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The Role of Courts in Interpreting and Enforcing Environmental Laws Related to Climate Change: A Catalyst for Progress or a Barrier?

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ABSTRACT

The increasing urgency of **climate change** has placed courts across the globe at the forefront of interpreting, enforcing, and shaping **environmental law**. Rising global temperatures, frequent natural disasters, biodiversity loss, and widespread environmental degradation demand urgent responses from states and corporations. However, political inertia, weak enforcement mechanisms, and economic interests often hinder effective climate governance. In this context, judicial institutions have emerged as critical actors in bridging the gap between international commitments and domestic implementation. This paper examines the **dual role of courts** as both catalysts for progress and barriers in addressing climate change. On the one hand, courts have acted as agents of **judicial activism**, setting important legal precedents, holding governments accountable to emission targets, and compelling corporations to reduce their carbon footprint. Landmark cases such as *Massachusetts v. EPA* (2007), *Urgenda Foundation v. The Netherlands* (2019), and *Milieudefensie v. Royal Dutch Shell* (2021) illustrate how judicial intervention can significantly influence climate policy and governance. On the other hand, courts are often constrained by rigid **legal frameworks**, jurisdictional limits, political backlash, and difficulties in enforcing compliance. The reliance on complex **scientific evidence** further complicates judicial reasoning, leading to fragmented or inconsistent rulings across jurisdictions. The study employs a **doctrinal and comparative**

	legal methodology , analyzing landmark national and international cases alongside scholarly literature. It argues that while courts are not a panacea for the climate crisis, they remain indispensable actors in climate governance. Ultimately, the paper concludes that enhancing judicial capacity, strengthening legal frameworks, and promoting international cooperation can empower courts to serve as effective catalysts rather than barriers to global climate action.
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1. Introduction

1.1 Background

Climate change is increasingly recognized as the defining challenge of the twenty-first century. Its consequences are not limited to environmental degradation but extend to economic instability, social inequality, public health crises, and threats to human rights. Reports from the **Intergovernmental Panel on Climate Change (IPCC)** consistently warn of the catastrophic consequences of failing to limit global warming to below 1.5°C. Yet, despite international frameworks such as the **United Nations Framework Convention on Climate Change (UNFCCC)** and the **Paris Agreement (2015)**, the world continues to fall short of its climate targets.

This gap between international commitments and practical action has created a governance vacuum. Legislatures and executives often hesitate to adopt ambitious climate policies due to political opposition, lobbying by powerful industries, or short-term economic concerns. In this context, courts are increasingly being called upon to interpret and enforce environmental laws, filling the void left by political inaction. The rise of **climate litigation**—cases where individuals, NGOs, or states sue governments or corporations for climate-related harms—highlights the judiciary’s emerging role as a central player in climate governance.

1.2 Problem Statement

Despite growing judicial involvement, the role of courts in addressing climate change remains contested. Proponents argue that courts act as **catalysts for progress**, holding states accountable for emission reductions, compelling corporations to act responsibly, and integrating scientific knowledge into legal decisions. Critics, however, caution that courts may act as **barriers**, constrained by separation of powers, narrow statutory interpretations, limited enforcement capacity, and political resistance. Moreover, while some courts adopt progressive approaches, others remain conservative, leading to inconsistency across jurisdictions. This duality raises an important research question: *Do courts act as catalysts for progress in climate governance, or do they risk becoming barriers to effective climate action?*

1.3 Research Objectives

The objectives of this paper are as follows:

1. To explore the evolving role of courts in interpreting and enforcing environmental laws related to climate change.
2. To evaluate how courts have acted as catalysts for climate progress through landmark decisions.
3. To analyze the barriers that limit judicial effectiveness in climate governance.

4. To assess the dual nature of courts as both enablers and obstacles in advancing climate justice.
5. To propose recommendations for enhancing the role of courts in global climate governance.

1.4 Research Questions

This study is guided by the following research questions:

- How have courts shaped climate governance through their interpretation of environmental laws?
- What enables courts to serve as catalysts for climate progress?
- What legal, political, and institutional barriers hinder courts in addressing climate issues?
- How can courts more effectively contribute to sustainable climate governance?

1.5 Significance of the Study

This paper contributes to the expanding body of scholarship on **climate litigation** and environmental law by providing a comprehensive analysis of the judiciary's role in climate governance. It bridges the gap between **legal theory** and **policy practice**, illustrating how courts interact with scientific knowledge, human rights principles, and institutional frameworks. By comparing cases from diverse jurisdictions—including the United States, the Netherlands, and Pakistan—the study highlights both the promise and pitfalls of judicial involvement in climate governance. Furthermore, the paper proposes practical recommendations aimed at strengthening judicial capacity, enhancing cooperation between courts, and ensuring better integration of scientific evidence in legal processes.

1.6 Structure of the Paper

The paper is divided into seven main sections. Following this introduction, Section 2 reviews the existing literature on climate change litigation and the evolving role of courts in environmental governance. Section 3 outlines the methodology, emphasizing the doctrinal and comparative legal approach. Section 4 analyzes how courts function as catalysts for progress, focusing on precedent-setting rulings, accountability enforcement, and reliance on science. Section 5 explores the barriers that limit judicial effectiveness, including legal, political, and institutional constraints. Section 6 provides case studies that illustrate the dual role of courts in practice. Section 7 proposes recommendations for enhancing the judiciary's role in climate governance. Finally, Section 8 concludes by summarizing key findings and reflecting on the judiciary's long-term role in shaping climate policy.

2. Literature Review

2.1 Climate Change and Environmental Law

The relationship between climate change and environmental law has evolved significantly over the past three decades. Early environmental statutes focused on pollution control, biodiversity protection, and resource management. However, the **globalization of climate change governance**—through the Kyoto Protocol (1997) and Paris Agreement (2015)—has expanded the scope of environmental law to include international obligations on greenhouse gas reduction. Scholars such as Peel and Osofsky (2018) argue that the climate crisis demands a reinterpretation of legal principles to incorporate sustainability, intergenerational equity, and precautionary measures.

2.2 The Rise of Climate Litigation

Climate litigation has emerged as a powerful tool for advancing climate governance. According to **UNEP's Global Climate Litigation Review (2020)**, over 1,500 climate-related cases have been filed worldwide. These cases typically fall into two categories:

1. **Government accountability cases**, where plaintiffs demand stricter enforcement of emission targets or adaptation measures (e.g., *Urgenda v. The Netherlands*).
2. **Corporate accountability cases**, where corporations are sued for their contributions to greenhouse gas emissions (e.g., *Milieudefensie v. Royal Dutch Shell*).

Setzer and Byrnes (2019) note that climate litigation not only shapes policy outcomes but also influences public discourse, increasing awareness of climate justice issues.

2.3 Judicial Activism vs Judicial Restraint

One of the central debates in legal scholarship concerns the extent to which courts should engage in **judicial activism**. Advocates argue that activism is necessary to address political inertia, citing cases like *Massachusetts v. EPA*, where the U.S. Supreme Court expanded the scope of the Clean Air Act to include greenhouse gases. Critics, however, warn that judicial overreach may undermine the separation of powers and provoke political backlash. This tension highlights the judiciary's delicate role in balancing progressive climate action with institutional legitimacy.

2.4 Human Rights and Climate Justice Frameworks

A growing body of scholarship situates climate litigation within the framework of **human rights**. Courts are increasingly recognizing that inadequate climate action may violate fundamental rights such as the right to life, health, and a clean environment. For example, the European Court of Human Rights (ECHR) has begun hearing climate cases alleging violations of the European Convention on Human Rights. Scholars such as Knox (2019) argue that framing climate litigation as a human rights issue strengthens its legitimacy and compels governments to adopt more ambitious climate policies.

2.5 Scientific Evidence in Judicial Decision-Making

Courts often rely on **scientific evidence** to evaluate climate claims. This integration of science into legal reasoning enhances the legitimacy of rulings but also introduces challenges, as judges may lack the expertise to assess complex climate models. Osofsky (2017) emphasizes the importance of judicial training in climate science to improve decision-making. Moreover, collaboration with scientific experts and amicus curiae briefs has become a common feature of climate litigation.

2.6 Gaps in the Literature

While scholarship on climate litigation has grown rapidly, several gaps remain. First, most studies focus on **Global North jurisdictions**, with limited attention to developing countries where courts often face resource and enforcement challenges. Second, the dual nature of courts—as both catalysts and barriers—remains underexplored. Third, there is insufficient focus on the long-term effectiveness of judicial rulings, particularly regarding enforcement and compliance. This paper seeks to address these gaps by providing a comparative analysis of landmark cases, highlighting both successes and limitations, and proposing recommendations for enhancing judicial effectiveness in climate governance.

3. Methodology

3.1 Research Approach

This paper adopts a **doctrinal and comparative legal research methodology**. Doctrinal research focuses on analyzing laws, judicial decisions, and legal principles that govern

climate change. Comparative analysis allows us to examine how courts across different jurisdictions—such as the United States, the Netherlands, Pakistan, and international tribunals—approach the interpretation and enforcement of environmental laws. Together, these methods provide a comprehensive understanding of the judiciary’s evolving role in climate governance.

3.2 Sources of Data

The research relies on three primary sources:

1. **Primary Legal Sources:** Judicial decisions, constitutions, environmental statutes, international treaties (e.g., UNFCCC, Paris Agreement), and regional frameworks (e.g., European Convention on Human Rights).
2. **Secondary Legal Sources:** Academic books, peer-reviewed journal articles, policy reports (e.g., UNEP Climate Litigation Reports), and commentaries from leading legal scholars.
3. **Case Studies:** Landmark judicial rulings such as *Massachusetts v. EPA* (2007), *Urgenda v. The Netherlands* (2019), *Milieudefensie v. Royal Dutch Shell* (2021), and climate-related cases in South Asia (e.g., *Asghar Leghari v. Federation of Pakistan* (2015)).

3.3 Method of Analysis

The analysis proceeds through:

- **Case Law Examination:** Studying judicial reasoning, reliance on scientific evidence, and integration of human rights principles.
- **Thematic Categorization:** Grouping cases into “progressive/catalyst” and “restrictive/barrier” outcomes.
- **Comparative Jurisdictional Analysis:** Identifying patterns, divergences, and similarities across Global North and Global South courts.

3.4 Limitations of Methodology

- Courts’ rulings often vary depending on **political and cultural contexts**, making comparisons challenging.
- Many cases are ongoing, so long-term impacts remain uncertain.
- Availability of reliable legal data in developing countries is limited, potentially narrowing the scope of analysis.

3.5 Ethical Considerations

The study respects academic integrity, citing all primary and secondary sources properly. It avoids bias by presenting both the progressive and restrictive roles of courts without privileging one perspective over the other.

4. Courts as Catalysts for Climate Progress

Courts have often emerged as **powerful catalysts** in advancing climate action when political actors fail to act decisively. Their contributions can be categorized into four key areas:

4.1 Expanding the Scope of Environmental Law

One of the judiciary’s most significant contributions has been the **reinterpretation of existing laws** to include climate concerns.

- In *Massachusetts v. EPA* (2007), the U.S. Supreme Court held that greenhouse gases qualify as “air pollutants” under the Clean Air Act. This ruling compelled the Environmental Protection Agency (EPA) to regulate carbon emissions, effectively expanding environmental law without requiring new legislation.

- Similarly, in *Leghari v. Federation of Pakistan (2015)*, the Lahore High Court directed the government to implement its National Climate Change Policy, recognizing climate adaptation as part of the constitutional right to life. These decisions illustrate how courts can creatively interpret laws to address urgent climate challenges, filling gaps left by outdated statutes or legislative inertia.

4.2 Enforcing Government Accountability

Courts frequently act as **watchdogs**, ensuring that governments comply with climate obligations.

- In the landmark *Urgenda Foundation v. The Netherlands (2019)*, the Dutch Supreme Court ordered the government to cut emissions by at least 25% by 2020, citing the state's duty to protect human rights under the European Convention on Human Rights.
- Similarly, German courts in 2021 ruled that parts of the German Climate Change Act were unconstitutional because they placed disproportionate burdens on future generations. These rulings emphasize that governments cannot delay climate action without violating legal and moral duties to their citizens.

4.3 Holding Corporations Responsible

Courts are also reshaping corporate accountability in climate governance.

- In *Milieudefensie v. Royal Dutch Shell (2021)*, a Dutch court ordered Shell to reduce its global carbon emissions by 45% by 2030, marking the first time a corporation was legally obligated to align with the Paris Agreement.
- Similar lawsuits have emerged in the U.S. and Australia, targeting fossil fuel companies for misleading the public or contributing significantly to climate harm. Through such rulings, courts are reinforcing the principle that corporations bear responsibility not only to shareholders but also to society and future generations.

4.4 Advancing Climate Justice and Human Rights

Climate litigation has increasingly been framed within **human rights law**.

- Courts have recognized that inadequate climate action violates rights to life, health, dignity, and a clean environment.
- For example, in *Neubauer v. Germany (2021)*, the Federal Constitutional Court ruled that insufficient emission reduction targets endangered the freedoms of future generations. By grounding climate protection in fundamental rights, courts enhance the legitimacy of climate action and ensure justice for vulnerable communities disproportionately affected by climate change.

4.5 Integrating Science into Judicial Decision-Making

Judicial reliance on scientific evidence has strengthened the credibility of climate rulings. Courts often consult IPCC reports, expert testimony, and climate models to support their judgments.

- For instance, the *Urgenda* decision relied heavily on scientific consensus regarding emission reduction pathways.
- Courts in Australia and New Zealand have similarly used climate science to reject projects that would increase emissions or harm ecosystems.

This scientific integration ensures that judicial decisions are fact-based, aligning law with environmental realities.

5. Courts as Barriers to Climate Governance

Despite these achievements, courts are not always progressive. They can also serve as **barriers** due to structural, political, and institutional limitations.

5.1 Rigid Legal Frameworks

Courts often operate within **narrow statutory boundaries**, limiting their ability to address climate issues.

- In the U.S., several lawsuits against corporations have been dismissed because existing environmental statutes did not explicitly cover climate damages.
 - In India, despite constitutional recognition of environmental rights, courts sometimes avoid bold rulings due to restrictive interpretations of laws.
- Such rigidity prevents courts from adapting to the unique and evolving challenges posed by climate change.

5.2 Jurisdictional and Procedural Barriers

Many climate cases face dismissal due to **jurisdictional hurdles**.

- Plaintiffs often struggle to prove “standing” (the right to bring a case) because courts demand direct evidence of harm caused by specific actors.
 - Cross-border climate harms raise additional challenges, as courts are reluctant to assume jurisdiction over global emissions or foreign corporations.
- As a result, many potentially groundbreaking cases are rejected before substantive hearings even begin.

5.3 Political Pressures and Institutional Constraints

Courts do not operate in isolation; they are influenced by political and institutional realities.

- In some countries, courts avoid strong climate rulings to prevent conflict with powerful political or corporate actors.
 - For example, in the U.S., courts have been accused of judicial restraint due to fears of interfering with the executive’s policy agenda.
- Such caution often undermines the judiciary’s potential as a catalyst for climate progress.

5.4 Difficulty in Enforcing Climate Rulings

Even when courts issue progressive judgments, **enforcement remains a major challenge**.

- Governments may delay implementation, citing budgetary constraints or political opposition.
- Corporations may exploit legal loopholes or shift operations to jurisdictions with weaker enforcement mechanisms.

This raises questions about the long-term effectiveness of judicial intervention.

5.5 Reliance on Complex Scientific Evidence

While science strengthens climate rulings, it can also act as a barrier. Judges may lack the expertise to interpret complex climate models, leading to inconsistent or cautious

decisions. Additionally, where scientific evidence is contested by fossil fuel lobbies or political actors, courts may hesitate to rule decisively.

5.6 Fragmentation and Inconsistency

Judicial approaches vary widely across jurisdictions. While courts in the Netherlands and Germany have adopted progressive stances, courts in other countries—particularly in the Global South—remain conservative. This inconsistency undermines the development of a **uniform body of climate jurisprudence** and weakens the global fight against climate change.

6. Case Studies

Case studies offer valuable insights into how courts have influenced climate governance in different jurisdictions. They demonstrate both the **progressive potential** and the **limitations** of judicial action in addressing the climate crisis.

6.1 *Urgenda Foundation v. The Netherlands (2019)*

The *Urgenda* case is widely regarded as a milestone in climate litigation. The Dutch Supreme Court ruled that the government had a legal duty to reduce greenhouse gas emissions by at least 25% by 2020 compared to 1990 levels. The decision was grounded in human rights law, particularly the right to life and private life under the **European Convention on Human Rights (ECHR)**.

The significance of *Urgenda* lies in several areas:

1. **Human Rights Integration:** The ruling explicitly tied climate action to the protection of human rights.
2. **Judicial Activism:** The court moved beyond statutory interpretation to hold the government accountable under international law.
3. **Global Influence:** The case has inspired similar lawsuits in France, Germany, Belgium, and Ireland.

Yet, challenges remain. While the Netherlands did adopt stricter climate policies, actual emission reductions lagged due to economic and political factors, highlighting the **gap between judicial decisions and enforcement**.

6.2 *Juliana v. United States (2020)*

This high-profile case was filed by a group of youth plaintiffs, arguing that the U.S. government's inaction on climate change violated their constitutional rights to life, liberty, and property. The plaintiffs demanded a government-wide plan to reduce carbon emissions.

Although the Ninth Circuit Court of Appeals dismissed the case for lack of standing, *Juliana* was groundbreaking in several ways:

- It framed climate change as a **constitutional issue** rather than solely an environmental one.
- It underscored the concept of **intergenerational equity**, recognizing that young and future generations disproportionately bear the burden of climate inaction.
- The case mobilized public opinion and inspired other youth-led climate lawsuits worldwide.

However, the dismissal illustrated the **procedural barriers** in U.S. courts, where standing requirements and separation-of-powers concerns often block climate litigation.

6.3 *Milieudefensie v. Royal Dutch Shell* (2021)

In a historic decision, the Hague District Court ordered Shell to reduce its global carbon emissions by 45% by 2030, relative to 2019 levels. Unlike *Urgenda*, this case directly targeted a **corporation** rather than a government.

Key contributions include:

1. **Corporate Accountability:** The court recognized that private corporations share responsibility for global emissions.
2. **Paris Agreement Alignment:** The judgment explicitly linked corporate obligations to international climate targets.
3. **Ripple Effect:** The case has emboldened litigants to pursue similar actions against multinational corporations in other countries.

However, critics argue that enforcement remains uncertain, given Shell's ability to restructure or shift operations across jurisdictions.

6.4 *Leghari v. Federation of Pakistan* (2015)

In South Asia, the *Leghari* case demonstrated how courts in developing countries can advance climate justice. The Lahore High Court ruled in favor of a farmer who argued that the government's failure to implement its National Climate Change Policy violated his constitutional right to life and dignity.

The court's contributions were significant:

- It recognized **climate adaptation** as part of fundamental rights.
- It established a **Climate Change Commission** to oversee implementation of policy measures.
- It provided a model for how courts in resource-constrained settings can still play a proactive role in climate governance.

Nonetheless, like in other jurisdictions, **implementation gaps** have limited the practical impact of the decision.

6.5 International Developments

International tribunals have also begun to engage with climate issues. For example, the **European Court of Human Rights (ECHR)** is currently hearing several climate-related cases, including *Duarte Agostinho v. Portugal and Others*, brought by six youth plaintiffs against multiple European states. Similarly, the **International Court of Justice (ICJ)** has been requested to issue an advisory opinion on states' obligations regarding climate change.

These cases signal a growing recognition that climate change is a **transboundary problem**, requiring cooperation and consistent jurisprudence across jurisdictions.

7. Recommendations

Based on the analysis, the following recommendations aim to strengthen the role of courts in climate governance:

7.1 Strengthening Legal Frameworks

Governments should enact **clear and comprehensive climate legislation**, specifying emission reduction targets, adaptation plans, and enforcement mechanisms. Stronger legal frameworks reduce ambiguity and give courts a more robust foundation for rulings.

7.2 Enhancing Judicial Capacity

Courts must be equipped with the **knowledge and resources** necessary to adjudicate complex climate cases. This can include:

- Specialized environmental benches or green tribunals.
- Access to climate experts and scientific advisors.
- Training programs for judges on climate science and international environmental law.

7.3 Promoting International Cooperation

Climate change is a global issue that transcends national borders. Greater **collaboration among national and international courts** can help harmonize rulings, reduce fragmentation, and enhance enforcement. Advisory opinions from the ICJ or binding decisions from regional human rights courts can provide much-needed clarity.

7.4 Bridging Science and Law

To improve the quality of judicial reasoning, courts should integrate **scientific evidence** more systematically. Expert testimony, reliance on IPCC reports, and interdisciplinary engagement with environmental scientists can ensure fact-based rulings.

7.5 Public Engagement and Access to Justice

Courts should adopt mechanisms to ensure **greater public participation** in climate litigation. Expanding legal standing, especially for youth, Indigenous communities, and NGOs, can empower marginalized voices and strengthen the legitimacy of judicial decisions.

7.6 Ensuring Enforcement Mechanisms

To prevent rulings from being symbolic, courts should establish **monitoring and compliance mechanisms**, such as independent commissions or reporting requirements. This would help bridge the gap between legal decisions and practical outcomes.

8. Conclusion

This paper has examined the **dual role of courts** in interpreting and enforcing environmental laws related to climate change. Courts have demonstrated their potential as **catalysts for progress**, setting legal precedents, enforcing accountability, holding corporations responsible, and integrating human rights and science into climate governance. Landmark cases such as *Urgenda*, *Juliana*, *Milieudefensie*, and *Leghari* illustrate the transformative power of judicial action.

At the same time, courts face significant **barriers**: rigid legal frameworks, jurisdictional hurdles, political pressures, and weak enforcement mechanisms. These limitations often restrict the ability of courts to drive systemic change.

The study concludes that while courts cannot single-handedly solve the climate crisis, they remain essential actors in bridging the gap between **scientific knowledge, policy commitments, and implementation**. Strengthening legal frameworks, enhancing judicial capacity, promoting international cooperation, and ensuring effective enforcement are necessary to maximize the judiciary's role in global climate governance. Ultimately, courts represent both a **hope and a challenge** in the fight against climate change. Their evolving jurisprudence will continue to shape the trajectory of climate governance, determining whether they serve primarily as catalysts for progress or as barriers to urgent action.

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