

The Role of International Environmental Law in Mitigating Climate Change: A Systematic Literature Review

Peran Hukum Lingkungan Internasional dalam Mitigasi Perubahan Iklim: Tinjauan Literatur yang Sistematis

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Abstract:

This research explores the role of international environmental law in climate change mitigation efforts through a systematic literature review. Evaluations are carried out on the effectiveness, challenges and opportunities related to various international legal instruments that have been adopted. The research method uses the PRISMA approach to identify and analyze relevant articles from international databases. The results of this research reveal the importance of global coordination in the implementation of international environmental law and its crucial role in supporting international cooperation in mitigating climate change.

Keywords: International environmental law, climate change mitigation, developing countries, developed countries, PRISMA, systematic literature review.

Abstrak:

Penelitian ini mengeksplorasi peran hukum lingkungan internasional dalam upaya mitigasi perubahan iklim melalui tinjauan literatur sistematis. Evaluasi dilakukan terhadap efektivitas, tantangan, dan peluang yang terkait dengan berbagai instrumen hukum internasional yang telah diadopsi. Metode penelitian menggunakan pendekatan PRISMA untuk mengidentifikasi dan menganalisis artikel-artikel yang relevan dari database internasional. Hasil penelitian ini mengungkapkan pentingnya koordinasi global dalam implementasi hukum lingkungan internasional serta peran krusialnya dalam mendukung kerjasama internasional dalam mitigasi perubahan iklim.

Kata Kunci: Hukum lingkungan internasional, mitigasi perubahan iklim, negara berkembang, negara maju, PRISMA, tinjauan literatur sistematis.

1. Introduction

The role of international environmental law in mitigating climate change is a critical area of study and has received significant attention in recent years. International environmental law plays an important role in shaping global efforts to address climate change through various mechanisms and agreements. One example of a key policy in a global climate change mitigation strategy is carbon pricing, which has become a key policy tool (Digitemie, 2024). It is important to evaluate the effectiveness, challenges and opportunities associated with carbon pricing to understand its impact in mitigating climate change globally. The international legal architecture related to climate change influences whether phenomena such as carbon leakage can undermine the mitigation objectives of climate policy (Pirlot, 2024). Understanding how international legal frameworks interact with environmental issues is critical to ensuring effective climate change mitigation strategies.

Climate change-related litigation is also increasing, with lawsuits highlighting the causes and consequences of climate change appearing in national courts (Setzer & Vanhala, 2019). Scholars have even proposed a potential role for international courts in addressing climate-related harm. This highlights the development of the legal response landscape to

climate change at both national and international levels. Additionally, shifts in environmental perspectives have emphasized the importance of nature-based solutions such as stream daylighting in greenhouse gas mitigation and adaptation to climate change (Khirfan et al., 2020). Such solutions demonstrate the interconnected relationship between environmental issues and the need for a comprehensive approach to climate change mitigation.

Overall, international environmental law plays a crucial role in mitigating climate change by shaping policy, addressing legal challenges, and promoting nature-based solutions. Understanding the intersection between law, policy, and environmental science is critical to developing effective strategies to address climate change globally. Climate change has become one of the biggest challenges for global environmental sustainability in this century. The increasingly obvious impacts include rising global temperatures, changes in extreme weather patterns, and threats to biodiversity and natural resources. Global initiatives to reduce greenhouse gas emissions have become a major focus, with international agreements such as the Paris Agreement setting ambitious targets for reducing global emissions. In the midst of these challenges, international environmental law plays a crucial role in coordinating mitigation efforts between countries.

This research question aims to explore the extent of the role and implementation of international environmental legal instruments in achieving climate change mitigation goals, especially in countries experiencing different economic developments. With a focus on developing and developed countries, this research will analyze the effectiveness of various agreements, protocols and international legal mechanisms that have been adopted to reduce greenhouse gas emissions.

Although there is a large body of literature on the role of international law in climate change mitigation, there is a lack of in-depth and focused studies evaluating the effectiveness of specific legal instruments. Previous research tends to provide a general overview or focus on policy aspects without in-depth analysis of the implementation and concrete impact of international legal regulations in reducing greenhouse gas emissions at the national and global levels. By exploring these aspects systematically, this research is expected to make a significant contribution to our understanding of how international environmental law can play a role in effective and sustainable climate change mitigation efforts.

This research is urgently carried out considering the escalation of global warming which has triggered extreme weather phenomena, rising sea levels and threats to global biodiversity. Climate change mitigation efforts are crucial for maintaining environmental stability and the sustainability of the planet's ecosystem. In this context, an in-depth evaluation of the effectiveness of international environmental law in facing these challenges is essential to provide a solid legal basis for safeguarding the future of the earth.

This research will fill a gap in the literature by focusing on a systematic analysis of various existing international legal instruments, with the aim of offering new insights into the effectiveness of implementation and the mechanisms that support or hinder the achievement of climate change mitigation goals. Through this systematic approach, the research is expected to provide in-depth and structured analysis, and make a valuable contribution to our understanding of the role of environmental law in global mitigation of climate change.

This study is expected to provide a significant contribution to the development of theory and practice in the field of international environmental law, especially in the context of climate change mitigation. By analyzing the effectiveness of various legal instruments and considering the differences between developing and developed countries, this research will provide valuable insights for policy makers, legal practitioners, as well as researchers to improve international cooperation and compliance with global environmental regulations. Thus, it is hoped that the results of this research can become a basis for improving global policies that are more effective in responding to increasingly urgent climate change.

2. Research Methods

2.1. Collection of Articles

To identify relevant literature, this research will use the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method. This approach allows researchers to conduct systematic and selective searches for articles in leading international databases such as Scopus and Web of Science. By adhering to the PRISMA protocol, careful steps will be taken to identify articles that meet the established inclusion criteria.

2.2. Keywords

Searches will use predefined keywords to ensure relevant articles can be found. Keywords used include: "international environmental law", "climate change mitigation", "developing countries", "developed countries". This combination of keywords will guide the search process to cover various aspects of international environmental law and climate change mitigation policies in developing and developed countries.

2.3. Number of Articles

After conducting an initial search based on predetermined keywords, the total articles found will be documented. This will provide an idea of the abundance of literature available and form the basis for further selection processes.

2.4. Inclusion and Exclusion Techniques

The inclusion criteria applied were articles that specifically discussed the effectiveness of international legal instruments in reducing greenhouse gas emissions. Articles that are not relevant or do not provide sufficient data will be excluded from this study. This inclusion and exclusion technique will ensure that only literature that has direct relevance to the topic under study will be included in this systematic analysis. With a structured methodological approach like this, it is hoped that this research can provide an in-depth and reliable understanding of the role of international environmental law in climate change mitigation efforts at the global level.

3. Results and Discussions

3.1. Definition and scope of international environmental law

International environmental law plays an important role in addressing global environmental challenges, which are evolving with geopolitical shifts and a deeper understanding of environmental complexity (Rajamani & Peel, 2021). Initially focused on issues such as ozone layer depletion and transboundary pollution through inter-state regulations (Kotzé, 2021), this legal framework now emphasizes the adoption of clean and sustainable technologies to ensure environmental sustainability (Meškić et al., 2022).

The development of international environmental law has significantly strengthened global environmental protection efforts (Kotzé, 2022), introducing principles such as non-regression to prevent rollbacks in environmental protection (Mitchell & Munro, 2023). Proposals such as the 'Global Pact for the Environment' aim to increase fairness in international environmental law, particularly taking into account the needs of developing countries (Voigt, 2019). The principles of sustainable development form the basis of international environmental law, which highlights the importance of balancing human needs with environmental preservation (Christmas & Aminah, 2019).

In addition, international environmental law plays an important role in protecting environmental rights, amidst increasing environmental degradation (Wang et al., 2022). These laws have influenced corporate environmental accountability standards, emphasizing proactive environmental protection measures (Morgera, 2020). Maritime environmental regulations and the preservation of marine biodiversity are also important aspects regulated in international

environmental law (Szewczyk, 2021). Overall, international environmental law is a dynamic and evolving field that significantly contributes to advancing environmental protection, sustainable development, and global cooperation. These laws address challenges ranging from transboundary pollution to corporate responsibility and marine ecosystem preservation, reflecting the interconnectedness of global environmental issues.

3.1.2. Theories and concepts of climate change mitigation

Climate change mitigation efforts involve steps to reduce greenhouse gas emissions and stabilize CO₂ concentrations to prevent further global climate change (Alsabbagh & Alnaser, 2023). It is important to understand that climate change mitigation and adaptation are different concepts, where mitigation focuses on preventing further climate change, while adaptation involves adjusting to current climate changes (Arora & Kaur, 2023). The concept of transformative climate change mitigation includes various mitigation-related transformations across various sectors and scales to collectively address global climate change (Moore et al., 2021).

Mitigation strategies are essential in reducing the negative impacts of climate change and ensuring a sustainable future (Pedreño, 2022). This strategy involves action at multiple levels, including individual behavior change, collective action across sectors, and global initiatives (Hung & Bayrak, 2019). In addition, convergence in achieving the Zero Net Emissions (NZE) target is a significant development in climate change mitigation efforts (Arogyaswamy, 2022).

Efforts to mitigate climate change require a multidisciplinary approach, involving fields such as psychology, economics, engineering and education (Lavonen, 2022). Understanding human reactions to climate change and social representations of mitigation strategies is important for increasing community engagement and action (Jaspal & Nerlich, 2022). In addition, the role of renewable energy sources in mitigating climate change was raised as a key aspect in the transition to a low-carbon economy (Uğurlu, 2021). In conclusion, climate change mitigation is a complex and multifaceted endeavor that requires global cooperation, transformative action, and a comprehensive understanding of the interrelated relationships of climate change across various scientific disciplines.

3.2. Relevant international legal instruments

3.2.1. Treaty of Paris

The Paris Agreement, a very important international legal instrument in the realm of climate change, is an important milestone after the United Nations Framework Convention on Climate Change and the Kyoto Protocol. This agreement, with its ambitious goal of limiting global warming to well below 2°C and working to achieve 1.5°C above pre-industrial levels, has ushered in a new era in climate change governance (Ekardt et al., 2022 ; Katwyk et al., 2020). The agreement emphasizes the development of nationally determined contributions and robust reporting mechanisms to ensure accountability and progress towards its goals (Thakur, 2021). The Paris Agreement's hybrid approach to climate change governance, balancing flexible measures such as nationally determined commitments with the primary goal of temperature limitation, has resulted in a climate change regime that is complex and involves multiple stakeholders (Voigt, 2023).

Moreover, the influence of the Paris Agreement extends beyond its immediate application, influencing international climate litigation and the interpretation of other treaties such as the European Convention on Human Rights and the UN Convention on the Law of the Sea (Tolliver et al., 2019). The agreement also spurred substantial global investment in line with the Sustainable Development Goals, emphasizing the need for long-term cost-efficient financing to support its goals (Oberthür, 2019). The legal nature of these agreements has been the subject of debate, with discussions about binding obligations and the need for smaller

carbon budgets to align with human rights and environmental imperatives (Ekardt et al., 2023; Geiges et al., 2020).

In the context of the goals of the Paris Agreement, it is clear that incremental increases in targets will not be enough to achieve its goals, requiring increased transformational ambition to avoid the worst impacts of climate change (Hautereau-Boutonnet, 2024). The Treaty's enforcement mechanisms and the ever-changing development of global climate governance underscore the need for continuous analysis and adaptation to ensure its effectiveness in addressing the urgent challenge of climate change (Stranadko, 2022).

3.2.2. Kyoto Protocol

The Kyoto Protocol, an international agreement that entered into force in February 2005, aims to limit and reduce greenhouse gas emissions by industrialized countries and countries in transition (Ito et al., 2021). This protocol is part of the broader international climate change regime, which includes the United Nations Framework Convention on Climate Change (UNFCCC) and the 2015 Paris Agreement (Rajamani, 2019). Despite being an important binding agreement, the Kyoto Protocol faces challenges in achieving its emissions reduction targets (Peng, 2024). This protocol introduces mechanisms such as the Clean Development Mechanism (CDM) to facilitate emission reductions (Kim, 2021). The failure of these protocols to effectively reduce emissions resulted in a shift towards the more flexible and non-binding approach seen in the Paris Agreement (Thakur, 2021). The Kyoto Protocol also affected trade dynamics, causing a shift in production of carbon-intensive goods to non-Kyoto countries (Kang et al., 2021). Additionally, this protocol recognizes the importance of forest carbon wells in mitigating climate change, which raises questions about their effectiveness in promoting the development of such carbon wells (Ge & Lin, 2021). In conclusion, the Kyoto Protocol plays an important role in setting emission reduction targets for industrialized countries but faces challenges in achieving these targets. The mechanisms and their influence on trading dynamics and forest carbon wells have been the subject of analysis and debate in the context of international climate governance.

3.2.3. United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) became the cornerstone of the global response to climate change, providing the basis for subsequent agreements such as the Kyoto Protocol and the Paris Agreement (Jolly & Naik, 2021). Article 4b of the UNFCCC emphasizes the importance of member countries taking action to promote sustainable adaptation to climate change (Lusiru, 2023). The Convention recognizes the diverse vulnerabilities of countries to the impacts of climate change, with a particular focus on the challenges faced by developing countries (Patra et al., 2022).

One of the important mechanisms introduced by the UNFCCC is REDD+ (Reducing Emissions from Deforestation and Forest Degradation), which aims to reduce forest loss and carbon emissions in developing countries (García et al., 2021). The UNFCCC plays an important role in international climate policymaking, facilitating agreements among countries to reduce greenhouse gas emissions and address climate change (Neff & Jemielniak, 2022). Additionally, the UNFCCC has played a role in harmonizing efforts across various legal frameworks such as the Sendai Framework for Disaster Risk Reduction, the Paris Agreement, and the UN Sustainable Development Goals (Cubie & Natoli, 2021).

The Paris Agreement, as a key agreement under the UNFCCC, not only sets mandatory requirements but also includes recommendations for gender-responsive climate adaptation, emphasizing the importance of gender equality in climate action (Jannat, 2023). With 198 parties, the UNFCCC functions as a universal convention, featuring broad international participation in addressing climate change (Desai, 2024). Countries have committed to

implementing the UNFCCC through agreements such as the Kyoto Protocol and the Paris Agreement, demonstrating their commitment to climate action (Dagnet et al., 2021).

As the impacts of climate change intensify, there is an increasing need to address loss and damage. Vulnerable countries and communities are exploring legal avenues to seek redress for loss and damage, reflecting the limitations of current UNFCCC negotiations in adequately supporting victims of climate change (Toussaint, 2020). Efforts are underway to establish a loss and damage financing mechanism under the UNFCCC, with proposals such as a climate damage tax on fossil fuel companies under consideration (Wewerinke-Singh & Salili, 2019).

In conclusion, the UNFCCC serves as a crucial international legal instrument in fighting climate change, providing a framework for global cooperation and action. Through subsequent agreements and mechanisms, the UNFCCC continues to shape climate policy, adaptation efforts, and responses to loss and damage, highlighting the changing landscape of international climate governance.

3.2.4. Division of developing countries and developed countries

In the context of international legal instruments, it is important to consider the implications of various international treaties and conventions. International cooperation plays an important role in forming legal concepts and frameworks that meet the needs and interests of developing and developed countries (Zunnuraeni et al., 2020). These agreements aim to form relations, promote world peace, and become a source of international law (Arianty et al., 2023).

Experts highlight that international arrangements can take various forms of legal instruments with varying degrees of legal force, such as political declarations, binding agreements, guidelines, codes of practice, or prohibitions against certain activities (Belikova & Akhmadova, 2021). It is recognized that the unique needs of developing countries must be considered in the development and application of international environmental law, emphasizing the importance of equality in international law (Voigt, 2019).

The principles of sustainable development are universally recognized by all countries, including developing and developed countries, which emphasize the importance of sustainable practices (Niu et al., 2021). Good governance and the rule of law are fundamental prerequisites for sustainable development and are actively promoted by international organizations to advance democracy and ensure equitable development (Zikria & Roofi, 2019).

In international law, the distinction between developed and developing countries is an important aspect, especially in agreements such as the Paris Agreement, where issues such as the legal form of instruments, provisions, and differentiation between countries are central topics in discussions (Rajamani, 2019). The handling of human rights violations by multinational companies also highlights the role of international human rights law in guiding legal development and ensuring cross-border accountability (Du, 2022). Overall, international legal instruments play a central role in addressing global challenges, promoting cooperation, and ensuring fair treatment of countries at different stages of development. By taking into account the specific needs and conditions of developing countries, these instruments can contribute to a more inclusive and sustainable international legal framework.

3.3. The effectiveness of international legal instruments

International legal instruments play an important role in promoting global cooperation and addressing various issues. However, implementation of these instruments varies significantly between developed and developing countries. In developed countries, the implementation of international legal instruments often requires the establishment of domestic legislation and strong political support from member states (Berdzuli et al., 2020).

This emphasizes the importance of aligning international obligations with national law to ensure effective implementation.

In contrast, in developing countries, the implementation of international legal instruments can be more challenging due to factors such as limited resources and limited capacity. To overcome global issues such as non-communicable diseases (NCDs), special policies are needed that are supported by an international legal framework that is actively supported and negotiated with various stakeholders (Stoeva, 2020). This emphasizes the need for capacity building and support mechanisms to facilitate the implementation of international agreements in developing countries.

International organizations, such as the United Nations (UN), and specialized entities such as the International Court of Justice (ICJ) and the International Law Commission (ILC), play a crucial role in developing, codifying and facilitating the implementation of international law. These organizations provide guidance and assistance to countries to align their legal frameworks with global standards, thereby assisting in the adoption and enforcement of legal instruments at regional and national levels.

In addition, the enforcement and effectiveness of international legal instruments is strengthened by the support of a strong domestic legal framework. For example, the UN Convention against Transboundary Organized Crime (UNTOC) serves as a framework for countries to update their laws and increase international cooperation in fighting organized crime (Tennant, 2021). By aligning national laws with international norms, countries can more effectively investigate and prosecute criminal activities that cross borders. In conclusion, the successful implementation of international legal instruments in both developed and developing countries depends on the alignment of international obligations with domestic laws, support from international organizations, and building national capacity for law enforcement. Collaboration between countries, international bodies and stakeholders remains key to building an effective legal framework to comprehensively address global challenges.

3.4. Case studies of specific countries

In examining the role of international environmental law in mitigating climate change, it is important to consider case studies from developed and developing countries. Developed countries such as the United States and the European Union have been key in establishing international climate agreements such as the United Nations Framework on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement (Jolly & Naik, 2021). This legal framework provides the basis for global cooperation in addressing climate change and related challenges.

On the other hand, developing countries such as India and Brazil also make significant contributions to climate governance. For example, India has demonstrated leadership in climate change governance through initiatives such as the International Solar Alliance, demonstrating the country's commitment to renewable energy and sustainable development (Jha, 2021). Moreover, India's flexible approach in international climate negotiations, as seen in the 2009 Copenhagen climate summit, highlights its willingness to participate constructively in addressing climate issues (Zhang et al., 2023).

Furthermore, the importance of maintaining healthy ecosystems and biodiversity conservation in mitigating climate change is emphasized in studies focusing on countries such as India (Behera & Sharma, 2019). These efforts not only contribute to climate adaptation but also generate environmental, economic and social benefits. In addition, the concept of justice in climate action, as outlined in the Paris Agreement, emphasizes the need for countries to align their contributions with the principles established in international environmental law (Rajamani et al., 2021).

In terms of legal mechanisms, arbitration has become an important tool in resolving international environmental disputes related to climate change. Arbitration institutions play a

role in enforcing climate change-related obligations and promoting expertise in addressing climate-related issues (Miles & Lawry-White, 2019). In addition, developments in international human rights law increasingly require states to be responsible in taking effective steps to combat climate change, including mitigation measures (Mesquita, 2024).

Overall, the synthesis of these references underscores the multifaceted nature of international environmental law in climate change mitigation. From legal frameworks and arbitration mechanisms to national case studies and justice considerations, a comprehensive approach involving both developed and developing countries is essential in addressing the global challenge of climate change.

3.5. Factors Affecting Effectiveness

3.5.1. National policy and regulatory aspects

National policies and regulatory aspects have a central role in determining the success of various initiatives and programs. Factors that influence the success of national policies include cross-institutional coordination, stakeholder participation, and regulatory capacity (Al-Tokhais & Thapa, 2019). For example, viewing resource mobilization to strengthen regulatory authority as a national security agenda can emphasize the importance of quality assurance in health systems (Orubu et al., 2020). Weak legal systems and law enforcement environments in developing countries may hinder the impact of environmental taxes and research and development incentives on green innovation, thereby affecting the implementation of regulatory policies (Zheng et al., 2023).

During the COVID-19 pandemic, effective policy measures are critical to balance health outcomes with economic, social, and environmental goals (Sahin et al., 2020). National policies related to occupational health and safety can have a significant influence on people's actions in maintaining physical and psychological well-being (Potter et al., 2019). Additionally, policies targeting poverty reduction can address various barriers to individuals achieving their full potential, such as weak governance, environmental degradation, and cultural norms (Gill et al., 2021).

Furthermore, the effectiveness of entrepreneurship promotion policies can influence the efficiency of urban carbon emissions, emphasizing the need to consider environmental issues in policy design (He, 2024). Policies related to patent protection and innovation incentives can significantly influence a firm's technological innovation and patent generation (Song et al., 2023). In addition, implementing national policies related to fitness can improve national health by optimizing investment and increasing socio-economic benefits (Zheng et al., 2022). In conclusion, national policy and regulatory aspects cover various factors that can shape the success of initiatives in various sectors. By addressing challenges such as cross-agency coordination, stakeholder engagement, and regulatory capacity, policymakers can strengthen the effectiveness of national policies and contribute to sustainable development.

3.5.2. Financial and technological support

Strict environmental regulations play an important role in encouraging greener energy production, while ecological innovation contributes greatly to reducing the impacts of climate change (Jafri & Liu, 2023). Multilateral agreements such as the Paris Agreement provide a framework for countries to coordinate efforts, set emission reduction targets, and mobilize resources for climate action, including in the agricultural sector (Singh, 2024). The principles of international environmental law emphasize shared responsibility for the Earth's climate system and advocate cooperation to prevent environmental degradation, emphasizing a preventative approach in responding to climate change (Akhmatov et al., 2021). Climate and energy provisions in trade agreements align with environmental agreements such as the UNFCCC and the Paris Agreement, encouraging collaborative efforts to address climate change, particularly those led by developed countries (Gehring & Morison, 2020). International climate finance

mechanisms are very important in helping developing countries reduce and adapt to the impacts of climate change (Adisa, 2024). By incorporating the costs of climate change through mechanisms such as carbon pricing, these financial tools encourage the adoption of cleaner technologies (Digitemie, 2024).

In addition, the international legal structure related to climate change influences the effectiveness of climate policy in addressing problems such as carbon leakage (Pirlot, 2024). International legal regulations and legal institutions have significantly enhanced the global response to climate change, emphasizing cooperation and mitigation efforts (Li, 2023). The Climate Technology Center and Network (CTCN) plays a key role in facilitating the transfer of climate technology and innovation among developing countries (Lee & Mwebaza, 2020). Understanding credit access can help formulate interventions to improve adaptation strategies to climate change, especially in the agricultural sector (Nugroho, 2024).

Overall, financial and technological support are crucial factors influencing the effectiveness of international environmental law in mitigating climate change. Through ecological innovation, multilateral agreements, climate finance mechanisms and technology transfer, countries can work together effectively to address the challenges of climate change, promoting cooperation, innovation and sustainable practices.

3.5.3. Institutional capacity and law enforcement

In examining the factors that influence the effectiveness of international environmental law in mitigating climate change from the perspective of institutional capacity and law enforcement, there are several main themes that can be seen from various related references. First, international environmental law plays a central role in addressing climate change by providing a legal framework for cooperation between countries in preventing environmental degradation and encouraging a preventative approach to climate change (Akhmatov et al., 2021). This emphasizes the importance of legal mechanisms to direct global efforts to mitigate climate change.

In addition, environmental law enforcement is an important key in achieving effective climate change mitigation. The success of environmental law enforcement depends on the formation of partnerships, well-implemented strategies, and flexible interventions, especially in the face of rapid social and ecological change (Mulatu, 2023). This indicates the need for strong enforcement mechanisms to ensure compliance with environmental regulations. Capacity building for law enforcement agencies is also crucial in improving environmental management and promoting effective environmental law enforcement (Susan, 2024). Strengthening the institutional capacity of law enforcement agencies can improve the implementation of environmental regulations and contribute to better results in climate change mitigation efforts.

Apart from that, the role of private environmental governance (PEG) is also important in adapting to climate change (Vandenbergh & Johnson, 2021). Initiatives and governance mechanisms from the private sector can complement government efforts in facing the challenges of climate change, demonstrating the importance of involving various parties in climate action. Furthermore, integration of the global science-policy agenda on climate change and biodiversity is also critical in facing challenges related to climate change and biodiversity loss (Pettorelli et al., 2021). This integration requires a review of environmental legislation to support biodiversity conservation amidst rapid climate change, highlighting the need for a holistic approach to environmental protection.

In conclusion, the effectiveness of international environmental law in mitigating climate change is influenced by institutional capacity, law enforcement mechanisms, private sector involvement, and integration of climate change and biodiversity agendas. Strengthening institutional capacity, improving law enforcement mechanisms, encouraging multi-stakeholder collaboration, and integrating climate change and biodiversity policies are important steps towards achieving effective climate change mitigation.

3.5.4. Political commitment and international cooperation

In the realm of international environmental law and its role in mitigating climate change, political commitment and international cooperation play a crucial role. The principles of international environmental law emphasize shared concern for the Earth's climate system, highlighting the need for government cooperation to prevent environmental degradation (Akhmatov et al., 2021). This collaboration is important to promote effective preventive approaches to addressing climate change. Moreover, addressing climate change is not only an environmental issue, but also an important aspect of global security, as cooperation in reducing emissions and adapting to climate change can help prevent conflict and promote stability (Ramirez, 2024).

The Paris Agreement is an important milestone in international efforts to combat climate change. This agreement is a legally valid and binding global agreement that requires member countries to follow its provisions, encouraging effective international transparency in global climate action (Guha, 2022). In addition, this agreement has been an important tool in bridging the gap between developed and developing countries, by emphasizing the importance of equality and shared but differentiated responsibilities in climate change mitigation efforts.

Effective governance at all levels of government is essential for coordinated action against climate change (Ding & Beh, 2022). This governance includes measures that encourage efforts to build capacity to deal with the impacts of climate change and strengthen resilience, reflecting a growing focus in the international climate change regime (Cullum, 2019). In addition, the obligation of cooperation in international law implies that every country must contribute to climate change mitigation, emphasizing collective responsibility in facing this global challenge (Mayer, 2021). In conclusion, international environmental law, political commitment, and international cooperation are interrelated factors that influence the effectiveness of climate change mitigation. By respecting the principles of cooperation, transparency, and equality, countries can work together to fight climate change, promote sustainability, and ensure a safe future for all.

3.5.5. Barriers to Implementation

In the context of the role of international environmental law in mitigating climate change, several obstacles may hinder its effective implementation. These obstacles can be grouped into economic and social challenges, technical and administrative obstacles, and issues related to justice and balance of responsibilities. Economically and socially, the implementation of international environmental law to mitigate climate change can face challenges such as ineffective law enforcement of existing regulations, non-adoption of international agreements on climate change, as well as the need for fair implementation of carbon pricing policies and mitigation policies (Tari, 2024; Amaefule et al., 2023). These barriers can hinder progress in achieving climate change mitigation goals, especially in developing countries such as Nigeria.

From a technical and administrative perspective, there are complexities in addressing climate change through international agreements due to factors such as carbon leakage, which can undermine the effectiveness of climate policy (Pirlot, 2024). Additionally, the need for better policy integration at multiple levels, from local to international, is critical for successful climate change adaptation and mitigation (Azevedo et al., 2020).

Issues of justice and balance of responsibilities also play an important role in the implementation of international environmental law for climate change mitigation. The 2015 Paris Climate Change Agreement was an important milestone in environmental multilateralism by bringing together more than 196 sovereign countries to voluntarily commit to climate change mitigation. However, there are still challenges in ensuring that every country contributes to climate change mitigation efforts, regardless of its individual interests. In conclusion, to effectively implement international environmental law in climate change

mitigation, it is important to overcome barriers related to economic and social factors, technical and administrative challenges, as well as issues of justice and responsibility. Overcoming these obstacles requires coordinated efforts at multiple levels of government and a commitment to upholding the principles of environmental sustainability and climate justice.

4. Conclusions

Overall, international environmental law has a crucial role in mitigating climate change, both in developed and developing countries. Effective implementation of international legal instruments depends on the alignment of international obligations with domestic law, support from international organizations, and building national capacity for law enforcement. Close collaboration between countries, international bodies and stakeholders remains key to building an effective legal framework to comprehensively address the global challenge of climate change.

4.1. Implications

Effective implementation of international environmental law will promote better global cooperation in confronting climate change. International organizations such as the UN and the International Court of Justice play an important role in facilitating the creation, coding and implementation of international law. Supporting national capacities in developing countries is also crucial to ensuring that international regulations can be implemented effectively at regional and national levels.

4.2. Limitations

Although international environmental law offers an important framework, its implementation is often met with significant challenges. Factors such as limited resources, low institutional capacity, and political challenges in some countries can hinder efforts to comply with and enforce international environmental regulations. In addition, the imbalance in responsibilities between developed and developing countries is also an obstacle to achieving an effective global consensus.

4.3. Future Research

Future research can dig deeper into effective law enforcement mechanisms in the context of international environmental law. Further studies could also focus on the influence of new technologies such as artificial intelligence (AI) in strengthening the implementation of international environmental law. In addition, it is important to further investigate the impact of national policies on the effectiveness of international environmental law, as well as how private sector involvement can strengthen climate change mitigation efforts globally.

By understanding and overcoming existing limitations, as well as through in-depth research and stronger global collaboration, the implementation of international environmental law can become more effective in responding to the challenges of global climate change in the future.

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