

Setting a Clear Path for Implementing and Adhering to a Global Legal Framework: Strategies for Building Consensus for Climate Change Regulation

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Abstract

Climate change represents a global crisis that requires immediate and coordinated action. Despite international initiatives such as the Paris Agreement, current voluntary commitments, and fragmented approaches have proven inadequate in reducing greenhouse gas emissions and constraining global warming to within 1.5°C or 2°C, as indicated by the 2021 Climate Action Tracker. This paper critically examines the need to establish a legally binding global climate framework to address the crisis effectively. Key facets of this proposed framework include mandatory emission targets, adaptability through systematic scientific evaluations, financial and technical support mechanisms for developing nations, and the establishment or enhancement of an international entity to supervise implementation and compliance. Such a framework would ensure accountability, facilitate fair climate action, and mobilize essential resources to support global mitigation and adaptation efforts. The paper urges policymakers, international institutions, and civil society to collaboratively work towards establishing this global climate law, emphasizing that only through unified and legally enforced actions can the future of the planet be secured for generations to come.

Keywords: Climate Change, International Law, Legally Binding Framework, Regulations, UN, World Trade Organization, Science, Weather.

Introduction

Climate change is widely acknowledged as the most pressing crisis of the 21st century, exerting profound influence on all aspects of life on Earth. The rising global temperatures, shrinking ice caps, and increasing frequency and severity of extreme weather events pose existential threats to ecosystems, human well-being, food security, and global economies [1]. These impacts go beyond national borders, affecting countries regardless of emission levels. Despite ongoing international climate negotiations and the endorsement of agreements like the Kyoto Protocol and the Paris Agreement, global efforts are falling short of the goal to limit global warming to well below 2°C, let alone the more ambitious 1.5°C target [2, 3]. This ongoing inadequacy highlights the urgent need for a comprehensive, legally binding global framework to address the complexities of climate change effectively.

The lack of a unified global legal standard has led to fragmented and insufficient efforts to tackle climate change. Many interna-

tional climate agreements are voluntary, allowing countries to set their targets without enforceable mechanisms. For example, while the Paris Agreement represented a significant commitment to global climate action by securing pledges from nearly every country, it relies on Nationally Determined Contributions (NDCs) that lack strict accountability and are self-determined [4]. As a result, current NDCs are insufficient to achieve the necessary emissions reductions to prevent catastrophic climate impacts [5]. The absence of clear legal obligations allows countries to withdraw their commitments, creating discrepancies between national actions and global climate goals.

The need for a global legal standard becomes even more compelling when considering the principle of equity and "common but differentiated responsibilities" (CBDR). Throughout history, developed countries have been the main contributors to greenhouse gas emissions, while developing nations, despite contributing the least, are the most vulnerable to the impacts of climate change [6].

Climate Change Poses a Significant Global Crisis

Climate change is universally recognized as a substantial global challenge with far-reaching impacts on the environment, economies, and societies. This phenomenon is characterized by significant alterations in weather patterns, primarily attributable to human activities such as fossil fuel combustion, deforestation, and industrial processes, resulting in heightened concentrations of greenhouse gases (GHGs) in the atmosphere (Intergovernmental Panel on Climate Change [1]).

These modifications within the Earth's climate system have profound implications, including extreme weather events, rising sea levels, and biodiversity loss. The extensive global consequences of climate change affect a wide range of sectors. Specifically, there has been a marked increase in the frequency and intensity of extreme weather events, such as hurricanes, floods, droughts, and heatwaves, leading to substantial loss of life, infrastructure damage, and economic implications [1]. The agricultural industry is particularly vulnerable, as changes in temperature and precipitation patterns can disrupt crop yields, threatening food security for millions of people, especially in regions heavily reliant on agriculture [7].

The potential rise in sea levels presents a significant hazard to coastal communities and ecosystems. The combination of polar ice cap and glacier melt, coupled with the thermal expansion of seawater, has resulted in elevated sea levels. Consequently, coastal areas are at heightened risk of flooding and erosion (National Aeronautics and Space Administration [8]). Regions with low-lying islands and densely populated coastal cities are particularly susceptible to submergence, which may necessitate large-scale migration and community displacement.

The loss of biodiversity is a significant repercussion of climate change. Modifications in temperature and precipitation patterns profoundly impact habitats, posing challenges to the survival of various plant and animal species [9]. Coral reefs serve as a pertinent example as they experience bleaching due to increasing sea surface temperatures, potentially leading to the collapse of marine ecosystems reliant on these reefs for sustenance and protection.

Lack of Binding Enforcement Mechanisms

Agreement primary deficiencies in current international climate agreements, such as the Paris Agreement, is the lack of legally binding enforcement mechanisms. Although the Paris Agreement established a global framework for addressing climate change, it heavily relies on voluntary national commitments, known as Nationally Determined Contributions (NDCs). However, there are no obligatory enforcement mechanisms to ensure adherence [10]. This absence of binding enforcement results in a scenario where countries can establish less ambitious targets or fail to fulfill their commitments without encountering legal repercussions (United Nations Framework Convention on Climate Change [2]).

The current international legal framework affords countries the autonomy to establish their climate objectives, resulting in notable disparities in the levels of ambition across nations. Many countries' NDCs (Nationally Determined Contributions) within the framework of the Paris Agreement prove inadequate in con-

straining global warming to the stipulated targets of well below 2°C and are notably insufficient in achieving the more ambitious 1.5°C target [5]. The absence of legally mandated requirements for more rigorous and cohesive global targets poses a challenge for international law in instigating the necessary degree of change to combat the climate crisis effectively.

An additional deficiency pertains to the need for robust legal provisions aimed at aiding developing nations in their efforts to mitigate and adapt to climate change. Despite the recognition of the principle of "common but differentiated responsibilities" (CBDR) in the Paris Agreement, there is a notable absence of clearly defined legal mandates concerning the provision of financial and technological assistance to developing countries [2]. This deficiency engenders an imbalance, as numerous developing nations require more excellent resources and capabilities to implement effective climate action, exacerbating global inequalities [4].

Uncertainties in the Concept of Climate Justice and Responsibility

The current state of international law reveals a notable absence of a definitive and enforceable framework for addressing climate justice and historical responsibility for emissions. Notably, developed nations, by historical measure, have been the primary contributors to greenhouse gas emissions. Despite this, international agreements have failed to establish legally binding obligations for these nations to assume a more substantial role in climate action (Parks & Roberts, 2010). This absence of accountability significantly impedes progress toward formulating fair and effective climate strategies.

There is an increasingly widespread recognition of the loss and damage attributable to climate change, particularly in vulnerable countries. Nonetheless, international law has not established unambiguous mechanisms or legal obligations for compensating countries for these damages [11]. The Warsaw International Mechanism for Loss and Damage, instituted under the UNFCCC, functions more as a framework for dialogue rather than a legally binding instrument for compensation, thereby underscoring the deficiencies in international legal responses to climate-induced harm.

The Paris Agreement mandates countries report their greenhouse gas emissions and progress towards climate goals. However, the monitoring and verification systems necessitate enhanced rigor. The transparency framework heavily relies on self-reporting, potentially resulting in inconsistent or incomplete data [12]. The lack of a centralized enforcement body to verify and hold countries accountable restricts the effectiveness of international climate agreements.

The international climate regime is fragmented, with multiple treaties, protocols, and initiatives addressing various aspects of climate change without a cohesive, overarching legal framework [13]. This fragmented approach leads to overlaps and inconsistencies, diminishing the overall effectiveness of international law in comprehensively addressing climate change.

Establishing Clear and Binding Commitments

A comprehensive international legal framework would establish obligatory commitments for nations to mitigate greenhouse gas

emissions and adapt to climate-related impacts. In contrast to voluntary undertakings, legally binding accords can ensure national adherence to commitments, thereby fostering heightened climate-related endeavors [10]. Mandatory commitments would further guarantee harmonizing national policies with global climate objectives, thereby bolstering collective endeavors to limit global temperature rise to pivotal thresholds, such as 1.5°C (United Nations Framework Convention on Climate Change [2]).

Climate change has varying impacts on countries, with developing nations often experiencing disproportionate effects despite contributing less to global emissions. Establishing an international legal framework would be instrumental in codifying principles of equity, such as "common but differentiated responsibilities" (CBDR), to ensure that wealthier nations, which have historically contributed more to climate change, provide financial and technological assistance to developing countries [4]. This is crucial for establishing a fair and impartial system that enables all nations to engage in climate action effectively.

A universal legal framework would set forth standardized definitions, guidelines, and protocols for climate-related activities, including emissions reporting, carbon trading, and renewable energy adoption [14]. This standardization would mitigate ambiguity, enabling countries to harmonize their policies and practices, bolstering global cooperation, and streamlining endeavors to address climate change.

Ensuring Accountability and Compliance

One of the primary deficiencies found in existing climate agreements, such as the Paris Agreement, is the absence of enforcement mechanisms [10]. Implementing a global legal framework could establish a system of accountability through mechanisms such as international courts or compliance committees, which would be empowered to impose sanctions or other penalties in cases of non-compliance. This, in turn, would incentivize countries to honor their commitments and take substantial steps toward reducing emissions and advancing sustainability [4].

Furthermore, a global legal framework could be the foundation for creating robust financial mechanisms to bolster climate mitigation and adaptation efforts, particularly in developing nations [7]. By instituting legal obligations for developed countries to contribute to global climate funds, the framework would ensure a consistent flow of resources to support green technologies, capacity-building, and resilience initiatives in vulnerable communities.

Climate change engenders irreversible loss and damage, particularly affecting nations vulnerable to extreme weather events and rising sea levels. The establishment of a global legal framework holds the potential to provide compensation and assistance to countries grappling with such adversities [11]. This framework would encompass mechanisms for damage assessment, financial resource allocation, and facilitation of recovery endeavors, thereby fostering global unity and upholding principles of climate justice.

Climate change constitutes a multifaceted global challenge necessitating international cooperation, encompassing the exchange of technology, knowledge, and best practices. A global

legal framework would furnish directives for technology transfer and capacity-building initiatives, fostering collaboration between developed and developing nations [4]. This would fortify global endeavors to hasten the embrace of renewable energy, sustainable agriculture, and other climate-centric solutions.

Limitations of Current Climate Agreements, Like the Paris Agreement

The Paris Agreement, adopted in 2015, is one of the most significant international efforts to combat climate change, aiming to limit global temperature rise to well below 2°C, with efforts to keep it below 1.5°C (United Nations Framework Convention on Climate Change [2]). Despite its ambitious goals, the Paris Agreement has several limitations that impede its effectiveness in addressing the climate crisis.

One of the main criticisms of the Paris Agreement is its need for legally binding commitments and enforcement mechanisms. While the Agreement requires countries to submit their Nationally Determined Contributions (NDCs) and report progress, there are no penalties for non-compliance or failure to meet targets [10]. This lack of binding enforcement creates a significant gap in ensuring accountability, as countries can set relatively low targets or not adhere to their commitments without facing direct consequences [4].

Another limitation is the inadequacy of current NDCs in meeting the Paris Agreement's temperature goals. Many countries' pledges fall short of what is needed to prevent global warming from exceeding 2°C, let alone 1.5°C. A study by Rogelj et al. shows that even if all current NDCs are fully implemented, global temperature rise could still exceed 2.7°C by the end of the century. The voluntary nature of these pledges and the absence of a standardized method to evaluate their adequacy result in a fragmented and inconsistent approach to emissions reduction. The Paris Agreement acknowledges the principle of "common but differentiated responsibilities" (CBDR) and the need for developed countries to support developing nations in mitigation and adaptation efforts [2].

The absence of legally enforceable requirements for loss and damage limits the ability of vulnerable countries to claim financial or technical assistance in dealing with climate-induced disasters [11]. The Paris Agreement significantly emphasizes individual national policies and efforts, allowing countries to set climate goals. This self-determined approach has resulted in varying levels of ambition, as some nations may prioritize short-term economic growth over long-term climate action. Moreover, without a centralized, binding framework to ensure that national policies collectively meet global targets, the Agreement is ineffective in driving the necessary reductions in greenhouse gas emissions (Höhne et al., 2017).

The Need for a Global Legal Framework to Regulate the Excesses of Climate Change and Ensure Compliance by All Nations

The transboundary implications of climate change underscore the necessity of a comprehensive global legal framework. Given the diverse and far-reaching impacts of climate change, including extreme weather events, sea-level rise, and disruptions to ecosystems, a singular national focus is inadequate. Conse-

quently, a global legal framework becomes indispensable in effectively governing climate change and ensuring the fulfillment of obligations by all nations. A pivotal rationale for instituting a global legal framework is harmonizing climate action.

Present endeavors, as seen in agreements like the Paris Agreement, permit nations to establish their own emissions targets, resulting in inconsistencies and varying levels of ambition. A consolidated legal framework would standardize climate objectives and actions, guaranteeing alignment with the global imperative to restrict temperature escalation to 1.5°C or 2°C. By stipulating unequivocal, legally binding commitments for all nations, an international framework would mitigate disparities and foster a unified drive towards more efficacious climate mitigation.

The voluntary nature of existing climate agreements, such as the Nationally Determined Contributions (NDCs) within the framework of the Paris Agreement, has prompted concerns regarding accountability and enforcement. Imposing binding commitments would empower nations to establish more ambitious targets and attain their objectives by being subject to penalties [4]. Establishing a global legal framework would introduce mechanisms for monitoring, reporting, and enforcing compliance, potentially through international courts or compliance committees, to hold countries accountable for their climate actions. These mechanisms would foster a sense of responsibility among nations and ensure their adherence to the agreed-upon emissions reduction targets [10].

Climate change disproportionately impacts developing nations, which often need more capacity to adapt despite their minimal contribution to the crisis. It is imperative to establish a comprehensive global legal framework that embodies principles of equity and "common but differentiated responsibilities" (CBDR). This framework would necessitate more affluent, developed nations to assume a more significant share of the burden in addressing climate change and to provide financial and technological assistance to developing countries [14]. Such an approach would level the playing field and ensure that all nations have the necessary resources to implement climate action effectively.

Providing Legal Structures for Financial Mechanisms

The provision of funding for climate action is of utmost importance, particularly for developing nations needing support for adaptation and mitigation efforts. The establishment of a global legal framework would serve to institute legally binding commitments for developed nations to contribute to global climate funds, ensuring a consistent and dependable flow of resources [15].

These legal mandates would offer a structured approach to transparently managing and allocating these funds, fostering trust and cooperation among nations. Moreover, the framework could introduce mechanisms for compensation in cases of loss and damage, thereby providing a legal basis for nations most severely impacted by climate-induced disasters to receive support [11].

A global framework could provide the legal foundation for technology transfer and capacity-building initiatives, thus enabling developing countries to adopt renewable energy technologies, enhance energy efficiency, and bolster resilience to climate im-

pacts. By enshrining these practices in international law, the framework would ensure the fulfillment of developed nations' obligations to share technologies and knowledge, thereby fostering global cooperation for a sustainable future [4]. Transparency and reliable data are essential for evaluating progress in climate action. A global legal framework would establish standardized requirements for monitoring, reporting, and verification (MRV) of emissions and climate policies, thereby creating a more transparent system for tracking national and global efforts [12].

Establishing a global legal framework is essential to provide comprehensive guidelines for climate adaptation, particularly for nations that are vulnerable to its effects. Through the implementation of legally binding agreements, countries can collaborate on the development of resilient infrastructure, the reduction of disaster risks, and the formulation of community-based adaptation strategies [9]. This concerted effort is indispensable in safeguarding lives, livelihoods, and ecosystems in the wake of escalating climate impacts. Given the intricate and transboundary nature of climate change, the need for a global legal framework that can enforce uniform standards, provide financial and technological support and ensure equitable climate action becomes increasingly apparent.

Evolution of Legal Mechanisms to Bind Climate Change

Over the past few decades, international climate agreements have undergone considerable evolution in response to the urgent need to address the complex and profound impacts of climate change. These agreements, such as the Kyoto Protocol and the Paris Agreement, have shaped the global response to this pressing issue. They have led to increased awareness and collaboration among nations to mitigate the effects of climate change and pave the way for a more sustainable future.

The evolution of international climate agreements from the UNFCCC to the Paris Agreement reflects the growing recognition of climate change as a global crisis requiring collective action. While earlier agreements like the Kyoto Protocol focused on legally binding targets for developed countries, the Paris Agreement represents a more inclusive and flexible approach, emphasizing voluntary commitments and global participation. However, the effectiveness of these agreements depends on their implementation and the ambition of national policies, highlighting the ongoing need for stronger global governance mechanisms.

A. United Nations Framework Convention on Climate Change (UNFCCC), 1992

The UNFCCC, established at the Earth Summit in Rio de Janeiro in 1992, represents one of the pioneering international treaties to address climate change. Its primary objective was to stabilize greenhouse gas concentrations in the atmosphere to prevent hazardous human-induced interference with the climate system [16]. The Convention served as the cornerstone for subsequent climate accords, emphasizing the principles of "common but differentiated responsibilities." This framework acknowledges that developed nations have made greater contributions to climate change and, as a result, bear a greater responsibility for its mitigation.

B. Kyoto Protocol, 1997

The Kyoto Protocol, adopted in 1997 and enforced in 2005, represented a significant milestone as the first legally binding

international treaty to establish specific emissions reduction targets for industrialized countries, also known as Annex I parties [17]. This landmark agreement introduced mechanisms such as the Clean Development Mechanism (CDM), enabling developed nations to invest in emissions reduction projects within developing countries to fulfill their targets.

Despite its ambitious goals, the Kyoto Protocol had several limitations. Notably, it did not impose binding commitments on developing countries, including major emitters like China and India, which led to criticisms regarding its effectiveness. Additionally, some significant emitters, such as the United States, never ratified the agreement, limiting its global impact [18]. The Protocol's first commitment period ran from 2008 to 2012, after which an extension was agreed upon in the form of the Doha Amendment, setting new targets for the period 2013-2020 [19].

C. Copenhagen Accord, 2009

In 2009, global leaders convened at the Copenhagen Climate Change Conference (COP15) with the expectation of reaching a comprehensive climate agreement. Despite falling short of expectations, the Copenhagen Accord was established, recognizing the imperative to limit global temperature rise to under 2°C [20]. The Accord also acknowledged the significance of offering financial assistance to developing nations, with developed countries pledging to mobilize \$100 billion annually by 2020. However, the Accord was non-binding and lacked specific targets or enforcement mechanisms.

D. Paris Agreement, 2015

The Paris Agreement, adopted in 2015 at COP21, marked a significant turning point in international climate policy. For the first time, almost all countries, both developed and developing, committed to climate action [2]. The Agreement's main goals are to limit global warming to well below 2°C above pre-industrial levels, with efforts to limit it to 1.5°C, and to achieve global carbon neutrality in the second half of the century.

Unlike the Kyoto Protocol, the Paris Agreement employs a more flexible approach, allowing countries to set emissions reduction targets, known as Nationally Determined Contributions (NDCs). While this encourages broader participation, the targets are not legally binding, and there are no penalties for non-compliance. The Paris Agreement also established mechanisms for transparency, financial support, and periodic global stock takes to assess progress toward its goals [4]. Despite its shortcomings, the Agreement has been praised for its inclusivity and emphasis on transparency and equity [10].

E. Katowice Rulebook, 2018

In 2018, the Katowice Climate Change Conference (COP24) culminated in the adoption of the Katowice Rulebook, which outlines guidelines for the implementation of the Paris Agreement. The Rulebook delineates specific regulations governing the reporting of emissions, the tracking of progress on Nationally Determined Contributions (NDCs), and the disclosure of climate finance contributions [21]. This accomplishment marked a pivotal advancement in the operationalization of the transparency and accountability mechanisms of the Paris Agreement.

Successes of Existing Frameworks

In recent decades, a series of international climate frameworks, exemplified by the Kyoto Protocol and the Paris Agreement, have been established to address the global climate crisis. Despite notable achievements, these frameworks are subject to significant limitations that impede their efficacy. While they have successfully raised awareness, facilitated the implementation of flexible market mechanisms, and encouraged global participation, their deficiencies, including the absence of binding commitments, insufficient ambition, and inadequate support for developing nations, underscore the necessity of a more robust global legal framework. The rectification of these deficiencies is imperative for the realization of global climate objectives and the establishment of a sustainable future.

The United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement have successfully heightened global awareness regarding climate change and its impact. These accords have fostered global unity in acknowledging climate change as an urgent global concern and the imperative for collaborative action [4]. Notably, the Paris Agreement represented a watershed moment by securing commitments from nearly every nation to undertake climate action, encompassing developed and developing countries [2]. The extensive participation in this agreement signifies a burgeoning global consensus on addressing climate change.

The Kyoto Protocol introduced flexible market mechanisms, such as the Clean Development Mechanism (CDM). These mechanisms permitted developed nations to invest in emission-reduction projects in developing countries to fulfill their emission targets [17]. They facilitated financial and technological support to developing nations and facilitated the integration of climate action into market-based strategies [18].

The Paris Agreement represented a significant departure by incorporating adaptation and loss and damage as central components of the global climate response. This signified a departure from previous frameworks predominantly concentrating on mitigation [9]. Establishing the Warsaw International Mechanism for Loss and Damage under the UNFCCC also acknowledged the reality of climate-induced impacts and the necessity to assist vulnerable countries [2].

Shortcomings of Existing Frameworks

The current frameworks, especially the Paris Agreement, have a significant shortcoming in that they need to have legally binding obligations for countries to achieve their emissions reduction targets [10]. Although the Paris Agreement mandates countries to establish and report on their NDCs, it does not enforce penalties for failing to meet these targets. This lack of enforcement reduces the motivation for countries to take on more ambitious climate action [4].

The Paris Agreement acknowledges the principle of "common but differentiated responsibilities" (CBDR). However, there are concerns regarding its insufficient consideration of the needs and capabilities of developing nations. Financial commitments from developed countries aimed at supporting developing nations in their adaptation and mitigation endeavors are reported to need to be more adequately funded [22]. This deficiency in support

constrains the capacity of vulnerable nations to manage climate impacts and transition to low-carbon economies.

The Paris Agreement incorporates provisions for "loss and damage" attributable to the effects of climate change; however, it lacks a clearly defined mechanism for compensation or liability [2]. This absence of enforceable measures leaves susceptible nations, particularly those confronting severe weather events and escalating sea levels, without adequate assistance to recuperate from climate-induced impairments [11].

The existing frameworks heavily depend on countries' voluntary compliance and self-reporting. Despite establishing a transparency framework in the Paris Agreement, discrepancies in countries' reporting capacities and methodologies pose challenges in accurately gauging global progress [12]. This lack of uniformity renders it arduous to enforce accountability for countries' commitments.

The Intersection Between Science and Law to Combat Climate Change

Aligning international law with scientific evidence on climate change is crucial to tackling the global climate crisis effectively. Research offers an evidence-based grasp of the causes, consequences, and solutions to climate change, which is essential for crafting effective legal and policy responses. Integrating international law with scientific evidence is necessary for creating realistic, just, and successful climate policies, ensuring that legal measures are based on the best available knowledge.

This, in turn, directs global efforts toward achieving climate objectives, endorsing sustainability, and addressing the wide-ranging impacts of climate change. As our scientific comprehension of climate change evolves, international law must also adapt to include new findings, ensuring a dynamic and responsive approach to the global climate crisis. Numerous studies show that current national policies fall short of the worldwide climate targets set by international agreements like the Paris Agreement. Two prominent studies underscore this shortfall.

Scientific research on climate change, predominantly carried out by entities such as the Intergovernmental Panel on Climate Change (IPCC), furnishes comprehensive evaluations of climate-related hazards, prospective forecasts, and the efficacy of measures for mitigating and adapting to climate change [1]. This substantiation is indispensable for informing international legal frameworks, including establishing targets for reducing emissions and timetables for stabilizing global temperatures. By integrating scientific findings into international law, policymakers can render well-informed decisions that harmonize with the most up-to-date understanding of climate dynamics and associated risks [4].

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Ensuring Long-Term Environmental Sustainability

Scientific research yields valuable insights into the enduring ramifications of climate change, encompassing sea-level escalation, ocean acidification, biodiversity diminution, and alterations in meteorological patterns [1]. International law, underpinned by this empirical foundation, can establish mandates that not only redress immediate climate concerns but also foster enduring sustainability. To illustrate, scientifically informed legal provisions can steer the cultivation of sustainable land utilization methodologies, preservation of ecosystems, and safeguarding of natural resources, which are integral to upholding the planet's ecological equilibrium.

The impact of climate change on vulnerable populations and regions, such as small island states and developing countries, is highlighted by climate science. Scientific evidence indicates that these regions are disproportionately affected by climate change despite contributing the least to global emissions [6]. Aligning international law with this evidence can help uphold the principle of equity in climate action, as outlined in the Paris Agreement. This approach ensures that developed nations, historically contributing the most to greenhouse gas emissions, bear greater responsibility for reducing emissions and providing financial and technological support to developing countries [2].

The utilization of scientific methodologies for the monitoring of greenhouse gas emissions, deforestation, and climate impacts is imperative for assessing progress in climate action [12]. Integrating these scientific methods into international law can facilitate the establishment of transparent and precise reporting systems in line with the transparency framework of the Paris Agreement. This synchronization enables validating countries' emissions data and their advancements toward their climate commitments, contributing to the cultivation of trust and accountability within the international climate regime.

Critical Gap Between the Existing Policies and Actions Required

One of the fundamental principles of international law is the unequivocal respect for national sovereignty. Nations frequently exhibit reluctance to endorse external enforcement mechanisms that could encroach upon their domestic policies and decision-making [4]. This guiding principle has culminated in adopting a more adaptable, grassroots approach within agreements such as the Paris Agreement, wherein nations proffer self-determined Nationally Determined Contributions (NDCs) devoid of legally binding repercussions for non-compliance [2]. This flexibility facilitates extensive participation but concurrently constrains the enforceability of the undertaken commitments. The below studies show the gap that still exists in these policies.

In a study by Rogelj et al., an assessment of the climate pledges made by countries under the Paris Agreement, known as Nationally Determined Contributions (NDCs), was conducted. The findings indicate that even if all current NDCs are fully implemented, a global temperature rise of approximately 2.7°C by the end of the century is projected. This exceeds the Paris Agreement's goal of limiting warming to below 2°C, ideally to 1.5°C.

The substantial disparity underscores countries' need to embrace more ambitious climate policies to reconcile the variance between existing commitments and global targets.

The Emissions Gap Report 2020, published by the United Nations Environment Programme (UNEP), offers a comprehensive analysis of the disparity between anticipated emissions based on existing policies and the requisite reductions essential for achieving global climate objectives. The report underscores that current national policies and commitments are markedly inadequate, resulting in a projected rise in temperature of approximately 3.2°C by the close of the century. It underscores the imperative for more robust national policies, particularly in renewable energy, energy efficiency, and climate finance, to address the emissions gap and attain the benchmarks stipulated in the Paris Agreement.

According to the Climate Action Tracker, a significant disparity exists between the national commitments and the global climate targets necessary to restrict warming to 1.5°C or 2°C. The absence of a binding international framework to regulate and enforce emission reductions allows countries to establish relatively low targets without repercussions. This paradox underscores how voluntary national commitments undermine collective efforts to address climate change effectively.

The Role of Institutions in Implementing and Enforcing the Global Legal Framework on Climate Change

Keohane and Victor posit that their fragmented nature constrains the effectiveness of global climate governance institutions. Each institution operates within its designated mandate, leading to overlaps and inconsistencies in policy implementation. The United Nations, for instance, possesses the capacity to facilitate international agreements but needs more authority to enforce them. Similarly, the World Bank is capable of providing crucial financial support but cannot mandate specific policies. The World Trade Organization can influence trade policies, yet its impact on climate-related regulations is indirect and often contingent upon political and economic considerations.

The United Nations (UN), the World Bank, and the World Trade Organization (WTO) are pivotal international institutions that significantly influence the global legal framework concerning climate change. Nonetheless, to enhance their effectiveness, establishing a centralized, binding enforcement mechanism is warranted. It is imperative to foster greater cooperation and integration among these institutions to forge a more coherent and resilient global climate governance system. Their roles encompass the facilitation of international agreements, the provision of financial support, and the alignment of trade policies with environmental objectives.

a. United Nations (UN)

The United Nations, principally through the United Nations Framework Convention on Climate Change (UNFCCC), is the primary platform for global climate negotiations. It has facilitated vital agreements such as the Kyoto Protocol and the Paris Agreement, establishing international legal frameworks for emissions reductions and climate action [2]. The UN's role encompasses coordinating efforts across nations, conducting global climate assessments through the Intergovernmental Panel on

Climate Change (IPCC), and advocating for policy coherence. The United Nations (UN) has demonstrated a nuanced performance in global climate governance. It has effectively raised awareness and facilitated the establishment of international climate agreements. However, the organization encounters challenges in enforcing compliance, primarily attributable to its reliance on voluntary commitments and the absence of binding enforcement mechanisms [4].

b. World Bank

The World Bank assumes a crucial role in the financing of climate action, particularly within developing nations. It extends loans, grants, and technical support for projects designed to diminish greenhouse gas emissions, bolster climate resilience, and advance sustainable development [7]. Furthermore, the World Bank facilitates the establishment of climate policies through initiatives focused on capacity-building and knowledge-sharing. While the World Bank has made substantial contributions to climate financing, its efficacy is sometimes constrained by its focus on economic development, which may occasionally conflict with environmental goals [13]. Nonetheless, its financial support is vital for implementing climate policies in resource-limited settings.

c. World Trade Organization (WTO)

The World Trade Organization (WTO) serves as the primary regulator of international trade and also ensures that trade policies align with climate objectives. It facilitates discussions concerning the interplay between trade and climate change, advocates for the reduction of trade barriers for environmentally friendly technologies and adjudicates trade disputes involving environmental regulations [23].

The WTO's involvement in climate governance is intricate, as trade policies can have both positive and negative impacts on climate efforts. While liberalizing trade in green technologies can bolster climate action, trade rules may clash with national environmental regulations. Criticism has been directed at the WTO for perceived inadequacies in reconciling trade and environmental policies [13]. Nonetheless, ongoing negotiations addressing trade and ecological sustainability indicate the institution's potential to significantly contribute to global climate objectives.

The Importance of Legally Binding Emission Targets for All Countries

The establishment of legally binding emission targets is essential to ensure the practicality and equity of climate action. By holding nations accountable, acknowledging historical emissions, and promoting transparency, these binding targets can propel global endeavors to mitigate climate change and address its impacts, particularly on the most vulnerable populations. It is imperative to implement legally binding emission targets for all countries to guarantee the effectiveness and equity of global efforts to combat climate change. By holding nations accountable for their emissions reductions, legally binding targets can drive the necessary concerted international action to limit global warming and address the disproportionate impacts of climate change.

Adherence to legally binding emission targets necessitates that countries undertake specific, measurable actions to decrease

their greenhouse gas emissions. Climate accords devoid of legally binding commitments rely on voluntary efforts, potentially resulting in disparities in ambition and impeding the necessary progress to attain global climate objectives [5]. Enforcing binding targets would render countries answerable for their commitments, establishing a more robust incentive for the implementation of effective policies and practices.

The consideration of legally binding targets gives rise to the fundamental issue of equity. Throughout history, developed nations have been the primary contributors to global emissions, benefiting from industrialization while disproportionately affecting developing countries, which are more susceptible to the impacts of climate change [6]. It is crucial for the principles of climate justice that legally binding emission targets encompass historical emissions, thereby attributing greater responsibility to developed nations to lead in emission reduction efforts and support developing nations.

Consensus for a legally Binding Framework Almost Impossible?

Developing a globally enforceable framework to address climate change presents significant challenges stemming from political, economic, and social complexities. These obstacles encompass divergent national interests, economic reliance on fossil fuels, the financial burdens associated with climate action, public perceptions, and equity considerations. These challenges are notably evidenced in the persistent impediments encountered during international negotiations, as exemplified in case studies such as COP26 and the Kyoto Protocol. Overcoming these barriers necessitates a nuanced approach that acknowledges the diverse priorities of nations and underscores the overarching necessity for global climate cooperation.

The COP26 summit held in Glasgow in 2021 underscored the challenges associated with achieving a global consensus on climate action. Disputes surrounding crucial matters such as the phase-out of coal, financial assistance for developing nations, and regulations governing carbon markets resulted in protracted negotiations. The ultimate Glasgow Climate Pact employed the terminology of "phasing down" coal as opposed to "phasing out," thereby underscoring the influence of nations reliant on fossil fuels and the concessions made to accommodate diverse national interests [24]. Additionally, developing nations voiced discontent with the limited headway in climate financing, contending that the unmet pledge of \$100 billion per year by developed countries impedes their capacity to execute climate mitigation and adaptation initiatives.

The Kyoto Protocol, established in 1997, sought to institute binding emission reduction targets for developed nations. However, it encountered opposition from countries like the United States, which ultimately declined to ratify the accord. The United States cited economic considerations and the exemption of developing nations from obligatory commitments as grounds for non-ratification [18]. This case underscores the challenge of reconciling the economic interests of significant emitters with the imperative of globally binding climate action.

Some Political, Social, and Economic Factors

Diverse nations display disparate priorities and capacities about climate action. Developed countries typically possess the re-

sources to transition to renewable energy and enforce stringent emissions reductions, whereas developing nations may prioritize economic growth and poverty alleviation over climate mitigation [6]. This divergence in priorities engenders challenges in formulating a universally applicable legal framework that garners consensus from all stakeholders.

Many nations need to exhibit more support in embracing legally binding commitments that could infringe upon their sovereignty and constrain their policy prerogatives. Climate change policies wield considerable influence over national economies, energy production, and industrial sectors, prompting governments to oppose international accords that constrain domestic affairs [4]. This opposition is particularly pronounced in nations heavily reliant on fossil fuels for economic advancement.

Transitioning to low-carbon economies necessitates substantial investments in renewable energy, infrastructure, and technology. Many developing nations encounter economic constraints and need more financial means to effect these changes without external assistance [25]. Furthermore, the reluctance of developed countries to provide adequate financial and technological support exacerbates the challenge of establishing a legally binding global framework.

The existing international climate agreements, such as the Paris Agreement, predominantly rely on voluntary commitments due to the absence of a centralized authority for enforcing global compliance. The principle of national sovereignty constrains the capacity to impose penalties or sanctions on nations failing to fulfill their commitments [13]. This absence of enforceability diminishes the motivation for nations to embrace and uphold mandatory emissions reduction targets.

Recommendations and Conclusion

Developing a comprehensive global legal framework for climate change requires a multifaceted approach integrating scientific guidance, equitable principles, and inclusivity. The following steps delineate a roadmap for constructing such a framework and propose methods to guarantee its effective implementation and ongoing evolution. A legally binding global framework is essential to provide consistent guidelines, enforce commitments, and ensure equitable action among all nations. However, reaching an internationally agreed-upon legal framework on climate change has proven to be a complex challenge due to differing national interests, economic dependencies, and geopolitical considerations [4].

The pursuit of a legally binding framework hinges on the establishment of unambiguous rules and mechanisms that encompass critical elements such as emissions reductions, climate finance, adaptation, and technology transfer. This endeavor necessitates addressing contentious issues, notably historical emissions, which attribute greater accountability to developed countries due to their heightened contribution to greenhouse gas accumulation and equity, ensuring that developing nations receive adequate support to fulfill their climate commitments [6]. Furthermore, the framework must possess adaptability, allowing for periodic revisions based on evolving scientific evidence, technological advancements, and socio-economic developments [26].

Adopt Legally Binding Emission Targets

The framework should establish legally binding emission reduction targets for all nations, grounded in the principles of equity and "common but differentiated responsibilities" (CBDR) [2]. This approach acknowledges the varying capabilities and historical responsibilities of developed and developing countries, thereby ensuring fairness in climate action.

Adhering to precise, science-based targets, as delineated by the Intergovernmental Panel on Climate Change, would establish a standardized trajectory for attaining the global temperature objectives, specifically limiting warming to 1.5°C. The framework should incorporate provisions for periodic reviews, such as those occurring every five years, to assess global progress in reducing emissions, enhancing adaptation, and addressing loss and damage. These evaluations would facilitate nations in revising their commitments in response to advancements in climate science, technological progress, and socio-economic shifts [1]. This iterative process would ensure the framework's dynamism and responsiveness, enabling it to adapt to new scientific findings and emerging climate challenges.

Incorporate a Science-Policy Interface

To maintain the framework's alignment with the latest scientific evidence, it is imperative to incorporate a standardized science-policy interface. This necessitates regular assessments by scientific bodies such as the IPCC to inform policy decisions and target revisions. Policy formulation within the legal framework should be underpinned by science-based metrics, including global carbon budgets and climate risk assessments [1].

The effectiveness of the framework hinges on the establishment of a transparent monitoring, reporting, and verification (MRV) system. This requires countries to regularly submit emissions inventories and progress reports for independent review by the new international body. To ensure inclusivity, it is essential to provide developing nations with financial and technical support to bolster their reporting and monitoring capacities.

Establish a Global Climate Fund for Inclusivity and Equity

Develop a robust **Global Climate Fund** that supports developing nations for mitigation, adaptation, and loss and damage recovery. This fund should be backed by mandatory contributions from developed countries based on their historical emissions and current economic capacities [6].

The fund would also facilitate technology transfer, capacity-building initiatives, and climate-resilient infrastructure projects, ensuring that developing countries can actively participate in global climate action. Encourage regional climate pacts and initiatives that align with the global legal framework. Regional cooperation can address specific climate issues such as transboundary water management, deforestation, and regional renewable energy grids, enhancing the framework's implementation at multiple levels [26].

Create a New International Body for Climate Law Implementation

Establishing a new International Climate Authority (ICA) or enhancing the powers of existing bodies, such as the UNFCCC, to

oversee the implementation, compliance, and enforcement of the global legal framework is imperative.

Alternatively, existing institutions such as the World Trade Organization (WTO) and the World Bank could be integrated into the framework to ensure that trade policies and financial mechanisms align with climate objectives [13].

Conclusion

The necessity of a comprehensive global legal framework to address climate change is increasingly apparent in light of the escalating impacts of global warming, which encompass extreme weather events, rising sea levels, and biodiversity loss [1]. Recent studies have underscored the need for current voluntary agreements and fragmented efforts in achieving the requisite reductions in greenhouse gas emissions [3].

A legally binding global climate law is indispensable for consolidating efforts, ensuring accountability, and facilitating the systematic implementation of climate actions at the requisite scale and pace. Such a comprehensive framework would establish a cohesive global approach to addressing climate change, fostering enhanced accountability, and ensuring alignment with current scientific discoveries. Furthermore, it would facilitate the equitable allocation of climate action responsibilities, extend support to vulnerable communities, and mobilize resources to underpin mitigation and adaptation efforts worldwide [27-30].

Collaboration among policymakers, international institutions, and civil society is imperative in expediting a binding global climate law. Policymakers are urged to commit to robust climate targets, while international institutions are positioned to facilitate negotiations and provide the necessary infrastructure for monitoring and enforcement. Notably, civil society organizations are pivotal in advocating for climate justice, raising awareness, and ensuring governmental accountability. Through concerted efforts, these entities can enact the requisite changes to safeguard the planet for posterity [31-37].

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