

(REVIEW ARTICLE)



Climate change litigation as a tool for global environmental policy reform: A comparative study of international case law

Precious Oluwaseun Okedele ^{1,*}, Onoriode Reginald Aziza ², Portia Oduro ³ and Akinwale Omowumi Ishola ⁴

¹ *Independent Researcher, New Jersey, USA.*

² *Independent Researcher, Lagos Nigeria.*

³ *Energy Law Center, Paul M. Hebert Law Center, Louisiana State University, USA.*

⁴ *Department of Sustainability, Eastern Illinois University Charleston Illinois, USA.*

Open Access Research Journal of Multidisciplinary Studies, 2024, 08(02), 104–115

Publication history: Received on 27 October 2024; revised on 01 December 2024; accepted on 05 December 2024

Article DOI: <https://doi.org/10.53022/oarjms.2024.8.2.0070>

Abstract

Climate change litigation has emerged as a potent mechanism to hold governments, corporations, and other entities accountable for their role in environmental degradation and to drive forward global environmental policy reform. This comparative study examines landmark cases across various jurisdictions, exploring how litigation has been utilized to enforce environmental laws, promote stricter emission regulations, and demand climate-related disclosures. By analyzing a diverse selection of case law from regions including North America, Europe, Asia, and Australia, the study identifies key legal arguments, doctrines, and trends that have shaped the outcomes of these cases. It further highlights the role of non-governmental organizations, indigenous communities, and youth activists in initiating and advancing climate change lawsuits, thus emphasizing the intersectionality and global reach of climate-related legal action. The findings reveal a progressive alignment of domestic courts with international climate frameworks, such as the Paris Agreement, demonstrating how litigation has become an influential tool for environmental advocacy and policy reform. This research contributes to the growing discourse on climate justice by providing insights into the legal strategies that have successfully driven systemic changes and offering policy recommendations for future climate governance.

Keywords: Climate change; Environmental policy; Climate justice; Environmental governance; Emission regulations

1. Introduction

Climate change has become one of the most pressing global challenges of the 21st century, affecting ecosystems, economies, and communities worldwide [1]. As the impacts of climate change intensify, so does the urgency for effective policy measures to mitigate greenhouse gas emissions, promote sustainable practices, and safeguard environmental resilience [2]. Traditional environmental policy avenues, such as international agreements and government regulations, have made progress but often lack enforcement mechanisms or political will, leading to significant gaps in climate action [3]. As a result, stakeholders—especially environmental groups, indigenous communities, and concerned citizens—are increasingly turning to litigation as a strategic tool to press for meaningful climate action [4]. Climate change litigation has grown in both scope and influence in recent years, evolving from domestic lawsuits against corporations and governments to sophisticated cases heard in international courts [5]. Plaintiffs in these cases seek to establish legal accountability for environmental damage, drive policy reforms, and hold states and corporations to their climate commitments. This wave of litigation aims not only to address specific environmental grievances but also to achieve broader policy outcomes that could reshape global environmental governance [6]- [10]. By focusing on climate litigation as an instrument of environmental policy reform, this study examines its potential to enforce compliance, set new precedents, and catalyze systematic change [11].

* Corresponding author: Precious Oluwaseun Okedele

Through a comparative study of international case law, this paper explores how climate change litigation has developed in different jurisdictions and analyzes the factors that determine its effectiveness [12]. This examination provides insights into the legal and regulatory strategies employed by different countries, the judicial interpretation of environmental rights, and the role of litigation in closing the gap between environmental aspirations and action [12]. By doing so, this study contributes to a deeper understanding of climate litigation as a vital, if complex, tool in the global fight against climate change.

1.1. Literature Review

1.1.1. The Evolution of Climate Change Litigation

Climate change litigation has experienced significant growth over the past two decades, evolving from isolated cases in select countries to a global phenomenon that spans various legal systems and jurisdictions [13]. Scholars argue that climate litigation emerged largely due to the failure of legislative and regulatory bodies to adequately address the climate crisis [14]. Litigation has increasingly served as a method for advocates to hold governments and corporations accountable, often leveraging human rights frameworks and principles of environmental justice [15].

In the early stages, climate litigation mainly targeted corporations for environmental degradation and sought damages or injunctive relief [16]. Landmark cases, such as the *Massachusetts v. Environmental Protection Agency* (2007) in the United States, set the precedent for recognizing greenhouse gas emissions as pollutants subject to regulation [17]. Over time, litigation expanded to include state accountability for climate inaction, with cases like the *Urgenda Foundation v. State of the Netherlands* (2019) marking a turning point [18]- [23]. In this landmark case, the Dutch Supreme Court mandated that the government adopt more aggressive carbon reduction measures, arguing that inaction breached human rights obligations [24]. This decision inspired similar cases in other countries, where courts are increasingly recognizing the duty of states to protect citizens from the adverse impacts of climate change [25].

1.1.2. Climate Litigation as a Tool for Policy Reform

The growing number of climate cases reflects a strategic effort to drive policy reform through judicial means [26]. Scholars argue that litigation has become a vital mechanism to shape environmental policy by pressuring governments to enhance regulatory standards, pushing corporations to adopt sustainable practices, and embedding climate considerations into legal frameworks [26]- [31]. Many cases invoke the precautionary principle, arguing that in the absence of full scientific certainty, authorities have a duty to prevent potential harm associated with climate change [32]. Additionally, climate litigation often leverages human rights law, framing climate inaction as a violation of fundamental rights to life, health, and a safe environment [33].

Studies show that climate litigation has diverse impacts across jurisdictions [34]. In countries where the judiciary is more independent and environmental rights are constitutionally guaranteed, litigation has led to policy changes and stricter emissions regulations [35]. For instance, the Colombian Supreme Court's ruling in *Future Generations v. Ministry of the Environment* (2018) recognized the Amazon rainforest's importance in combating climate change, leading to a mandate for the government to curb deforestation. In contrast, in jurisdictions with limited judicial independence or weak environmental protections, litigation has struggled to achieve substantive outcomes [36].

1.1.3. Comparative Analysis of International Case Law

Comparative studies reveal that climate litigation outcomes are influenced by national legal frameworks, judicial receptivity, and cultural perceptions of environmental responsibility [37]. In developed nations, where courts are often more receptive to environmental claims, plaintiffs tend to achieve greater success in pushing for policy reforms. For example, Australian courts have increasingly required environmental assessments to consider climate impacts in cases involving coal mining projects, setting an important precedent for how environmental law is interpreted in relation to climate change [38].

In developing countries, climate litigation faces unique challenges but also offers opportunities for transformative change. In Pakistan, for example, the *Leghari v. Federation of Pakistan* (2015) case led to the establishment of a climate change commission, tasked with enforcing the government's adaptation framework. This case demonstrates how litigation can drive policy innovation in settings with limited regulatory infrastructure by compelling governments to prioritize climate change in their policy agendas [39]. However, legal obstacles, such as limited access to courts and the absence of enforceable environmental rights, often impede similar advancements in other developing countries [40].

1.1.4. The Role of Human Rights in Climate Litigation

A significant development in climate litigation has been the growing emphasis on human rights, which has bolstered the legitimacy and moral authority of climate cases [41]. By linking climate change to rights such as life, health, and property, litigants have successfully framed environmental degradation as a human rights issue. International organizations, including the United Nations, have supported this approach, with the UN Special Rapporteur on Human Rights and the Environment emphasizing that states have an obligation to protect individuals from foreseeable climate-related harm [42]. Cases such as *Sacchi v. Argentina*, in which young activists filed a petition with the UN Committee on the Rights of the Child against several countries, illustrate this trend and underscore the moral imperative for governments to take action on climate change [43].

1.1.5. Limitations and Criticisms of Climate Litigation

Despite its potential, climate litigation faces various limitations. Critics argue that courts are not equipped to address complex scientific and policy questions and that litigation is an inefficient and adversarial means of pursuing climate action [44]. Others caution that litigation risks overburdening the judicial system and may lead to decisions that lack sufficient political or economic feasibility. Additionally, some argue that litigation may encourage a reactive, piecemeal approach to environmental protection rather than fostering comprehensive, long-term solutions [45].

Climate change litigation has emerged as a powerful tool for policy reform, offering a legal avenue to compel action from governments and corporations. Comparative case law illustrates both the potential and limitations of litigation across diverse jurisdictions [46]. While courts have demonstrated the capacity to drive meaningful policy changes, the success of litigation ultimately depends on the broader political, economic, and legal context [47]. As climate litigation continues to evolve, understanding its role within global environmental policy will be crucial for shaping future strategies to combat climate change [48]. This study aims to contribute to this discourse by providing a comparative analysis of international case law and exploring the conditions under which climate litigation can serve as an effective mechanism for environmental reform

2. Methodology

2.1. Research Design

This study employs a comparative qualitative research design to investigate the role of climate change litigation in shaping and reforming global environmental policy. The comparative approach is essential for examining different jurisdictions' responses to climate litigation and identifying patterns, trends, and unique approaches. Through case law analysis, this study aims to understand how courts worldwide are interpreting, enforcing, and innovating environmental policy through legal judgments.

2.2. Case Selection

The case selection process focuses on identifying prominent climate change litigation cases that represent diverse legal systems, regulatory frameworks, and socio-political contexts. The selection criteria are as follows:

- **Relevance:** The cases should directly address climate change issues and have a clear impact on environmental policies [49].
- **Jurisdictional Diversity:** Cases from a variety of legal systems (e.g., common law, civil law, hybrid systems) and geographical regions (e.g., North America, Europe, Africa, Asia, and Oceania) [50].
- **Impact:** Cases with significant legal or social impacts, especially those that have set a precedent or led to tangible policy changes [51].

Key cases may include landmark decisions such as *Urgenda Foundation v. State of the Netherlands* (Dutch Supreme Court, 2019), *Juliana v. United States* (Ninth Circuit, USA), and *Leghari v. Federation of Pakistan* (Lahore High Court, Pakistan), among others.

2.3. Data Collection

Data collection involves gathering judicial opinions, legal briefs, policy papers, government reports, and academic literature. Sources include:

- **Legal Databases:** Access to major legal databases such as Westlaw, LexisNexis, and HeinOnline to retrieve judicial opinions and case summaries [52].
- **International Treaties and Reports:** Documents from the United Nations Framework Convention on Climate Change (UNFCCC), IPCC reports, and national climate policies to contextualize the legal frameworks within which cases operate [53]- [57].
- **Interviews (if feasible):** In-depth interviews with key stakeholders (e.g., environmental lawyers, judges, policymakers, and activists) to gain insights into the motivations, strategies, and challenges behind climate litigation [58].

2.4. Data Analysis

- **Legal Analysis:** Perform a detailed examination of judicial opinions to identify the legal principles, doctrines, and arguments invoked by both plaintiffs and defendants. This analysis will focus on:
- **Jurisdictional Approaches:** How courts in different jurisdictions interpret environmental laws and human rights frameworks related to climate change [59].
- **Legal Doctrines:** Use of doctrines such as the "public trust doctrine," "precautionary principle," and "intergenerational equity" in rulings.
- **Remedies and Outcomes:** Types of judicial remedies, such as injunctions, fines, and mandates for policy change [60].
- **Comparative Analysis:** Conduct a comparative analysis of cases to assess similarities and differences in judicial reasoning and policy impacts across jurisdictions [61].
- **Pattern Identification:** Identify recurring themes or unique strategies that contribute to successful litigation outcomes [62].
- **Policy Impact Assessment:** Evaluate how case outcomes have influenced or directly contributed to policy reforms, both domestically and internationally [63].
- **Content Analysis of Policy Documents:** Analyze international and national policy documents for references or changes aligned with key court rulings, examining how litigation outcomes align with or diverge from broader climate goals [64].

2.5. Thematic Analysis

The study employs thematic analysis to identify common themes that emerge from the case law and policy documents. Key themes include:

- **Human Rights and Climate Justice:** Courts increasingly recognize climate change as a human rights issue, particularly for vulnerable populations [65].
- **Governance and Accountability:** Litigation as a means to hold governments and corporations accountable for environmental protection [66].
- **Policy Reform and Innovation:** The role of judicial decisions in driving policy innovation and enforcing international environmental standards [67]- [71].

2.6. Limitations and Challenges

Potential limitations and challenges include:

- **Jurisdictional Differences:** Variations in legal systems, evidentiary standards, and environmental laws across countries may limit the comparability of cases [72].
- **Data Access:** Accessibility of legal documents may be restricted in some jurisdictions, particularly for lower-profile cases or cases in developing nations [73].
- **Political and Social Factors:** Political context and public opinion may influence judicial decisions and the success of climate litigation in ways that are challenging to quantify.

2.7. Ethical Considerations

Ethical considerations involve ensuring the confidentiality and informed consent of interview participants, especially in jurisdictions where discussing litigation may be politically sensitive. Additionally, the analysis aims to remain objective and unbiased in interpreting judicial opinions and policy impacts [74].

2.8. Validation and Reliability

To ensure validity and reliability:

- **Triangulation:** Cross-check findings from multiple data sources, including case law, policy documents, and expert interviews [75].
- **Peer Review:** Seek feedback from environmental law experts to validate interpretations of legal doctrines and case outcomes.
- **Replicability:** Provide transparent documentation of data sources, case selection criteria, and analytical procedures to enhance the study's replicability [76].

2.9. Expected Contributions

This study contributes to academic discourse by providing a comprehensive comparative analysis of how climate litigation serves as a catalyst for environmental policy reform [77]. It aims to inform policymakers, legal practitioners, and activists on effective strategies for leveraging judicial systems to combat climate change [78]. The findings also offer valuable insights into the potential for international harmonization of climate litigation approaches and the role of courts in advancing global environmental goals.

3. Results and discussion

3.1. Overview of Climate Change Litigation Trends

Recent years have seen a marked increase in climate change litigation worldwide, reflecting the growing role of judicial systems in influencing environmental policy [79]- [84]. Through the lens of high-profile cases, this study identifies common trends, legal strategies, and case outcomes across various jurisdictions. Analysis shows that climate-related lawsuits tend to focus on three main issues: government accountability in meeting emission targets, corporate responsibility for environmental degradation, and the protection of fundamental rights threatened by climate change impacts [85].

In high-income countries, courts are often more receptive to climate claims that align with existing national or international environmental obligations, especially when supported by detailed climate science [86]. In contrast, cases in lower-income countries, although fewer in number, often highlight broader human rights implications and the disproportionate burden of climate impacts on vulnerable communities [87].

3.2. Government Accountability Cases

A significant portion of climate litigation targets governments for their perceived failure to meet climate obligations. Landmark cases like *Urgenda Foundation v. Netherlands* and *Friends of the Irish Environment v. Ireland* exemplify the judicial trend of mandating state action. In both cases, courts ruled in favor of plaintiffs, compelling governments to adopt more ambitious climate policies [88]. This trend highlights a growing judicial willingness to interpret human rights laws—such as the right to life and health—as obligations to mitigate climate impacts [89].

However, these cases also reveal limitations. Courts may mandate that governments take certain actions, but enforcement of these rulings remains challenging. For instance, in some countries, governments have delayed compliance by appealing court decisions or reinterpreting obligations to minimize economic impact [90]. This raises questions about the efficacy of litigation as a lasting tool for climate reform and suggests that judicial decisions alone may be insufficient without broader legislative or societal support [91].

3.3. Corporate Responsibility and Liability

A second major area of litigation involves corporate entities, particularly in the fossil fuel industry, being held liable for environmental harm. Cases such as *Lliuya v. RWE* and *Milieudefensie et al. v. Royal Dutch Shell* have set important precedents for corporate accountability. The decision in the Shell case, in which the Hague District Court mandated that Shell reduce its global emissions, marks a groundbreaking step toward corporate responsibility [92].

The outcomes of corporate cases indicate a trend where courts are increasingly receptive to holding corporations accountable for climate impacts, especially when plaintiffs can demonstrate clear causation between emissions and climate harm [93]-[96]. However, establishing liability remains complex, as many corporations argue that responsibility for climate change is cumulative and global, involving many actors beyond their direct control. These cases reveal the

challenge of balancing corporate accountability with the legal doctrine of proportional responsibility, an issue particularly evident in transboundary pollution cases.

3.4. Human Rights and Climate Justice

One of the emerging themes in climate litigation is the link between climate change and human rights. Courts in cases such as *Leghari v. Federation of Pakistan* and *Juliana v. United States* have acknowledged that climate inaction can constitute a breach of fundamental human rights [97]. In *Leghari*, the Lahore High Court explicitly linked climate adaptation to the right to life, resulting in a landmark ruling for the climate justice movement in the Global South.

However, while the judiciary has become a platform for climate justice, this approach faces several challenges [98]. Courts in some jurisdictions, such as the United States, have dismissed human rights-based claims on the grounds of standing, arguing that climate policy decisions fall under legislative and executive purview. This distinction underscores the complex relationship between human rights claims and climate action, especially in legal systems that favor legislative supremacy over judicial intervention [99]. Additionally, the reliance on human rights frameworks may not always align with climate policy priorities, as demonstrated by varied judicial interpretations of what constitutes an actionable “climate right.”

3.5. Implications for Global Environmental Policy Reform

Climate litigation has undoubtedly influenced environmental policy, but its role in achieving systemic global reform remains nuanced. Comparative analysis reveals that cases successful in one jurisdiction can inspire similar actions in others, creating a ripple effect across borders. For instance, the *Urgenda* case inspired parallel actions in Germany and France, illustrating litigation’s potential as a catalyst for harmonizing international climate commitments. Yet, the success of climate litigation is unevenly distributed, with more robust outcomes in countries with well-developed legal frameworks for environmental protection. This disparity underscores the need for cohesive international frameworks that facilitate climate action across jurisdictions, particularly for countries without the means to support high-profile litigation. Moreover, international bodies, such as the United Nations, may play a more active role in standardizing climate obligations to reduce litigation disparities and enhance enforcement mechanisms.

3.6. Challenges and Limitations of Climate Litigation

While litigation has made significant strides in promoting climate accountability, this approach faces several limitations. Firstly, legal processes are often time-consuming and costly, creating barriers for marginalized communities disproportionately affected by climate change. Moreover, the adversarial nature of litigation can foster defensive policies rather than proactive climate solutions, with governments or corporations adopting minimal compliance measures to avoid litigation rather than embracing sustainable reforms.

Furthermore, some legal systems impose high burdens of proof on plaintiffs, who must demonstrate direct causation between defendants’ actions and climate harm. This challenge is particularly pronounced in countries where climate science is under-resourced or where judicial systems lack expertise in handling complex environmental cases. In addition, the scope of judicial mandates in environmental cases remains restricted by existing national laws, often preventing courts from addressing the broader structural issues that contribute to climate change. The comparative study of international case law on climate litigation reveals its potential and limits as a tool for global environmental policy reform. Judicial systems have proven effective in pushing governments and corporations toward climate accountability, especially in cases grounded in human rights and environmental obligations. However, systemic reform requires more than litigation; it calls for coordinated international frameworks, stronger enforcement mechanisms, and inclusive policies that prioritize climate justice.

4. Conclusion and future directions

In conclusion, the study "Climate Change Litigation as a Tool for Global Environmental Policy Reform: A Comparative Study of International Case Law" highlights the growing impact of climate change litigation as a mechanism for catalyzing environmental policy reform worldwide. This comparative analysis reveals that, while climate litigation is still an emerging field, it has already started to reshape national and international environmental governance by holding corporations, governments, and other entities accountable for their roles in environmental degradation. Cases from various jurisdictions demonstrate how courts increasingly recognize the urgency of addressing climate change and the need for stronger legal and policy frameworks that uphold the rights of future generations and vulnerable communities. Key cases examined across different countries show a diversity of legal approaches and outcomes, emphasizing the necessity of tailoring strategies to specific political, legal, and social contexts. Some countries have developed

progressive jurisprudence, expanding the interpretation of human rights and constitutional obligations to encompass environmental protection. This judicial trend underscores a significant shift towards acknowledging environmental protection as integral to human rights, health, and intergenerational equity. Courts in countries like the Netherlands, Colombia, and Australia have issued landmark judgments compelling governments to meet more ambitious climate targets and affirming the state's duty to protect its citizens from climate risks. Despite these advances, challenges remain, including jurisdictional limitations, enforcement difficulties, and resistance from powerful corporate interests. Nevertheless, the rise of climate change litigation has also spurred proactive policy changes, encouraging governments and businesses to adopt more sustainable practices to mitigate legal risks. Moreover, as case law evolves, it establishes precedents that can influence and strengthen international climate agreements, contributing to a cohesive global policy landscape. The increased cooperation between civil society, legal experts, and climate scientists in litigating these cases enhances the credibility and impact of litigation efforts. Ultimately, climate change litigation serves as both a moral and legal imperative, providing a pathway for the public to demand accountability and action on climate issues. This study underscores that while litigation alone cannot solve the climate crisis, it is an invaluable tool in the broader arsenal of strategies to drive systemic change and enforce environmental protection standards. As climate-related impacts intensify, climate change litigation will likely become an even more crucial component of global environmental policy reform, fostering a paradigm shift towards a sustainable and resilient future.

Future research should examine the long-term effectiveness of judicial interventions, particularly in bridging the gap between climate justice and policy implementation. Additionally, expanding access to climate litigation for marginalized communities and streamlining litigation processes in under-resourced legal systems will be essential to ensure that climate litigation remains a viable tool for achieving global environmental equity. Climate litigation, while impactful, must operate in conjunction with legislative and executive initiatives to facilitate a truly transformative approach to climate governance.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest exists among the Authors.

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