

From Carbon Markets to Climate Justice: Legal Challenges in Advancing Equitable Environmental Sustainability

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ABSTRACT

Climate change has encouraged the adoption of carbon markets as a market-based mechanism for reducing greenhouse gas emissions and supporting sustainable development. In Indonesia, carbon market governance has expanded through regulatory reforms aimed at achieving the country's Nationally Determined Contributions (NDCs) under the Paris Agreement. However, the implementation of carbon market mechanisms raises legal concerns related to equity, participation, accountability, and environmental justice. This study analyzes the legal challenges of carbon market governance in Indonesia and their implications for climate justice and environmental sustainability. Using a normative legal research method with statutory, conceptual, and comparative approaches, the study examines constitutional provisions, environmental legislation, climate regulations, and international legal instruments. The findings reveal that although Indonesia has established a legal framework for carbon market development, significant challenges remain, including regulatory fragmentation, legal uncertainty, inadequate protection of indigenous and local communities, inequitable benefit distribution, and limited public participation. The study concludes that integrating climate justice principles through stronger legal accountability, transparent benefit-sharing, community rights protection, and inclusive participation is essential to ensure that carbon market policies contribute not only to emission reductions but also to social equity, environmental integrity, and sustainable development in Indonesia.

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A. INTRODUCTION

Climate change has emerged as one of the most significant global challenges of the twenty-first century, generating profound environmental, economic, social, and legal consequences worldwide. Rising global temperatures, increasing greenhouse gas emissions, biodiversity loss, extreme weather events, sea-level rise, and ecosystem degradation have intensified concerns regarding the sustainability of carbon-intensive development models. As a country highly vulnerable to climate-related risks, Indonesia faces substantial challenges in balancing economic growth, environmental protection, and social welfare. Its extensive coastline, dependence on natural resources, and large population living in climate-sensitive regions make the country particularly susceptible to the adverse impacts of climate change. Consequently, climate governance has become a central issue within Indonesia's legal and policy framework, requiring innovative approaches that can reduce emissions while supporting sustainable development. One important strategy is the implementation of carbon markets, which facilitate the trading of carbon credits to reduce greenhouse gas emissions while supporting economic growth and environmental protection in line with Indonesia's Nationally Determined Contributions (NDCs) under the Paris Agreement.

Indonesia has initiated a carbon trading system as part of its commitment to achieving national climate targets and fulfilling international climate obligations (Kristianto, 2024). The legal foundation for this mechanism is reflected in regulations such as Presidential Regulation No. 98 of 2021, which provides the operational framework for carbon market implementation (Prananda et al., 2025). However, several challenges continue to affect its effectiveness, including overlapping institutional authorities, underdeveloped market infrastructure, limited stakeholder understanding, regulatory gaps, and enforcement issues that require stronger monitoring and clearer governance arrangements (Prananda et al., 2025; Rahmawati, Haryono, Endarto, Soraya, & Nurani, 2024). Despite these constraints, carbon trading has the potential to enhance ecological sustainability by reducing emissions and encouraging environmentally responsible practices (Samasta, 2023). Furthermore, market-based mechanisms such as carbon trading and cap-and-tax approaches are increasingly viewed as cost-effective instruments for climate mitigation because they internalize environmental costs while maintaining economic efficiency, although their success remains dependent on institutional capacity and political commitment (Muna, 2025). As a result, carbon markets have become an increasingly important component of both Indonesia's climate governance framework and the broader implementation of the Paris Agreement.

Indonesia has actively embraced the development of carbon market mechanisms as part of its national climate policy strategy. Through various regulatory initiatives, the government has sought to establish a framework for carbon pricing, carbon trading, and emissions reduction programs that support the achievement of Indonesia's Nationally Determined Contributions (NDCs). Regulatory instruments such as Presidential Regulation Number 98 of 2021 concerning the Economic Value of Carbon demonstrate the government's commitment to incorporating carbon market mechanisms into environmental governance. These policies are intended not only to support climate mitigation efforts but also to attract green investment and facilitate a transition toward a more sustainable and low-carbon economy. Consequently, carbon markets have become increasingly significant within Indonesia's evolving environmental regulatory landscape.

Indonesia has developed carbon market mechanisms through Presidential Regulation No. 98 of 2021 concerning the Economic Value of Carbon, which provides the legal foundation for carbon pricing, carbon trading, and emissions reduction initiatives aimed at achieving the country's Nationally Determined Contributions (NDCs). These policies are intended to support climate mitigation while encouraging investment in low-carbon development. However, several regulatory and institutional challenges remain. The existing framework has been criticized for lacking sufficient clarity regarding stakeholder roles, governance responsibilities, and mechanisms for public participation (Yanti & Buana, 2023). Furthermore, Indonesia's significant potential for carbon credit generation, particularly in the forestry sector, has not

been fully realized due to institutional gaps, limited regulatory coherence, weak monitoring systems, overlapping authorities, and insufficient stakeholder understanding of carbon trading mechanisms (Demmalino & Salahuddin, 2025; Prananda et al., 2025).

Despite these developments, the expansion of carbon markets has generated substantial debate regarding their effectiveness, legitimacy, and fairness. Critics argue that carbon market mechanisms often prioritize economic efficiency over substantive environmental protection and social justice, resulting in the unequal distribution of benefits, where corporations and investors frequently gain greater advantages than vulnerable communities (Rahmawati, Haryono, Endarto, Soraya, & Nurani, 2024). These conditions raise concerns related to distributive, procedural, and recognition justice within climate governance systems. Moreover, carbon market projects may create tensions concerning land ownership, resource control, and access to environmental benefits, particularly in areas where local communities depend heavily on natural resources for their livelihoods. Consequently, scholars emphasize the importance of ensuring social, environmental, and economic justice through stronger enforcement mechanisms, greater community engagement, and meaningful public participation, especially for marginalized and vulnerable groups, to prevent social inequities and conflicts over land rights (Prananda et al., 2025; Prihatiningtyas et al., 2023; Rahmawati, Haryono, Endarto, Soraya, & Nurani, 2024).

These concerns have contributed to the growing importance of climate justice as a framework for evaluating climate-related policies and institutions. Climate justice emphasizes that both the impacts of climate change and the burdens associated with mitigation measures are distributed unevenly across societies. Vulnerable groups, including indigenous peoples, local communities, small-scale farmers, coastal populations, and economically disadvantaged groups, often experience the most severe consequences of climate change despite contributing the least to global greenhouse gas emissions. Within the Indonesian context, this issue is particularly relevant because many carbon market initiatives involve forest conservation, peatland management, reforestation, and ecosystem restoration programs. While such initiatives may contribute to emission reductions, they also raise important questions regarding community participation, benefit-sharing mechanisms, land rights protection, and the recognition of traditional resource management practices.

Although carbon markets have been widely examined from economic, environmental, and policy perspectives, relatively limited scholarly attention has been devoted to the legal challenges associated with climate justice within Indonesia's carbon market framework. Existing studies frequently focus on carbon pricing mechanisms, emissions reduction effectiveness, and investment opportunities, while issues concerning rights protection, social equity, legal accountability, and regulatory safeguards remain underexplored. This gap highlights the need for a comprehensive legal analysis of the relationship between carbon market governance and climate justice in Indonesia. Therefore, this study seeks to analyze the legal challenges arising from the implementation of carbon market mechanisms and evaluate their implications for achieving equitable environmental sustainability. The study argues that the long-term legitimacy and effectiveness of carbon markets depend not only on their capacity to reduce emissions but also on their ability to promote fairness, participation, accountability, human rights protection, and sustainable development for present and future generations.

B. LITERATURE REVIEW

Theoretical Foundations of Environmental Sustainability

Environmental sustainability is a fundamental concept in contemporary environmental governance that refers to the ability of societies to meet present developmental needs without compromising the capacity of future generations to meet their own needs, as articulated in the Brundtland Report of the World Commission on Environment and Development (WCED). The concept emphasizes the integration of

economic development, social welfare, and environmental protection, while serving as a normative principle that guides public policy through principles such as precaution, prevention, intergenerational equity, the polluter-pays principle, and public participation (Sumartini et al., 2025). In Indonesia, environmental sustainability is embedded within Articles 28H and 33 of the 1945 Constitution, which guarantee the right to a healthy environment and mandate the management of natural resources for public welfare, thereby establishing sustainability as both a legal obligation and a public policy objective (Shokhikhah, 2025). Furthermore, the growing challenges of climate change have expanded the scope of sustainability to encompass climate resilience, low-carbon development, ecosystem conservation, and social inclusion, requiring climate-related policies, including carbon markets, to be evaluated not only for their environmental effectiveness but also for their contribution to broader sustainability and justice objectives.

Carbon Markets and Market-Based Environmental Governance

Carbon markets are among the most prominent market-based instruments for addressing climate change, grounded in the environmental economics concept of negative externalities, whereby carbon pricing seeks to internalize the environmental and social costs of greenhouse gas emissions by assigning them economic value. Their development gained momentum following the adoption of the Kyoto Protocol in 1997 through mechanisms such as Emissions Trading, Joint Implementation, and the Clean Development Mechanism (CDM), and was further strengthened by the Paris Agreement, which promotes international cooperation through carbon trading and voluntary carbon market initiatives. Carbon markets operate through compliance and voluntary schemes and are widely regarded as cost-effective tools for reducing emissions, encouraging innovation, lowering compliance costs, and mobilizing private investment in climate mitigation. In Indonesia, carbon market development has accelerated through regulatory initiatives, including the ratification of the Kyoto Protocol and Paris Agreement, as well as the enactment of Presidential Regulation No. 98 of 2021 and POJK No. 14 of 2023, which provide the legal framework for carbon trading (Prananda et al., 2025). Despite their potential to attract foreign investment, support renewable energy development, and contribute to the achievement of net-zero emissions targets by 2060, implementation continues to face challenges such as overlapping institutional authorities, underdeveloped market infrastructure, and concerns regarding environmental integrity, effectiveness, and fairness (Johnstone et al., 2026; Michaelowa et al., 2019; Mukti, 2025; Prananda et al., 2025). Critics further argue that carbon markets may perpetuate inequalities and commodify nature, highlighting the importance of robust legal institutions capable of ensuring transparency, accountability, legal certainty, and equitable outcomes for all stakeholders.

Climate Justice as a Framework for Environmental Governance

Climate justice emerged from concerns that vulnerable populations disproportionately bear the impacts of climate change despite contributing the least to greenhouse gas emissions. Unlike conventional environmental approaches that focus primarily on ecological protection, climate justice emphasizes fairness, equity, human rights, and social responsibility within climate governance through three interconnected dimensions: distributive justice, which seeks the equitable distribution of environmental benefits and burdens and addresses the disproportionate impacts of climate change on marginalized communities (Bartmann & Halsband, 2023); procedural justice, which promotes meaningful participation, transparency, accountability, and access to information and justice for affected communities (Haar & Levy, 2024); and recognition justice, which acknowledges the identities, rights, and interests of indigenous peoples, local communities, women, and other marginalized groups while emphasizing the need for support and reparative measures for those most affected by climate change (Hayward & Singh, 2025). Increasingly recognized within international environmental law and reflected in the Paris Agreement's emphasis on human rights, intergenerational equity, and social inclusion, climate justice provides an important framework for evaluating carbon markets, as market-based mechanisms may generate unequal social and economic outcomes, particularly in projects involving land-use change, forest conservation, and natural

resource management, thereby determining whether such policies contribute to equitable environmental sustainability or reinforce existing social, economic, and environmental inequalities.

Environmental Justice and Human Rights Perspectives

Environmental justice serves as a fundamental foundation for climate justice by addressing the unequal distribution of environmental risks and benefits among different social groups, particularly marginalized communities that often experience disproportionate environmental degradation despite having limited political and economic influence (Ali & Kamraju, 2023). The concept integrates environmental rights, social equity, democratic governance, and human rights, recognizing that climate change threatens fundamental rights such as access to health, food, water, housing, and sustainable livelihoods, especially among vulnerable populations (Karim & Zannat, 2025). In the context of carbon market governance, environmental justice requires legal frameworks that ensure community participation, transparency, accountability, equitable benefit-sharing, and effective grievance mechanisms to prevent climate mitigation projects from exacerbating existing inequalities or undermining access to land and natural resources (Hill, 2017; Schapper, 2018). Therefore, climate policies should be evaluated not only based on market efficiency but also on their contribution to justice, equality, social inclusion, human dignity, and sustainable environmental outcomes.

Conceptual Framework

This study is grounded in the proposition that environmental sustainability, carbon market governance, and climate justice are interconnected legal and policy concepts. Carbon markets function as market-based instruments designed to reduce greenhouse gas emissions and support sustainable development by creating economic incentives for climate mitigation. However, their legitimacy and effectiveness cannot be assessed solely through environmental or economic outcomes, as they also depend on the extent to which carbon market mechanisms comply with climate justice principles. The conceptual framework of this study therefore assumes that equitable environmental sustainability can only be achieved when carbon market regulations incorporate key dimensions of climate justice, including distributive justice, procedural justice, recognition justice, human rights protection, and environmental accountability.

Based on this framework, the study examines carbon market governance not merely as an economic mechanism but as a legal institution that must reconcile environmental objectives with constitutional values, social equity, and sustainable development principles. The legal analysis focuses on evaluating whether Indonesia's existing carbon market framework adequately addresses these dimensions and identifying legal challenges that may hinder the realization of climate justice. Through this perspective, the research seeks to contribute to ongoing scholarly and policy debates concerning the role of law in ensuring that climate mitigation efforts advance not only environmental protection and emissions reduction but also social justice, legal accountability, and equitable sustainability in Indonesia.

C. RESEARCH METHOD

This study employs a normative legal research approach to examine the legal challenges associated with carbon market governance and climate justice in Indonesia. Normative legal research focuses on the analysis of legal norms, principles, doctrines, statutes, and institutional frameworks that regulate particular legal issues. The selection of this approach is based on the nature of the research problem, which seeks to evaluate the adequacy of existing legal frameworks in addressing climate justice within the implementation of carbon market mechanisms. Since the study examines constitutional provisions, environmental legislation, climate-related regulations, and international legal instruments, a doctrinal legal method provides an appropriate framework for assessing legal consistency, identifying regulatory gaps, and evaluating the incorporation of climate justice principles within Indonesia's carbon market governance system. The research adopts a qualitative analytical perspective, focusing on the relationship between environmental

sustainability, carbon market regulation, and climate justice to generate a comprehensive understanding of the legal opportunities and challenges associated with equitable environmental sustainability.

To achieve the research objectives, this study employs statutory, conceptual, and comparative approaches. The statutory approach is used to examine constitutional provisions, laws, regulations, and policy instruments governing environmental protection, climate change mitigation, carbon trading, and sustainable development in Indonesia, including the 1945 Constitution, Law Number 32 of 2009 on Environmental Protection and Management, Law Number 16 of 2016 concerning the Ratification of the Paris Agreement, and Presidential Regulation Number 98 of 2021 concerning the Economic Value of Carbon. The conceptual approach is utilized to analyze legal doctrines and theoretical frameworks related to sustainable development, climate justice, environmental justice, human rights-based environmental governance, market-based environmental regulation, and good environmental governance principles. In addition, the comparative approach examines international climate governance mechanisms, global carbon market practices, and international principles concerning environmental justice and human rights in order to identify normative standards and best practices that may strengthen Indonesia's carbon market regulatory framework.

The study relies exclusively on secondary data consisting of primary, secondary, and tertiary legal materials collected through a comprehensive literature review and document analysis. Primary legal materials include constitutional provisions, statutory regulations, international agreements, judicial decisions, and official legal documents related to environmental governance and climate regulation. Secondary legal materials comprise academic journal articles, legal textbooks, research reports, policy papers, conference proceedings, and publications from international organizations, while tertiary materials include legal dictionaries, encyclopedias, reference works, and legal databases. The collected legal materials are analyzed using qualitative legal analysis through several stages, including classification of legal sources, doctrinal interpretation of relevant legal provisions, evaluation of consistency between domestic regulations and constitutional or international legal principles, and critical analysis of legal gaps, regulatory ambiguities, and institutional challenges. The findings are subsequently synthesized to formulate normative recommendations aimed at strengthening legal certainty, enhancing accountability, protecting community rights, promoting climate justice, and ensuring that carbon market governance contributes to both environmental sustainability and social equity in Indonesia.

D. RESULTS AND DISCUSSION

The Development of Carbon Market Governance in Indonesia

The global transition toward low-carbon development has encouraged governments worldwide to adopt carbon market mechanisms as a means of reducing greenhouse gas emissions while maintaining economic growth. In Indonesia, the adoption of carbon market policies reflects the government's commitment to addressing climate change following the ratification of the Paris Agreement through Law Number 16 of 2016 and the implementation of its Nationally Determined Contributions (NDCs), which establish national emission reduction targets through domestic actions and international cooperation.

To support these commitments, Indonesia introduced various climate-related regulations, culminating in Presidential Regulation No. 98 of 2021 concerning the Economic Value of Carbon. This regulation provides the legal foundation for carbon pricing, carbon trading, results-based payments, and other market-based instruments intended to encourage cleaner technologies, improve energy efficiency, attract investment, and support environmental conservation, renewable energy development, and ecosystem restoration. Nevertheless, implementation continues to face challenges, including regulatory uncertainty, overlapping institutional authorities, underdeveloped market infrastructure, and limited

stakeholder understanding, which may hinder the effectiveness of carbon trading mechanisms (Prananda et al., 2025; Yanti & Buana, 2023).

From a legal perspective, carbon markets represent a shift toward market-based environmental governance, where environmental protection is viewed not only as a regulatory obligation but also as an economic opportunity. However, their effectiveness depends on strong institutional capacity, regulatory coherence, transparent governance, and cross-sectoral coordination to ensure accountability, legal certainty, and public trust (Demmalino & Salahuddin, 2025). In addition, scholars emphasize the importance of public participation and the equitable distribution of carbon market benefits to prevent marginalized communities from being disproportionately affected and to promote social justice within Indonesia's climate governance framework (Rahmawati, Haryono, Endarto, Soraya, & Ngaisah, 2024).

Constitutional Foundations of Climate Justice and Environmental Sustainability

The implementation of carbon market mechanisms in Indonesia must be aligned with the constitutional framework governing environmental protection, sustainable development, and social justice. Article 28H paragraph (1) of the 1945 Constitution guarantees every person the right to a good and healthy environment, making environmental protection a fundamental human right and requiring climate-related policies, including carbon market regulations, to uphold and protect these constitutional guarantees (Satmaidi, 2011). Therefore, the legitimacy of carbon market governance depends not only on its environmental effectiveness but also on its consistency with constitutionally protected environmental rights.

In addition, Article 33 paragraph (3) of the Constitution mandates that land, water, and natural resources be controlled by the state and utilized for the greatest prosperity of the people. This provision reflects Indonesia's commitment to social justice and equitable resource governance, requiring carbon market projects involving forests, peatlands, mangroves, and other strategic resources to ensure fair distribution of environmental and economic benefits. However, existing regulations still reveal gaps in ensuring that marginalized communities fully benefit from carbon trading initiatives, highlighting the need for stronger mechanisms for equitable benefit-sharing and protection of local interests (Prasetyo, 2025; Rahmawati, Haryono, Endarto, Soraya, & Ngaisah, 2024).

Furthermore, the constitutional principle of social justice embodied in the fifth principle of Pancasila reinforces the importance of fairness, inclusivity, and public welfare in environmental governance. Effective carbon market governance therefore requires meaningful community participation, transparency, and institutional coordination to prevent social inequities and conflicts over land rights (Demmalino & Salahuddin, 2025). Despite constitutional guarantees, challenges such as weak enforcement and limited coordination continue to hinder effective implementation (Susanto et al., 2024). Consequently, carbon market policies should be evaluated not only by their ability to reduce emissions but also by their contribution to social equity, public participation, sustainable development, and the protection of vulnerable communities, with greater public involvement and equitable revenue distribution remaining key policy priorities (Rahmawati, Haryono, Endarto, Soraya, & Ngaisah, 2024).

Legal Challenges in Achieving Climate Justice Through Carbon Markets

One of the most significant legal challenges in the implementation of carbon market mechanisms in Indonesia is regulatory fragmentation and legal uncertainty. Carbon market governance intersects with environmental, forestry, land, investment, and financial regulations, creating overlapping jurisdictions, institutional ambiguities, and enforcement challenges that complicate compliance, carbon ownership, and accountability (Prananda et al., 2025; Rahmawati, Haryono, Endarto, Soraya, & Nurani, 2024). The absence of a fully integrated regulatory framework may reduce legal certainty, weaken public trust, and hinder the effectiveness of carbon market operations, highlighting the need for stronger regulatory coherence and institutional coordination (Demmalino & Salahuddin, 2025).

Another critical challenge concerns the protection of indigenous peoples and local communities whose livelihoods are closely linked to forests, peatlands, mangroves, and other natural resources targeted by carbon market projects. Because many carbon initiatives overlap with customary territories, restrictions on land use and resource extraction may affect local livelihoods and cultural practices, raising concerns regarding recognition justice and community rights. Consequently, meaningful public participation, recognition of customary rights, and the inclusion of indigenous communities in decision-making processes are essential to ensure equitable and socially responsible climate governance (Demmalino & Salahuddin, 2025; Rahmawati, Haryono, Endarto, Soraya, & Ngaisah, 2024).

A further challenge relates to the unequal distribution of economic benefits generated through carbon trading activities. In practice, corporations, investors, and project developers often possess greater financial resources, technical expertise, and institutional capacity than local communities, enabling them to capture a disproportionate share of economic gains from carbon markets (Prananda et al., 2025; Rahmawati, Haryono, Endarto, Soraya, & Ngaisah, 2024). Meanwhile, communities that contribute directly to conservation and environmental stewardship may receive limited compensation, creating concerns regarding distributive justice. Therefore, transparent benefit-sharing mechanisms, equitable revenue allocation, meaningful community participation, and robust accountability measures are necessary to ensure that carbon markets contribute to climate justice and sustainable development rather than reinforce existing social and economic inequalities (Demmalino & Salahuddin, 2025).

Procedural Justice and Public Participation in Carbon Market Governance

Procedural justice constitutes a central dimension of climate justice because it emphasizes inclusive and participatory decision-making processes in environmental governance. Within the context of carbon market governance, procedural justice requires that affected communities, indigenous peoples, civil society organizations, and other stakeholders be provided with meaningful opportunities to participate in policy formulation, project planning, implementation, and monitoring processes. Such participation is essential for strengthening democratic legitimacy, accountability, and public trust while ensuring that diverse interests and concerns are adequately considered in climate-related decision-making (Cavallo & Tolosa, 2025; Thùà, 2025).

Meaningful participation extends beyond formal consultation and requires access to accurate, timely, and understandable information regarding project objectives, financial arrangements, environmental impacts, and potential social consequences. Communities affected by carbon market projects must be able to understand how such initiatives may influence their rights, livelihoods, and access to natural resources before key decisions are made. Transparency and access to information are therefore fundamental components of procedural justice, enabling stakeholders to contribute local knowledge and engage effectively in environmental governance processes (Kravchenko, 2009).

In addition to participation and transparency, procedural justice requires effective grievance and dispute-resolution mechanisms to protect community rights and address conflicts arising from carbon market activities. Access to judicial review, administrative appeals, mediation, and other legal remedies is essential for ensuring accountability and preventing social inequities. These mechanisms not only enhance legal legitimacy and public confidence but also improve the long-term effectiveness and sustainability of climate policies by fostering fair, transparent, and accountable governance (Duong, 2024; Kravchenko, 2009).

Climate Justice, Human Rights, and Environmental Sustainability

The relationship between climate justice and human rights has become increasingly significant within international environmental law because climate change threatens fundamental rights, including the rights to life, health, food, water, housing, and a healthy environment. These impacts are particularly severe for vulnerable populations, exacerbating existing social inequalities and environmental injustices (Prasetya,

2025; Schapper, 2018). As a result, climate policies must be evaluated not only on their environmental effectiveness but also on their capacity to protect and promote human rights. This growing recognition is reflected in international human rights institutions and the incorporation of human rights principles within global climate frameworks such as the Paris Agreement (Savaresi, 2018).

Carbon markets, as market-based climate mitigation mechanisms, have the potential to support emission reductions, mobilize climate finance, and promote low-carbon development. However, these mechanisms may also generate human rights concerns when implemented without adequate legal safeguards, particularly in relation to restrictions on land access, risks of displacement, unequal benefit distribution, and limited participation of affected communities in decision-making processes (Vidhate, 2025). Furthermore, carbon market projects may disproportionately affect marginalized groups, raising concerns that climate mitigation efforts could unintentionally reinforce existing inequalities rather than address them (Sartori et al., 2025).

A rights-based approach to climate governance therefore emphasizes the importance of legal frameworks grounded in transparency, accountability, non-discrimination, and meaningful participation. Effective governance that incorporates these principles is essential for ensuring that climate mitigation efforts are equitable, socially acceptable, and capable of protecting vulnerable communities (Prasetya, 2025; Vidhate, 2025). Moreover, involving communities in carbon market governance can strengthen public trust and improve long-term environmental outcomes (Schapper, 2018). Accordingly, integrating climate justice and human rights considerations into carbon market regulation is necessary to ensure that climate policies contribute not only to emission reductions but also to broader objectives of social equity, environmental integrity, and sustainable development.

Strengthening Indonesia's Legal Framework for Equitable Environmental Sustainability

The findings indicate that Indonesia has made significant progress in developing a legal framework for carbon market governance through regulations on carbon pricing, carbon trading, and climate mitigation. However, achieving equitable environmental sustainability requires stronger regulatory harmonization, greater legal protection for indigenous peoples and local communities, recognition of customary rights, meaningful participation, and fair benefit-sharing mechanisms. In addition, improving transparency, accountability, public access to information, independent monitoring, and grievance mechanisms is essential to strengthen governance effectiveness and public trust. Ultimately, climate justice principles should be more explicitly integrated into carbon market policies so that their success is measured not only by emission reductions but also by their contribution to social equity, human rights protection, community empowerment, environmental integrity, and sustainable development.

E. CONCLUSION

The development of carbon market mechanisms in Indonesia represents an important strategy for addressing climate change and fulfilling international environmental commitments through market-based instruments that support emission reductions, environmental financing, technological innovation, and low-carbon development. However, the effectiveness and legitimacy of carbon market governance cannot be measured solely by economic efficiency or emission reduction outcomes, as significant challenges remain, including regulatory fragmentation, legal uncertainty, inadequate protection of indigenous peoples and local communities, unequal distribution of benefits, and limited public participation. This study demonstrates that climate justice—through the principles of distributive, procedural, and recognition justice—provides an essential framework for ensuring that carbon market policies protect human rights, promote social equity, and respect vulnerable communities. Accordingly, Indonesia's future carbon market framework should be supported by stronger regulatory coherence, transparency, accountability, equitable benefit-sharing, protection of community rights, and meaningful public participation so that climate governance

advances not only environmental effectiveness but also climate justice, environmental integrity, and sustainable development for present and future generations.

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