

Carbon Trading and Environmental Justice: A Juridical Examination of Fairness in Indonesia's Emissions Reduction Initiative

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ABSTRACT

This paper provides a normative juridical analysis of Indonesia's carbon trading regulations, with a focus on environmental justice and fairness. It examines the legal framework established by Presidential Regulation No. 98 of 2021, which governs carbon pricing mechanisms, including carbon taxes and carbon credit trading. The analysis highlights key gaps in the regulation, particularly in terms of equitable benefit distribution and inclusion of vulnerable communities in decision-making processes. While Indonesia's carbon trading system aligns with global trends and its international obligations, significant improvements are needed to ensure that marginalized groups are not further disadvantaged. Recommendations include the redistribution of carbon trading revenues, enhanced public participation, stronger enforcement mechanisms, and alignment with international best practices.

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1. INTRODUCTION

Indonesia's adoption of carbon trading is a key step in its strategy to reduce greenhouse gas emissions, particularly as a major emitter due to deforestation and land-use changes. Carbon trading, a market-based approach, allows the buying and selling of carbon credits, offering economic incentives for emission reductions. However, its implementation raises concerns about fairness and environmental justice. Indonesia is actively developing carbon markets as part of its climate strategy, supported by international entities like the EU, to align with global reduction targets [1]. Nonetheless, carbon pricing can disproportionately impact low-income populations, highlighting

challenges related to environmental justice [2]–[4]. Despite these issues, carbon trading has the potential to enhance Indonesia's carbon and energy performance through technology and stakeholder involvement [1]. Carbon credits can also serve a dual purpose of environmental protection and revenue generation, benefiting developing nations like Indonesia through international emissions trading [5].

Indonesia's efforts to reduce emissions are closely tied to its commitments under the Paris Agreement, focusing on carbon pricing mechanisms such as carbon taxes and carbon trading to curb emissions while stimulating economic growth through green technology investments. The success of

these initiatives depends on fair and inclusive regulatory frameworks that ensure vulnerable communities are not marginalized. The carbon tax, introduced through the 2021 Harmonization of Tax Regulations Law, targets CO₂ emissions from fossil fuels like coal, oil, and natural gas, but faces challenges such as administrative complexity and resistance from industrial sectors [6]. Allocating tax revenues to sustainable projects is seen as a strategy to mitigate economic impacts and promote green technologies [6]. Carbon trading, supported by international entities like the EU, plays a crucial role in Indonesia's climate mitigation plans, although it requires technical improvements and stakeholder engagement to enhance carbon and energy performance [1]. The emission trading system is effective in reducing emissions but requires cooperation among various parties [7]. Indonesia's sustainable development policy integrates environmental, social, and economic considerations, promoting renewable energy and equitable resource access to empower marginalized communities [8].

Environmental justice in Indonesia is a critical issue, particularly for indigenous and rural communities disproportionately affected by environmental degradation and carbon emissions. These challenges, exacerbated by deforestation, land degradation, and inadequate policy frameworks, highlight the need for recognizing indigenous rights and integrating their perspectives into environmental decision-making. While these communities have constitutionally recognized rights to manage natural resources, unequal access to information and social injustices persist [9]. Collaboration between the government, private sector, and indigenous groups is essential to ensure meaningful participation in environmental governance [9]. Marginalized communities often bear the brunt of pollution and land degradation due to historical inequities [10], with barriers like lack of transparency and limited access to justice [11]. Educational institutions play a

key role in promoting environmental justice through community engagement and advocating for policy changes, using a socioecological approach for sustainable and equitable conditions [12]. The question arises: does Indonesia's carbon trading framework adequately protect these vulnerable groups and ensure that the benefits of emissions reduction are shared equitably?

This paper conducts a normative juridical examination of Indonesia's carbon trading laws to evaluate their alignment with fairness and justice in environmental governance. It identifies gaps in the current legal frameworks and proposes reforms to enhance environmental justice in Indonesia's carbon trading system. The analysis focuses on the legal foundations of carbon trading, the impact on vulnerable communities, and whether the regulations ensure fair distribution of economic benefits to marginalized groups. While Indonesia has made progress, stronger legal safeguards are needed to ensure fairness and justice. By aligning regulations with environmental justice principles, Indonesia can enhance emissions reduction efforts and promote social equity. This paper offers a legal analysis of Indonesia's approach and suggests policy recommendations for future development.

2. LITERATURE REVIEW

2.1 Carbon Trading as a Mechanism for Emissions Reduction

Carbon trading, particularly through the cap-and-trade system, is a market-based approach to reduce greenhouse gas emissions by setting a cap and allowing companies to trade carbon credits. This incentivizes innovation and investment in cleaner technologies, as companies can profit from selling excess credits if they reduce emissions below their quota. The effectiveness of carbon trading depends on the design, regulatory oversight, and integration of technology. Mechanisms like multi-agent reinforcement learning can simulate market dynamics and optimize emissions reduction [13]. Energy-efficient technologies (EET), such as Variable

Frequency Drives, play a key role in emission reduction alongside carbon trading [5]. Carbon trading also enhances green innovation efficiency (GIE) through increased subsidies and research investments, though its impact varies with the technical intensity of enterprises [14]. Individual-level carbon trading, facilitated by blockchain technology, can significantly reduce consumer emissions and improve environmental outcomes [13]. However, challenges include potential market manipulation and the commodification of pollution, requiring robust legal frameworks to ensure emission targets are met [15].

2.2 Environmental Justice and Carbon Trading

Environmental justice is crucial in evaluating carbon trading, as it calls for equitable distribution of environmental benefits and burdens. Poorly designed carbon trading can worsen inequalities, disproportionately affecting marginalized communities with limited resources and political influence. This is particularly relevant in Indonesia, where indigenous and rural populations face deforestation and land-use changes from industries like palm oil plantations. Wealthier communities often gain from green technologies and carbon credits, while marginalized groups bear the environmental costs [10], [16]. The commodification of natural resources can further deepen economic disparities if compensation to affected communities is inadequate [16]. Environmental justice advocates for inclusive decision-making to ensure policies address marginalized groups' needs [12], [17]. Access to information, participation in governance, and legal remedies are essential for procedural justice, empowering vulnerable populations in carbon trading initiatives [16]. In Indonesia, the adequacy of public participation and legal recourse in carbon trading regulations remains a critical issue.

2.3 Juridical Analysis of Carbon Trading Regulations

Indonesia's legal framework for carbon trading, particularly under Presidential Regulation No. 98 of 2021,

represents a significant step in the country's climate policy, but a normative juridical analysis reveals challenges in aligning these regulations with legal principles like justice and fairness [18]. While the regulation establishes carbon pricing and trading roles for government agencies and sets penalties for non-compliance, it lacks provisions for equitable distribution of economic benefits, particularly for vulnerable communities. Furthermore, enforcement is questionable due to Indonesia's history of weak environmental governance and corruption, especially in the forestry sector [19], [20]. The regulation must address these gaps to ensure environmental justice, as Indonesia's carbon trading laws should align with international legal principles such as equity and common but differentiated responsibilities (CBDR) under the UNFCCC, which are designed to prevent exacerbation of social inequalities [20].

3. METHODS

3.1 Research Design

The research employs a qualitative design, focusing on a normative juridical analysis of Indonesia's carbon trading regulations. It systematically reviews legal texts, policy documents, and literature on carbon trading and environmental justice. The analysis includes primary legal sources, such as laws and policies, with emphasis on Presidential Regulation No. 98 of 2021 on Carbon Pricing, and secondary sources, including scholarly articles and expert opinions. Additionally, the study examines international frameworks like the Paris Agreement and UNFCCC to evaluate Indonesia's alignment with global legal standards.

3.2 Data Collection

The data for this study is collected through three primary methods: documentary analysis, literature review, and comparative analysis. The documentary analysis involves reviewing key Indonesian laws and regulations on carbon trading, such as Presidential Regulation No. 98 of 2021 on

Carbon Pricing, other relevant emissions reduction regulations, and international agreements like the Paris Agreement and related UNFCCC documents. The literature review examines secondary sources, including academic articles, legal commentaries, and reports from environmental organizations, to gain insights into the discourse on carbon trading and environmental justice. Additionally, a comparative analysis is conducted to compare Indonesia's carbon trading regulations with those of other countries, particularly the European Union's Emissions Trading System (EU ETS), to identify best practices and potential gaps in Indonesia's legal framework.

3.3 Data Analysis

The data is analyzed using a qualitative content analysis, examining legal texts and policy documents to identify key themes and gaps related to environmental justice and carbon trading. The analysis begins with a detailed review of carbon pricing mechanisms, emissions trading rules, and protections for vulnerable communities in Indonesia. Key questions focus on regulation, equitable benefit distribution, and marginalized groups. A normative evaluation then assesses whether the laws ensure fairness and public participation. Comparative legal analysis contrasts Indonesia's framework with systems like the EU ETS to identify best practices. Lastly, the analysis evaluates Indonesia's compliance with international obligations, particularly under the Paris Agreement.

4. RESULTS AND DISCUSSION

4.1 Legal Framework for Carbon Trading in Indonesia

The legal framework for carbon trading in Indonesia is still relatively new, with the main regulation being Presidential Regulation No. 98 of 2021 on Carbon Pricing. This regulation sets the foundation for the carbon trading mechanism and outlines the roles and responsibilities of various government agencies in managing the carbon

market. It also establishes the legal structure for carbon taxes, carbon offset projects, and market-based mechanisms, including the issuance and trading of carbon credits.

Key provisions of Presidential Regulation No. 98 of 2021:

- a. This regulation introduces a carbon tax and carbon trading system as part of Indonesia's strategy to reduce emissions. The regulation sets emission limits for certain sectors and allows companies to trade carbon credits if they exceed or fall short of their emission targets.
- b. The regulation initially focuses on specific sectors such as energy, forestry, and waste management, where emission reductions are particularly important. However, there are plans to gradually expand the carbon trading system to other sectors.
- c. The system allocates carbon credits to companies based on their emissions targets. Companies that reduce emissions below their targets can sell excess credits to companies that exceed their targets, creating a market for carbon trading.
- d. The regulation imposes penalties for companies that fail to meet their emissions reduction targets or violate carbon trading rules. These penalties are intended to ensure compliance and encourage active participation in the carbon market.

Indonesia's legal framework for carbon trading, primarily established through Presidential Regulation No. 98 of 2021, introduces carbon pricing mechanisms, including carbon taxes and carbon credit trading, which are in line with global efforts to incentivise cleaner technologies. However, challenges remain, particularly in addressing environmental justice and ensuring equitable distribution of benefits. The regulation facilitates the issuance and trading of carbon credits [21] and supports Indonesia's commitment to reduce emissions by 31.89% with national efforts and 43.20% with

international assistance [22]. However, businesses face barriers such as bureaucratic complexity and limited trading volume on the Indonesian Carbon Exchange [22], while administrative issues such as inter-agency coordination and monitoring complicate carbon tax implementation (Ardhimansyah & Khaddafi, 2024). In addition, the framework lacks provisions for equitable distribution of benefits, raising concerns about environmental justice [21]. Lessons from other countries point to the need for additional rules and stakeholder cooperation to ensure that carbon taxes are effective in reducing emissions without disproportionately impacting vulnerable populations [23].

4.2 Environmental Justice and Equity in Indonesia's Carbon Trading Framework

The principles of environmental justice emphasise the fair distribution of environmental benefits and burdens, as well as the inclusion of marginalised communities in decision-making processes. In the context of carbon trading, these principles require that the economic and environmental benefits generated by carbon markets are shared fairly and that vulnerable communities are not disproportionately burdened by the negative impacts of emissions reduction policies.

4.2.1 Fairness of Distribution

While Presidential Regulation No. 98 of 2021 outlines the mechanism for carbon credit trading, it does not explicitly address how the economic benefits of carbon trading will be distributed. There are no provisions to ensure that profits generated from carbon credits are equitably distributed to communities most affected by deforestation and land use change, especially indigenous and rural communities.

- 1) A major concern is that the commodification of carbon emissions could lead to a situation where large companies, particularly in sectors such as palm oil and forestry, are able to profit from carbon trading without providing adequate compensation or benefits to local communities whose land is used for carbon sequestration projects.

- 2) The absence of clear legal mechanisms for redistributing profits from carbon trading raises questions about the fairness of the system. Vulnerable communities that bear the brunt of environmental degradation may not see tangible benefits from the carbon trading system, thus exacerbating existing social and environmental inequalities.

The equitable distribution of economic benefits from carbon trading, especially for indigenous and rural communities affected by deforestation and land use change, is an important concern. While mechanisms such as those in Presidential Regulation No. 98 of 2021 aim to mitigate climate change, they often lack provisions that ensure equitable benefit sharing with these communities. This raises issues of equity and social justice, as large companies may gain disproportionately without adequately compensating local communities. The absence of a legal framework to ensure benefit sharing [24], the volatility of carbon markets that hinders financing of community projects [25], and the commodification of carbon emissions that can marginalise vulnerable groups [24], exacerbate these challenges. Possible solutions include setting clear standards and policies for voluntary carbon markets [25], utilising blockchain and innovative financial tools to increase transparency [26], and integrating carbon credit trading with electricity markets to drive economic efficiency and social welfare for local communities [27].

4.2.2 Procedural Justice

Environmental justice also requires marginalised communities to have a voice in decision-making processes that affect their livelihoods. In Indonesia's carbon trading framework, there are limited provisions for public participation, especially for indigenous peoples and rural communities directly affected by carbon sequestration and emission reduction projects.

The regulation lacks clear guidelines to ensure that such communities are included

in the planning and implementation of carbon trading projects. This omission raises concerns about the transparency and inclusiveness of Indonesia's carbon trading system, as decision-making power remains concentrated in the hands of government agencies and large corporations.

4.2.3 International Legal Obligations

Indonesia's carbon trading regulations should also be evaluated in light of its international legal commitments, particularly under the Paris Agreement. The Paris Agreement emphasises the principles of equity and common but differentiated responsibilities (CBDR), requiring developing countries like Indonesia to receive support in meeting their emissions reduction targets while ensuring that vulnerable populations are protected.

While Indonesia's carbon trading framework is in line with its commitment to reduce emissions, it is still insufficient to ensure that the benefits of emissions reductions are distributed equitably, in line with the principles of equity laid out in the Paris Agreement.

4.3 Gaps and Challenges in Indonesia's Carbon Trading Regulations

An analysis of carbon trading regulations in Indonesia reveals several gaps and challenges in ensuring environmental justice and equity:

- a. Lack of Explicit Provisions for Vulnerable Communities: The regulations do not provide clear mechanisms to ensure that the benefits of carbon trading, such as the financial gains from carbon credits, can be enjoyed by marginalised communities, especially those in rural areas and indigenous peoples. This omission raises concerns about the fairness of the system, as these communities are often disproportionately affected by environmental degradation.
- b. Limited Public Participation: There are no explicit provisions for including vulnerable communities in decision-making processes related to

carbon trading projects. The lack of procedural justice undermines the transparency and fairness of the carbon trading system and limits the ability of marginalised groups to influence policies that affect their livelihoods.

- c. Law Enforcement Challenges: Effective enforcement of carbon trading regulations remains a challenge in Indonesia, given its history of weak environmental governance and corruption in sectors such as forestry. The success of the carbon trading system will depend on the government's ability to enforce compliance and prevent market manipulation.
- d. International Best Practices: Comparisons with existing carbon trading systems, such as the European Union Emissions Trading System (EU ETS), highlight the need for stronger safeguards to ensure fairness and equity. The EU ETS, for example, has a mechanism to redistribute carbon trading revenues to support sustainable development in less developed regions, a feature that is currently absent from Indonesia's system.

Carbon trading regulations in Indonesia face several challenges, particularly in ensuring environmental justice and equity. These challenges include the lack of explicit provisions for vulnerable communities, limited public participation, enforcement issues, and the need for alignment with international best practices. The current regulation lacks mechanisms to ensure that marginalised groups, such as rural communities and indigenous peoples, benefit from carbon trading, raising concerns about equity as these groups are often the most affected by environmental degradation [21]. In addition, the absence of provisions to involve communities in decision-making weakens transparency and limits their influence over policies that impact their livelihoods [22]. Law enforcement is another

issue, as weak environmental governance and a history of corruption in Indonesia, especially in forestry, hinder effective implementation of carbon trading [6]. International comparisons, such as the EU Emissions Trading System, highlight the need for stronger safeguards and mechanisms to redistribute revenues for sustainable development in vulnerable areas, something that is currently absent in Indonesia [23].

4.4 Recommendations to Improve Equity in Indonesia's Carbon Trading System

Based on the results of this analysis, several recommendations can be made to improve the fairness and equity of the carbon trading system in Indonesia:

- 1) The government should introduce legal provisions that ensure that revenues generated from carbon trading are shared with vulnerable communities, especially those affected by deforestation and land use change. This could be achieved through the establishment of a special fund that supports community-based environmental projects and sustainable livelihoods.
- 2) The regulatory framework should be amended to include explicit provisions for the participation of indigenous peoples and rural communities in decision-making processes related to carbon trading projects. This could involve the establishment of community advisory boards or consultations with local stakeholders before carbon trading projects are approved.
- 3) To ensure the integrity of the carbon trading system, governments should strengthen enforcement mechanisms and establish independent oversight bodies to monitor compliance with carbon trading regulations. This will

help prevent market manipulation and ensure that emission reduction targets are met.

- 4) Indonesia's carbon trading system should be aligned with international best practices, particularly in terms of revenue redistribution and community participation. Learning from the experiences of other jurisdictions, such as the EU ETS, can help Indonesia to create a more robust and equitable carbon trading system.

5. CONCLUSION

The implementation of carbon trading in Indonesia through Presidential Regulation No. 98 of 2021 marks a positive step toward reducing emissions and fulfilling international climate commitments. However, the current framework lacks sufficient safeguards to ensure that the benefits of carbon trading are equitably distributed, particularly to vulnerable communities that are disproportionately affected by environmental degradation. The absence of explicit provisions for the redistribution of carbon trading revenues and limited opportunities for public participation undermine the fairness of the system. Additionally, enforcement challenges pose a risk to the effectiveness of the carbon trading framework. To enhance fairness and align the system with the principles of environmental justice, legal reforms are necessary, including stronger mechanisms for community participation, revenue redistribution, and regulatory oversight. By addressing these gaps, Indonesia can create a more just and equitable carbon trading system that not only contributes to emissions reduction but also promotes social equity and protects marginalized populations.

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