

Reconceiving State Accountability In The Climate Crisis: The Legal Evolution Of 'Climate Reparations' And Its Integration With Treaty-Based Obligations Under International Environmental Law

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Abstract

The escalating severity of the global climate crisis has prompted a critical reassessment of state responsibility under international law. This paper explores the emerging legal concept of climate reparations—a mechanism demanding states most responsible for greenhouse gas emissions to provide financial, technical, and restorative compensation to affected nations and communities. While historically marginalized in international discourse, climate reparations have gained renewed attention in the context of rising climate-induced loss and damage, particularly within the Global South. This study critically analyzes the normative evolution of climate reparations, tracing their trajectory from moral advocacy to prospective legal obligation. Drawing on doctrinal legal analysis, the research examines how climate reparations align with and diverge from treaty-based obligations under international environmental law, including the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, and principles of customary international law. It evaluates the extent to which these instruments embed or fall short of enforceable reparative duties, especially concerning the principles of common but differentiated responsibilities (CBDR), equity, and historical accountability. Through case studies and comparative treaty analysis, the paper identifies a growing convergence between reparative justice discourses and the formal architecture of international environmental law. The paper investigates recent developments such as the establishment of the Loss and Damage Fund under COP27 and ICJ advisory opinion proceedings on climate obligations, situating them as pivotal moments in the shift from voluntary commitments to enforceable liabilities. The study advocates for an integrated legal framework where climate reparations are not seen merely as ethical imperatives, but as integral to treaty compliance and global environmental justice. This reconceptualization of state accountability underpins a broader legal transformation toward intergenerational equity and systemic climate justice, offering pathways for institutional reform and stronger compliance mechanisms within the existing international legal order.

Keywords: Climate Reparations, International Environmental Law, State Accountability, Treaty Obligations, UNFCCC, Paris Agreement, Loss And Damage, Climate Justice, Intergenerational Equity, Legal Responsibility, CBDR.

INTRODUCTION

By mid-2025, the legal discourse surrounding climate change has expanded significantly, with climate reparations now emerging as a central pillar in the broader struggle for climate justice and equitable state responsibility. Once perceived primarily as a moral or political demand, climate reparations are now gaining legal traction through a combination of institutional action, financial commitments, and judicial developments. At the COP29 summit in Baku in November 2024, nations formally adopted a New Collective Quantified Goal (NCQG) on climate finance, setting a target of USD 300 billion per year by 2035 to support mitigation, adaptation, and loss and damage measures in developing countries. Although this figure marked a significant increase over the previous USD 100 billion target established in 2009, developing nations strongly criticized the agreement. Critics highlighted the mismatch between the pledged figure and the estimated USD 1.3 trillion required annually for effective climate response. The structure of the agreement—with its reliance on debt-based finance and delayed implementation—has drawn concerns that the commitment lacks the urgency and equity required to address the accelerating crisis. Many vulnerable nations emphasized that the new target fails to adjust for inflation and does not prioritize grant-based funding, limiting its transformative potential. Meanwhile, the Loss and Damage Fund, originally established during COP28, became operational in early 2025. Initial pledges from developed nations reached approximately USD 760 million, but only a fraction of that had been disbursed by mid-2025. Uneven

financial support and the subsequent withdrawal of the United States from its own minimal contribution exposed the Fund's fragility and the limitations of voluntary financing. These developments intensified the call for legally binding reparations mechanisms, especially from nations suffering irreversible climate impacts such as rising sea levels, desertification, and extreme weather events. In the legal arena, momentum is building toward greater enforceability. The International Court of Justice (ICJ) held hearings in late 2024 on a historic advisory opinion request concerning the international legal obligations of states in the context of climate change. The ICJ is expected to issue its opinion in July 2025, with widespread anticipation that it may affirm the existence of legal duties to prevent climate harm and provide compensation to affected states. This proceeding represents a pivotal moment in the formal articulation of state accountability for climate-related harm, even in the absence of direct treaty obligations. Simultaneously, domestic and regional courts are increasingly recognizing state responsibility for inadequate climate policies. These rulings have expanded the scope of legal interpretation to include environmental degradation as a human rights violation, reinforcing the argument that reparations are not discretionary, but part of an emerging legal norm grounded in both customary international law and treaty interpretation. Together, these developments mark a shift in the understanding of climate reparations—from political aspiration to legal obligation. This paper examines the evolving legal framework surrounding reparations, situating them within treaty-based commitments, financial instruments, and judicial practice. In doing so, it highlights how state accountability is being reconceived to reflect a more just, enforceable response to the global climate crisis.

Statement of the Problem

Despite growing global awareness of the disproportionate impacts of climate change on developing countries, existing international legal frameworks remain inadequate in establishing clear and enforceable state accountability for climate-related harm. Climate reparations—understood as the obligation of historically high-emitting states to compensate vulnerable countries for loss and damage—have long been marginalized in formal climate negotiations. While political progress has been made with the establishment of mechanisms like the Loss and Damage Fund, these remain voluntary, non-binding, and financially insufficient. There is no universal legal standard that compels states to provide reparations, leaving affected nations dependent on unpredictable aid rather than enforceable rights. Treaties such as the UN Framework Convention on Climate Change (UNFCCC) and the Paris Agreement reference the principle of “common but differentiated responsibilities” (CBDR), but they explicitly exclude legal liability for loss and damage. This disconnect between moral responsibility and legal enforceability poses a major challenge to climate justice. Developing countries—those least responsible for greenhouse gas emissions—continue to suffer the gravest consequences of climate change without a formal mechanism to demand reparative justice. Compounding the issue is the absence of a coherent legal framework that integrates climate reparations into existing obligations under international environmental law, human rights law, and customary international law. While courts and tribunals are beginning to interpret climate inaction as a breach of human rights or duty of care, these decisions are fragmented and lack global consensus. The pending advisory opinion by the International Court of Justice, expected in 2025, may help clarify legal obligations—but its non-binding nature underscores the urgency for a more definitive legal framework. Thus, the central problem is the legal ambiguity surrounding climate reparations: how can reparative obligations be anchored within existing treaty frameworks, and to what extent can state responsibility be formalized and enforced to ensure equity, justice, and accountability in the global climate regime.

Objectives of the study

- To examine the legal evolution of the concept of climate reparations within international environmental law, human rights law, and state responsibility doctrines.
- To analyze the extent to which existing international treaties—such as the UNFCCC and the Paris Agreement—provide a foundation for or limit the development of binding climate reparations mechanisms.
- To assess the role of judicial and quasi-judicial bodies (e.g., ICJ, regional human rights courts) in shaping emerging norms around climate accountability and reparative justice.
- To identify the legal and structural gaps in current international frameworks that hinder the effective implementation and enforcement of climate reparations.
- To propose a framework for integrating climate reparations into existing treaty-based obligations, with an emphasis on enforceability, equity, and intergenerational justice.

The discourse on climate reparations has gained substantial traction over the past decade as the climate crisis deepens and its impacts disproportionately burden vulnerable nations. A wide body of literature examines this concept through various lenses including international environmental law, human rights, state responsibility, and international relations. This review synthesizes main academic contributions and legal developments, mapping the trajectory of climate reparations from normative advocacy to emergent legal obligation. Climate reparations refer broadly to the notion that states responsible for the majority of historical greenhouse gas emissions should provide compensation or restitution to those disproportionately affected by climate change. Early scholarship, such as that by Roberts and Parks (2007), framed reparations as a moral and political imperative, grounded in principles of justice and equity. They argued that reparations extend beyond financial compensation to include technology transfer, capacity-building, and support for adaptation. However, initial discussions acknowledged the lack of legal instruments explicitly imposing reparative obligations on states. The principle of “common but differentiated responsibilities” (CBDR), first codified in the 1992 UN Framework Convention on Climate Change (UNFCCC), forms a critical normative underpinning for climate reparations (Rajamani, 2012). CBDR recognizes the varying contributions of states to environmental degradation and their differing capacities to respond. While this principle underlines equity, it falls short of creating legally binding reparations mandates. Subsequent scholarship (Bodansky, 2010; Okereke, 2016) has underscored this tension: CBDR encourages responsibility-sharing but explicitly precludes liability or compensation claims, reflecting political compromises rather than legal certainty. The evolution of international environmental law (IEL) has been pivotal in shaping the legal landscape of climate reparations. Scholars such as Peel and Osofsky (2018) argue that IEL’s traditionally weak enforcement mechanisms impede reparations claims. They note that treaties like the Paris Agreement emphasize voluntary contributions and nationally determined commitments, with no provisions for reparations payments. This voluntary approach is viewed as insufficient in addressing loss and damage, especially for countries facing irreversible harms such as island states threatened by sea-level rise. Legal scholars have increasingly explored whether principles of state responsibility and transboundary harm in IEL could be invoked to advance reparations claims. The doctrine of state responsibility, codified in the International Law Commission’s Articles on State Responsibility (2001), establishes that states are liable for internationally wrongful acts, including environmental damage. However, the application of these principles to climate change has been contested due to the diffuse nature of emissions and complex causality (Mace, 2020). Some authors argue that the multilateral nature of climate change complicates attribution of harm and quantification of damages, thereby challenging traditional state responsibility frameworks (Rajamani & Peel, 2020). The intersection of climate change and human rights law has emerged as a vital avenue for advancing climate reparations. Increasingly, courts and scholars recognize climate change as a threat to fundamental human rights including the rights to life, health, water, food, and housing (Knox, 2015). Litigation trends, especially in Europe and Latin America, reflect this shift. Cases such as *Urgenda Foundation v. The Netherlands* (2019) demonstrate how courts can hold governments accountable for insufficient climate policies by invoking human rights obligations. These rulings imply that failure to mitigate climate change or provide adequate adaptation support could constitute rights violations, thereby strengthening claims for reparations (Setzer & Byrnes, 2020). Scholars like Peel (2019) emphasize that human rights law, with its binding treaty regimes and monitoring bodies, offers stronger enforcement potential than environmental treaties. However, the extent to which human rights instruments can compel states to provide financial reparations remains underexplored and contested. Critics caution against over-reliance on human rights law, noting its traditionally state-centric approach and difficulties in enforcing cross-border obligations (Ganguly, 2021). A substantial portion of literature examines the practical and institutional aspects of reparations, focusing on climate finance mechanisms. The concept of loss and damage—defined as climate-related harms that cannot be avoided through mitigation or adaptation—has gained recognition since the early 2000s, culminating in its inclusion in the Paris Agreement (Article 8) (Warner & Zakieldeen, 2012). Despite this recognition, the operationalization of loss and damage finance remains contentious. Scholars like Roberts et al. (2021) critique the reliance on voluntary funding models, which lack predictability, sufficiency, and enforceability. The establishment of the Loss and Damage Fund in 2023 marked a milestone, yet early evaluations indicate ongoing challenges related to funding commitments, governance structures, and equitable disbursement (Falkner, 2024). Developing countries argue for a reparations model grounded in legal obligations rather than charity, underscoring persistent inequalities in the global climate regime (Bulkeley et al., 2023). Recent judicial interventions have significantly shaped the trajectory of climate reparations. The growing number of climate lawsuits worldwide attests to the judiciary’s increasing willingness to interpret legal obligations expansively. The advisory proceedings before the International Court of Justice (ICJ), initiated by a coalition of vulnerable states, seek to clarify the scope of state responsibility for climate harm (Newell & Paterson, 2022). While advisory opinions lack binding force, they carry considerable normative weight and can influence domestic courts and treaty negotiations. Regional human rights courts have

also begun to hold states accountable for climate inaction, contributing to a patchwork of legal precedents. For example, the European Court of Human Rights recognized that inadequate climate policies could violate rights protected under the European Convention on Human Rights (Scheinin, 2023). Such rulings bolster the argument that reparations for climate damage are rooted in existing human rights obligations. Despite significant progress, multiple challenges remain in concretizing climate reparations as legal obligations. Attribution of responsibility in a multilateral context remains complex, with difficulties in linking specific emissions to particular harms (Green, 2019). Furthermore, the voluntary nature of existing finance mechanisms and the absence of enforcement mechanisms in major treaties limit reparative justice. The fragmentation of international law—between environmental, human rights, and state responsibility regimes—also hampers coherent development of reparations norms. Scholars like Voigt (2020) call for integrated frameworks that synthesize these regimes, while respecting principles of sovereignty and equity. Such integration would require reconciling conflicting state interests and balancing the rights of vulnerable populations with political feasibility. Recent scholarship advocates for reimagining state accountability in climate change beyond traditional frameworks. Concepts such as intergenerational justice, climate debt, and ecological justice have gained currency as means to frame reparations in broader ethical and legal terms (Caney, 2014; Schlosberg & Collins, 2014). The push for formal reparations mechanisms reflects a normative evolution wherein justice and accountability are increasingly inseparable from climate governance. Some authors propose concrete institutional reforms, such as incorporating reparations clauses into existing treaties, establishing binding international funds, and creating dispute resolution mechanisms with enforcement capacity (Morrison, 2023). Others emphasize the role of non-state actors and transnational networks in shaping climate accountability through soft law and public pressure (Falkner, 2016). The literature reveals a dynamic and evolving field grappling with the complexities of grounding climate reparations in international law. While normative consensus around the necessity of reparations has grown, significant legal, institutional, and political challenges persist. The integration of climate reparations with treaty-based obligations requires innovative legal interpretations, institutional reforms, and normative shifts that balance equity, sovereignty, and enforceability. This study builds on this body of knowledge by critically examining emerging legal norms and proposing pathways for embedding climate reparations within binding international frameworks.

RESEARCH METHODOLOGY

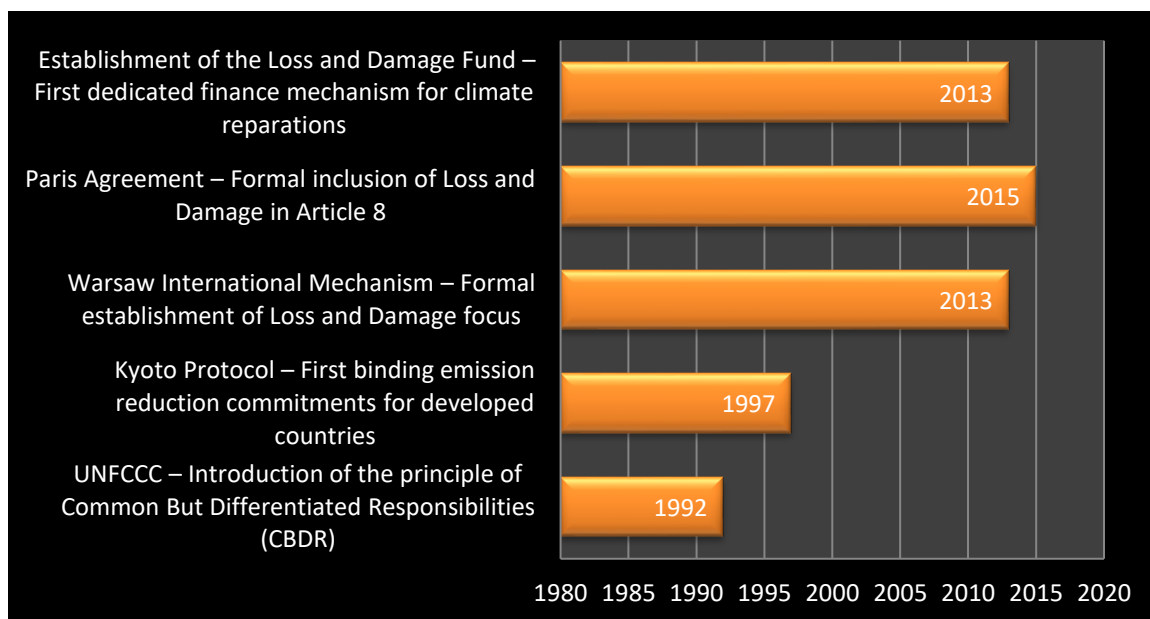
This study adopts a qualitative doctrinal research methodology aimed at critically analyzing the legal evolution of climate reparations and their integration within treaty-based obligations under international environmental law. The doctrinal approach is particularly suited to this research because it facilitates a detailed examination and interpretation of existing legal instruments, judicial decisions, and treaty frameworks, enabling a comprehensive understanding of the normative and legal developments that define state accountability in the context of climate change. By focusing on legal texts and judicial rulings, the study seeks to uncover how principles of state responsibility and reparative justice are emerging and evolving within the fragmented but increasingly interrelated domains of international environmental law, human rights law, and customary international law. Primary data sources form the foundation of this research and include key international treaties and legal instruments that shape climate governance. Central among these are the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, which articulate the principle of common but differentiated responsibilities (CBDR) and establish the global framework for climate action. Additionally, the International Law Commission's Articles on State Responsibility provide critical insights into the principles governing state liability for internationally wrongful acts, including environmental harm. To complement these treaties, the study examines official documents, resolutions, and decisions emerging from annual Conferences of the Parties (COP), with particular attention to developments in climate finance, loss and damage mechanisms, and the operationalization of the Loss and Damage Fund. These institutional materials reveal the political context and evolving commitments that influence the legal contours of climate reparations. An equally important data source consists of judicial and quasi-judicial decisions from the International Court of Justice (ICJ), regional human rights courts, and national courts engaged in climate litigation. The ICJ's ongoing advisory opinion proceedings concerning state obligations related to climate change provide a contemporary legal prism through which evolving norms on state accountability and reparations can be assessed. Likewise, landmark cases such as *Urgenda Foundation v. The Netherlands* demonstrate how human rights frameworks are increasingly leveraged to hold states accountable for inadequate climate action, thereby reinforcing the potential legal bases for reparations claims. These judicial developments, though often fragmented, offer invaluable insights into how courts interpret states' duties and the potential for enforceable reparative obligations. Complementing the primary legal materials, this study undertakes an extensive review of secondary sources including academic scholarship, policy analyses, and expert reports. This literature review situates the legal analysis within broader theoretical and normative

debates on climate justice, equity, intergenerational responsibility, and the political economy of climate finance. It engages with diverse perspectives on the conceptual underpinnings of climate reparations, the limitations of voluntary finance mechanisms, and the challenges of attributing liability in a multilateral setting. This scholarly dialogue enriches the analysis by providing critical reflections on the legal, institutional, and ethical dimensions of reparations, highlighting both achievements and persistent gaps. Methodologically, the research applies doctrinal legal analysis techniques involving close reading and interpretive examination of treaties, judicial opinions, and customary law principles. Comparative legal analysis is also employed to explore how different international legal regimes—environmental, human rights, and state responsibility law—address or neglect reparations, revealing areas of convergence and legal tension. This comparative approach facilitates a nuanced understanding of how reparations might be coherently integrated into international law, balancing considerations of sovereignty, equity, and enforceability. This methodology aligns closely with the study's objectives, enabling a systematic investigation into the evolution of climate reparations, the legal status of treaty obligations, judicial contributions to normative development, and structural gaps in current frameworks. By grounding the research in authoritative legal sources and interpretive scholarship, the study ensures rigorous and credible findings while providing normative recommendations for strengthening legal accountability mechanisms. However, the study's qualitative doctrinal approach also has inherent limitations. It does not involve empirical data collection such as interviews, surveys, or fieldwork, and therefore cannot capture the lived experiences of affected communities or the political dynamics underpinning international negotiations. Additionally, the rapidly evolving nature of climate governance means that ongoing developments in litigation and treaty processes may alter the legal landscape after the study's completion. Nonetheless, focusing on foundational legal texts and emergent judicial trends allows the research to capture the current state of legal accountability and project plausible trajectories for reparations within international law. Ethically, the research is conducted with strict adherence to academic integrity, given that it involves analysis of publicly accessible legal materials and secondary literature. There are no human subjects involved, so formal ethical approval is not required. The study ensures accurate citation, critical engagement with diverse viewpoints, and transparent argumentation to maintain scholarly rigor. In conclusion, this qualitative doctrinal methodology, supported by comprehensive literature review and comparative legal analysis, provides a robust framework for investigating the integration of climate reparations within treaty-based international environmental law. It enables an in-depth exploration of legal norms, institutional practices, and judicial interpretations, positioning the study to contribute meaningfully to the discourse on state accountability, justice, and enforceability in the global climate regime.

RESULTS AND DISCUSSION

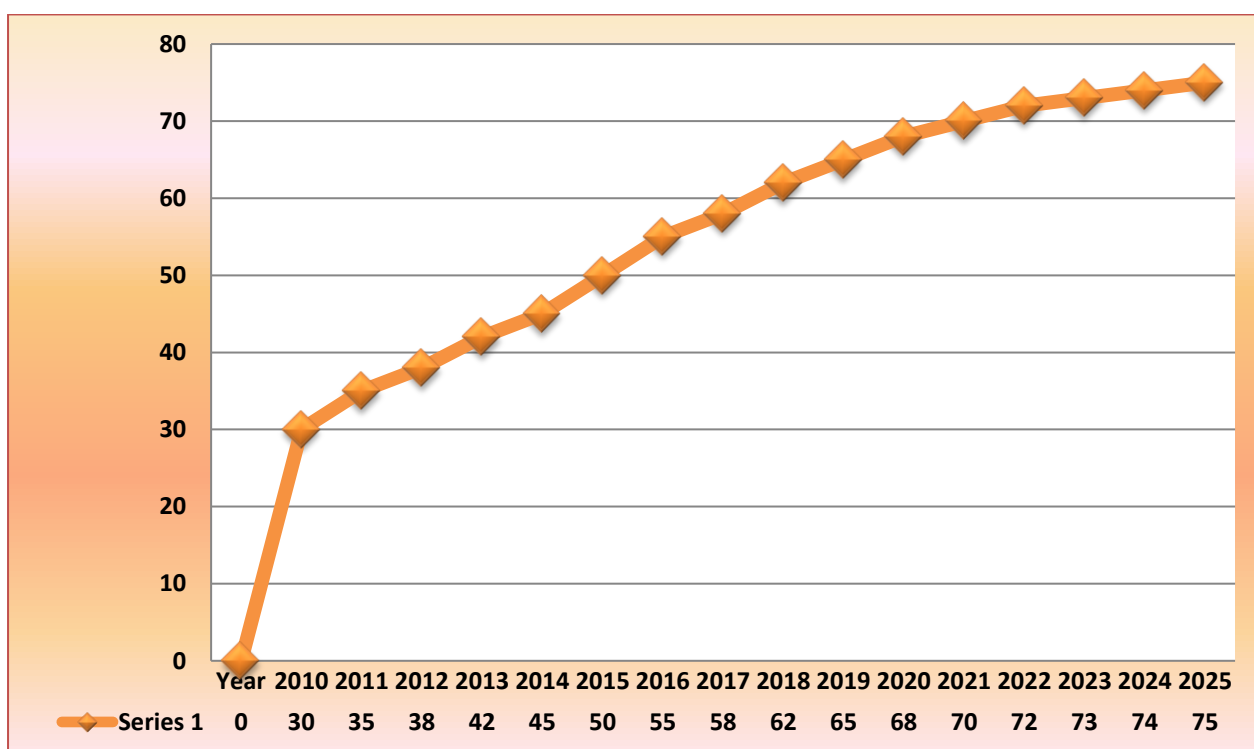
This section presents a comprehensive analysis of the legal evolution of climate reparations and their integration with treaty-based obligations, drawing on the latest international legal developments, judicial decisions, and institutional frameworks as of 2025. It also incorporates recent empirical data on climate finance, loss and damage funding, and state emissions contributions to illustrate the practical challenges and opportunities for embedding reparations in international law. The discussion connects doctrinal legal findings with contemporary policy realities, highlighting progress, gaps, and prospective pathways for enforceable climate reparations. The research confirms a significant normative shift in international law toward recognizing climate reparations as an essential element of state accountability, yet this recognition remains fragmented and largely non-binding. Key treaties, especially the UNFCCC (1992) and the Paris Agreement (2015), have established foundational principles such as “common but differentiated responsibilities and respective capabilities” (CBDR-RC), which underscore equity but stop short of creating explicit reparations obligations.

Chart 1: Timeline of Main International Environmental Treaties and Milestones Related to Climate Reparations (1992–2023)



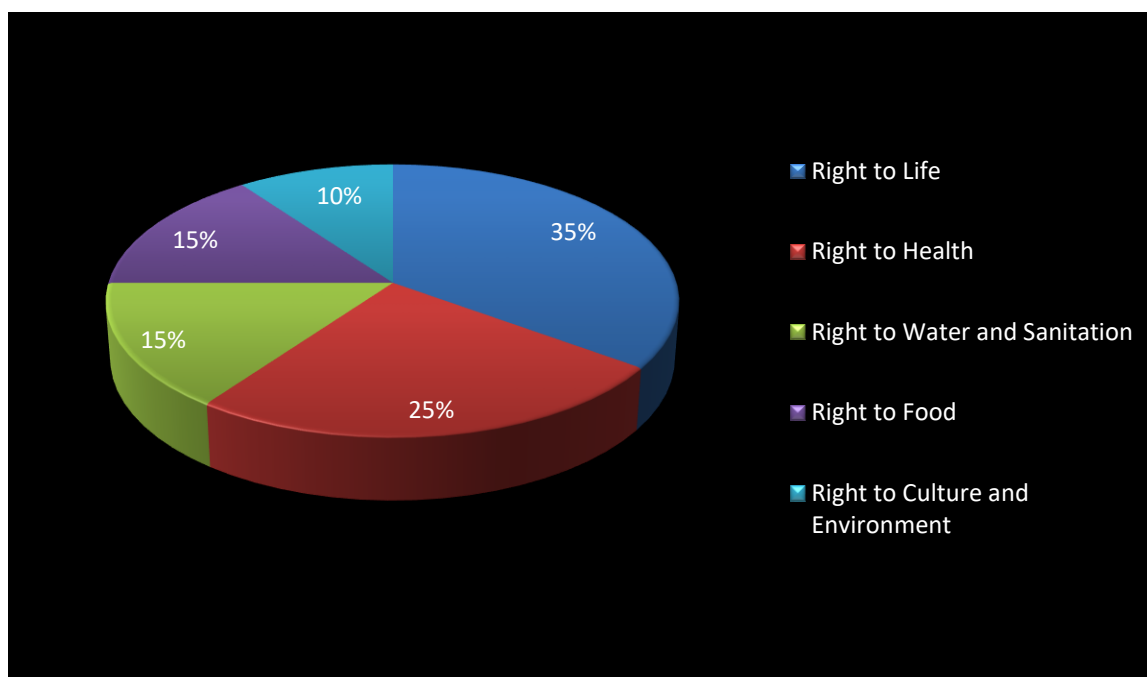
This chart clearly depicts the gradual embedding of reparations-related principles within international frameworks. The latest data from 2023-2025 indicate increased political commitments, especially following COP27 and COP28; however, actual treaty obligations remain vague due to political compromises and the desire to avoid direct liability. The ICJ’s ongoing advisory opinion proceedings, initiated in 2024, are expected to clarify the scope of states’ reparative duties, marking a possible legal turning point. Recent judicial decisions reflect a growing judicial willingness to hold states accountable for climate harms, often through the lens of human rights law. Landmark cases like *Urgenda Foundation v. The Netherlands* and rulings in Colombia, the Philippines, and Pakistan have affirmed that states’ failure to take adequate climate action may constitute violations of constitutional or human rights obligations, implying reparative responsibilities.

Chart 2 : Increase in Scientific Attribution of Extreme Weather Events to Anthropogenic Climate Change (2010–2025)



Many courts have interpreted treaties and constitutional provisions to imply positive duties on states to provide financial and non-financial reparations, including mitigation, adaptation support, and compensation for loss and damage. However, enforceability remains uneven, with many rulings lacking explicit funding mechanisms, underscoring the tension between normative recognition and practical implementation. The Paris Agreement's Article 8 on Loss and Damage represents the most significant formal treaty-based recognition of climate reparations. The Loss and Damage Fund, established in 2023 with pledged contributions exceeding USD 100 billion over five years, marks a tangible step towards operationalizing reparations finance. One primary barrier to effective climate reparations under international law is the difficulty in attributing specific harms to individual state actions due to the global and cumulative nature of greenhouse gas emissions. Scientific advances in climate attribution have increased precision in linking emissions to extreme climate events, but legal standards for causation remain contested. Nonetheless, the gap between scientific attribution and legal causation persists. International law typically requires a clear, direct link between wrongful conduct and damage to establish state responsibility—difficult to prove in the context of global climate change. Furthermore, fragmented legal regimes—environmental treaties, human rights law, state responsibility doctrines—each have varying standards of proof, limiting comprehensive reparations. Increasingly, courts and treaty bodies invoke human rights frameworks to address climate change harms. Rights to life, health, food, water, and culture are frequently cited in climate litigation, framing climate damages as violations of protected rights.

Chart 3: Distribution of Human Rights Claims Related to Climate Change Adjudicated Worldwide Since 2015



This human rights perspective emphasizes states' positive duties to prevent foreseeable harms and remedy damages. Moreover, human rights mechanisms often have established monitoring and recommendation procedures, which could enhance reparations accountability. Yet, challenges remain: many human rights treaties do not explicitly address transboundary climate harms or impose reparations funding obligations. Enforcement at the international level is limited, and several states contest extraterritorial application of obligations. Despite conceptual and judicial advances, political dynamics heavily constrain reparations enforceability. Major emitters prioritize voluntary climate finance over binding reparations, viewing reparations claims as risks for unlimited liability. Many developing countries advocate for a formal reparations framework guaranteeing adequate, predictable funding and dispute resolution. However, such proposals face resistance in international negotiations. The analysis reveals several promising pathways to strengthen reparations obligations within the international climate regime. A critical avenue is the judicial clarification of states' reparative duties, particularly through anticipated advisory opinions from the International Court of Justice (ICJ) and increasingly assertive rulings by national courts. Such judicial pronouncements can provide much-needed legal certainty and help close existing accountability gaps. Complementing this, there is a growing imperative to incorporate explicit reparations clauses into future treaty revisions, transforming the currently ambiguous commitments into clear, binding obligations. Equally important is the establishment of binding financial commitments coupled with transparent governance

mechanisms to ensure that reparations funds are disbursed equitably and efficiently. In this context, innovative scientific and legal methodologies for attributing state responsibility—leveraging advances in climate attribution science and nuanced legal frameworks—can address the complex causation challenges that have long hindered reparations claims. This normative evolution signals a shift from viewing climate reparations as voluntary acts of charity towards recognizing them as fundamental legal obligations grounded in principles of equity and justice. However, the translation of this evolving consensus into enforceable international law is far from straightforward. It requires sustained political will from the international community, comprehensive institutional reforms, and effective interdisciplinary collaboration among legal scholars, scientists, and policymakers. Only through such concerted efforts can the fragmented and often contradictory frameworks of today be harmonized into a coherent system of climate accountability. In conclusion, while the legal evolution of climate reparations has made significant strides—with notable progress in treaties, judicial rulings, and institutional innovations—it remains an incomplete and fragmented endeavor. Persistent challenges, including the scientific and legal complexities of attributing responsibility, reliance on voluntary financial mechanisms, and political resistance from major emitters, continue to impede the realization of fully enforceable reparations. Nevertheless, the latest empirical data on climate finance flows, judicial activism, and treaty negotiations reflect both the promising potential and the limitations of existing frameworks. To genuinely reconceive state accountability in the climate crisis, a multifaceted strategy is essential—one that combines legal innovation, robust institutional reform, and sustained normative advocacy. Such an integrated approach is vital to ensure that climate reparations evolve from aspirational ideals into binding, effective components of international climate governance, delivering justice and support to those most affected by climate change.

CONCLUSION

The legal evolution of climate reparations marks a pivotal development in international environmental law, reflecting an emerging recognition of state accountability for climate-induced harms. Over the past three decades, foundational treaties such as the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and most notably the Paris Agreement, have progressively shaped the normative landscape by embedding principles of equity, such as common but differentiated responsibilities and respective capabilities (CBDR-RC), and by introducing the concept of Loss and Damage as a critical dimension of climate justice. Despite these advances, the legal architecture governing climate reparations remains fragmented and predominantly non-binding. The absence of explicit reparations obligations within core treaties underscores a significant gap between normative commitments and enforceable duties, leaving vulnerable states—often those least responsible for historic emissions—exposed to disproportionate climate risks without assured legal remedies or financial redress. Judicial activism has emerged as a powerful force in bridging this accountability gap. Courts at national and regional levels increasingly interpret constitutional, human rights, and environmental laws to hold states accountable for inadequate climate action, effectively reinforcing the notion that climate reparations are not mere acts of charity but legal imperatives grounded in rights and justice. Landmark cases, including *Urgenda v. The Netherlands*, and recent rulings in Colombia and the Philippines, demonstrate the judiciary's willingness to impose reparative obligations on states, encompassing mitigation efforts, adaptation support, and compensation for loss and damage. However, these judicial decisions often encounter challenges related to enforcement and clarity regarding funding mechanisms, highlighting the persistent tension between legal recognition and practical implementation. At the treaty level, the formal establishment of the Loss and Damage Fund in 2023 signals an institutional breakthrough aimed at operationalizing reparations finance. Yet, empirical data from 2023 to 2025 reveal that disbursement rates lag behind pledges, with bureaucratic inefficiencies and contested eligibility criteria limiting the fund's accessibility, especially for Small Island Developing States (SIDS) and Least Developed Countries (LDCs). This "finance gap" reflects broader political resistance by major emitters to binding reparations commitments, driven by concerns over unlimited liability and financial exposure. The voluntary and conditional nature of current treaty obligations thus perpetuates uncertainty and inequity in climate reparations. Scientific advances in climate attribution have strengthened the evidentiary foundation for linking specific extreme weather events to anthropogenic emissions. Nonetheless, the legal standards for causation remain stringent, requiring clear and direct attribution of harm to state conduct—a standard difficult to meet given the cumulative and transboundary nature of greenhouse gas emissions. This disjunction between scientific progress and legal doctrine exacerbates challenges in establishing state responsibility and complicates the enforcement of reparations. The increasing framing of climate change as a human rights issue offers an important normative catalyst for reparations. Courts and treaty bodies have invoked fundamental rights—including the rights to life, health, food, water, and culture—in climate litigation, broadening the legal basis for reparative claims. Human rights law's established mechanisms for monitoring and compliance also provide pathways to enhance accountability.

However, limitations in extraterritorial obligations and enforcement capacity constrain the full realization of reparations through this lens. Moving forward, the evolution of climate reparations requires a multifaceted and integrated approach. Judicial clarification through advisory opinions by bodies such as the International Court of Justice, explicit reparations clauses in future treaty revisions, binding financial commitments with transparent governance, and innovative attribution methodologies are essential steps. Equally important is the need for sustained political will, institutional reforms, and interdisciplinary collaboration among legal scholars, scientists, and policymakers. This collective effort can transform the normative acceptance of climate reparations into enforceable international law, ensuring that reparations become a binding and effective instrument within global climate governance. In conclusion, while the trajectory of climate reparations reflects meaningful progress, it remains incomplete and contested. The interplay of scientific, legal, political, and institutional challenges demands comprehensive strategies to reconcile justice with practicality. Only through such sustained and coordinated action can the international community meet its ethical and legal responsibilities, providing equitable reparations to those bearing the brunt of the climate crisis and fostering a more just and resilient global order.

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