sectors ("bottom-up" solutions) have proven insufficient to meet the ambitious target of limiting global warming to below 2˚C. Without a binding international framework, these fragmented approaches lack the scale and enforcement mechanisms necessary to drive meaningful global emission reductions.
- Need for a Strong "Top-Down" Binding Regime:
- Only a top-down international regime with legally binding emission reduction targets and timelines can send clear, credible signals to businesses and investors. This reduces risks associated with carbon-intensive investments and encourages capital flows toward low-carbon technologies and industries.
- Urgent Ratification and Enforcement Are Imperative:
- Despite its limitations, the Kyoto Protocol's ratification remains crucial as a foundational step in the global climate policy process. Without effective enforcement and compliance during its commitment period, the international community risks losing momentum, weakening future agreements, and failing vulnerable populations most affected by climate change.
- Insufficient Attention to Climate-Vulnerable Populations and Remedy Measures: The current mechanisms inadequately address the needs and rights of climate-vulnerable people who suffer the greatest risks despite contributing least to emissions. There is a pressing need to develop new procedures to securitize climate victims and ensure equitable adaptation and compensation strategies.

7. Research Methodology and Research Design

Methodology broadly refers to the approaches applied throughout the research process of qualitative research, including data analysis. It also encompasses considerations of reliability and validity to ensure the accuracy and trustworthiness

of findings. This study primarily adopts secondary research approaches: Based on Documentary Analysis, documentary sources required materials to be: peer-reviewed, published by reputable international organizations (e.g., IPCC, UNEP, UNDP), and part of the official COP documentation. Sources from 1990 to 2025 were prioritized to capture the full arc of the Kyoto Protocol's development, implementation, and legacy, including the shift to the Paris Agreement. For this research, I have chosen documentary analysis as the main methodological approach. Data Sources refer to facts, figures, and relevant materials from both past and present that form the basis for analysis. These can be categorized into: Secondary Data: Existing data collected and published by others. Data have been gathered from a wide range of materials, including: Books, academic journals and periodicals, annual reports, research papers, seminar and conference proceedings, publications from international organizations and agencies.

Data Collection and Analysis: The study focuses on reviewing the current status of global environmental governance, with particular emphasis on organizations such as the United Nations (UN), United Nations Environment Program (UNEP), United Nations Development Program (UNDP), USAID, Commission on Sustainable Development (CSD), Environmental Management Group (EMG), Environmental Management Framework (EMGF), and initiatives like World Environment Organization (WEO) and Global Environment Organization (GEO).

Data were collected through:

- Systematic review of official websites, publications, and media reports related to these institutions and their climate policies.
- Examination of key international climate regime documents, including reports from the Sixth and Seventh Conferences of the Parties (COP) held in Bonn and Marrakech.
- Analysis of baseline emissions data, such as the "Baseline Emissions-2010" report, based on the International Energy Outlook (IEO 2001) by the U.S. Department of Energy, to evaluate projected business-as-usual (BAU) emissions during the Kyoto Protocol commitment period.

Research design: This study uses an observational and comparative design. Observational method: To assess and interpret the documented information from various international environmental governance bodies and climate agreements. Comparative analysis: To contrast engagement levels and policy effectiveness between different groups, such as elite actors in control versus treatment settings, to understand autonomous changes in policy and governance.

8. Research Findings

A New Discussion Section to Expand the Critical Framework on Power, Justice, and Global Constraints in Environmental Governance that is inherently political, shaped by asymmetrical power dynamics, institutional path-dependencies, and competing national interests. While treaties like Kyoto and Paris represent formal commitments, their implementation is constrained by governance deficits, partic-

ularly in integrating climate justice and local realities. The Grassroots of Environmental Justice and Vulnerable communities, especially indigenous groups and low-income populations in the Global South, continue to face exclusion from decision-making processes. Environmental justice movements, such as those led by the Climate Action Network and Climate Vulnerable Forum, advocate for procedural inclusion and reparative frameworks. However, their influence is often curtailed by limited institutional mandates and donor-driven agendas. Where the Constraints of Global Governance Structures in Multilateral environmental agreements rely on consensus, making them susceptible to lowest-common-denominator outcomes. Institutions such as the UNFCCC lack enforcement power, while domestic politics often override international commitments. Moreover, financial and technological barriers persist despite the Green Climate Fund's ambitions. The complex interplay between sovereign interests, capitalist imperatives, and geopolitical competition continues to dilute transformative climate action. To address these constraints, future climate governance must not only refine technical mechanisms but also rethink legitimacy, accountability, and representation in policymaking structures.

The study identifies significant gaps and challenges in the implementation of the Kyoto Protocol and the broader functioning of global environmental governance institutions. Although multiple international organizations, such as the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), address sector-specific emissions, and treaties like the Montreal Protocol successfully regulate substances like chlorofluorocarbons, the overall effectiveness of these efforts remains limited. Financing and capacity-building institutions, including UNEP, UNDP, and the World Bank, play critical roles, while the UN International Strategy for Disaster Reduction has recently identified climate change as a top global threat. However, despite these efforts, the global response to climate diplomacy and treaty implementation continues to face serious challenges.

Analysis: Kyoto Protocol in the Context of Carbon Trading—*The first market mechanism linking business with the environment, faces skepticism due to the lack of a comprehensive cost-benefit framework underpinning its targets and timelines. The Kyoto Protocol's emission targets resulted from complex political negotiations rather than purely scientific or economic analyses, leading to moderate emission reduction commitments and flexible mechanisms such as "hot air" credits and sink credits. While critics argue the Protocol lacks ambitious goals or enforceability beyond its initial period, it remains aligned with scientific consensus on the need for long-term emission reductions. From a game-theoretical perspective, the absence of an aggregate emission target may reduce incentives for free-riding and thus encourage participation. Even if all countries fully complied with Kyoto, the impact on global CO_2 concentrations would be limited, partly due to competing national interests and positions, raising questions about the effectiveness of current global environmental institutions.*

Vulnerability and Humanitarian Response—*Where the growing complexity of humanitarian emergencies, characterized by state collapse, widespread human rights violations, food insecurity, mass displacement, and economic collapse—that intersect with climate vulnerability. The increase in humanitarian funding, particularly from agencies like USAID to organizations such as the International Organization for Migration* (*IOM*) *and the Red Cross, reflects a shift towards immediate life-saving interventions rather than long-term sustainable development. This shift points to the intricate relationship between disaster politics, human security, and global governance in the context of climate change.*

9. Recommendations

In light of the findings, the study advocates for reform rather than outright rejection of the Kyoto Protocol framework. Reform should be viewed as a sign of institutional vitality and adaptability, not failure. Purposeful reforms are necessary to bridge the gap between political expectations and institutional capabilities, allowing the climate governance regime to evolve with scientific progress and political realities. Strengthening international mechanisms to enhance compliance and accountability is essential. There should be an emphasis on expanding the scope of emission reduction commitments beyond the current frameworks. Institutional reforms should prioritize integration between climate mitigation and adaptation, as well as the inclusion of vulnerable populations in policy-making. Enhanced cooperation between global environmental organizations and humanitarian agencies is needed to address climate-related vulnerabilities holistically.

10. Conclusion

Critics have often dismissed the Kyoto Protocol as an economically inefficient and politically impractical agreement (McKibbin & Wilcoxen, 2002). However, this study presents a more balanced view. The Protocol incorporates a flexible control mechanism that allows for iterative adjustments through successive commitment periods. This design acknowledges uncertainties and provides room for future policy refinement based on emerging scientific knowledge. Although uncertainties surrounding climate science and economic impacts have hindered more ambitious international agreements, the Protocol represents a necessary starting point for cooperative global action on climate change. The reluctance of major emitters to fully participate highlights the difficulty of achieving binding commitments in a complex geopolitical landscape. The study argues that clarifying the practical risks of climate change should be prioritized over perfecting the scientific mechanisms behind it. Immediate action, especially shifting towards renewable energy and low-carbon technologies, is crucial. Uncertainty should not be a reason for inaction; rather, it justifies adopting "no-regrets" policies that yield benefits regardless of future climate scenarios. The future international framework should consist of a series of flexible and evolving commitment periods, allowing targets to be updated in line with technological advancements and scientific pro-

gress. Ultimately, the major challenge remains: how to design and implement institutional settings that foster effective, comprehensive, and sustained international cooperation for substantial global emission reductions over the long term.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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