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Regulating Blue Carbon Finance in Indonesia: Advancing Innovative and Inclusive Governance for Coastal Resilience Amidst the Climate Crisis

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Abstract

Coastal blue carbon ecosystems are vital for climate mitigation but face continuous degradation in Indonesia due to weak governance. Although a carbon finance framework exists (Presidential Regulation 110/2025, MOEF Regulation 21/2022, POJK 14/2023), these instruments risk marginalizing local communities. This study critically examines structural barriers in Indonesia Indonesia's blue carbon finance regime, specifically restrictive capital requirements, ambiguous benefit-sharing, and institutional fragmentation. Using a prescriptive normative legal method with an intradisciplinary approach, the analysis integrates doctrinal studies, climate policies, and comparative models. Findings reveal the equitable climate finance access. The specific contribution of this research lies in proposing regulatory reconstruction to achieve integrated governance for blue carbon finance, emphasizing legally binding benefit-sharing designs and community-based financing models to ensure legal certainty, coastal community rights, and equitable distribution of economic benefits.

Keywords: *Blue Carbon; Climate Crisis; Governance; Inclusive; Innovative*

A. INTRODUCTION

"Blue carbon" is the term used for the carbon stored in mangrove forests, salt marshes, and carbon-rich seagrass beds. These coastal blue carbon ecosystems (CBEs) keep carbon in the ground and also provide important places for wildlife, especially species that are in jeopardy, and support fisheries by serving as nurseries for juvenile fish. Healthy CBEs along the coast can reduce erosion and improve

water quality.[1] Indeed, CBEs can sequester carbon at rates several times higher than many terrestrial forests on a per-unit-area basis.[2]

Globally, CBEs span an estimated 36 to 185 million hectares and store approximately 33 billion tons of carbon. Maintaining the health of CBEs has the potential to prevent emissions of 304 (141-466) Tg CO2e. Large-scale restoration initiatives have the capacity to reduce emissions by 841 (621-1,064) Tg CO2, equivalent to 841 million tons, by the year 2030, which is accounting for roughly 3% of worldwide greenhouses gases (GHG) emissions.[3] Indonesia is leading global contributor to coastal CBEs, hosting nearly 3 million hectares of mangroves and around 300,000 hectares of seagrass habitats. These ecosystems collectively hold substantial carbon storage capacity and constitute one of the world's largest concentrations of blue carbon ecosystems.[4]

These CBEs hold significant potential as both environmental and economic capital in addressing the climate crisis. However, there is mounting evidence that CBEs are undergoing a decline in quality over time. Between 2014 and 2016, Indonesia's mangrove extent registered a net contraction, declining from 4.4 million ha to a low of 3.7 million ha in 2015, with only a marginal recovery to 3.9 million ha the following year. In 2016, the extent of mangrove forest destruction was estimated to be 52%.[5] In Indonesia, seagrass beds have experienced a substantial decline, with a loss ranging from 30 to 40 percent of

1 WWF-Canada, *Financing Coastal Blue Carbon in Canada: Potential Tools for Supporting Protection, Restoration and Stewardship of Blue Carbon Ecosystems* (Toronto, Canada: World Wildlife Fund Canada, 2022), https://wwf.ca/wp-content/uploads/2022/07/Financing-Coastal-Blue-Carbon-in-Canada.pdf.

2 Elizabeth Mcleod et al., "A Blueprint for Blue Carbon: Toward an Improved Understanding of the Role of Vegetated Coastal Habitats in Sequestering CO 2," *Frontiers in Ecology and the Environment* 9, no. 10 (2011): 552–60, https://doi.org/10.1890/110004. p. 557.

3 Peter I. Macreadie et al., "Blue Carbon as a Natural Climate Solution," *Nature Reviews Earth & Environment* 2, no. 12 (2021): 826–39, https://doi.org/10.1038/s43017-021-00224-1. P. 827.

4 Murdiyarso D. et al., *Creating Blue Carbon Opportunities in the Maritime Archipelago Indonesia*, Policy Brief no. 3 (2018), https://doi.org/10.17528/cifor/007058.

5 H. Susanti and E. Yanti, "The Urgency to Strengthen Blue Carbon Ecosystem Settings Based on Theory Law Development to Use to Realize Sustainable Development in Indonesia," *IOP Conference Series: Earth and Environmental Science* 1181, no. 1 (2023): 012023, https://doi.org/10.1088/1755-1315/1181/1/012023. p. 4.

their seagrass population.[6] These figures highlight the ecological significance of Indonesia's blue carbon ecosystems. They also underscore the urgent need for a legal framework that ensures financing is legally certain, equitable, and enforceable, particularly for coastal communities that steward these resources.

Blue carbon is an evolving field of scholarship, increasingly approached through integrated management that connects ecosystem stewardship with sustainable use. In Indonesia, protecting, managing, and restoring coastal CBEs presents both significant opportunities and responsibilities amid accelerating global environmental change. These responsibilities are closely tied to reversing biodiversity loss, advancing climate mitigation and adaptation, and improving the socioeconomic well-being of coastal communities.

Funding limitations remain a major impediment to the restoration, protection, and sustainable management required by a blue economy. Although nearly $8 billion from non-profit entities and $5 billion through state-led foreign aid have flowed into Indonesia's oceanic habitats over the past decade, these contributions remain insufficient.[7] APBN allocations cover only one-fifth of the funding required to meet the 2020–2025 maritime and fisheries targets under the National Medium-Term Development Plan (RPJM 2020–2025), while Marine Protected Areas require an estimated Rp690 billion ($48 million) annually but receive only Rp75 billion ($8.3 million).[8] Climate and environmental adaptation face a similar gap, with Rp7.81 trillion allocated in 2020 against an estimated annual need

[6] Indonesia Ocean Justice Initiative, *Ekosistem Karbon Biru sebagai Critical Natural Capital: Penguatan Blue Carbon Ecosystem Governance di Indonesia* (Jakarta, Indonesia: IOJI, 2023), https://oceanjusticeinitiative.org/wp-content/uploads/2023/09/STUDI-BCEG-small-res.pdf.

[7] Friends of Ocean Action, *The Ocean Finance Handbook* (Ocean Fox Advisory and the Friends of Ocean Action Secretariat, 2020), https://www3.weforum.org/docs/WEF_FOA_The_Ocean_Finance_Handbook_April_2020.pdf.

[8] Christy Desta Pratama et al., *Indonesia Blue Finance Policy Note*, 3.0 (Jakarta, Indonesia: Indonesia Climate Change Trust Fund (ICCTF), 2022), https://www.icctf.or.id/wp-content/uploads/2022/12/Blue-Finance-Policy-Note_Publish.pdf.

of Rp200–300 trillion.[9] The challenge, therefore, is not simply insufficient funding but the absence of legal mechanisms to channel available finance effectively toward CBEs and dependent communities through transparent benefit-sharing, standardized accounting, and requirements manageable for small-scale coastal actors.[10,11] Addressing this gap is central to Indonesia's blue carbon financing agenda and reflects a broader challenge across developing countries, where marine conservation remains chronically underfunded and SDG 14 receives disproportionately limited support.[12]

Recent research highlights innovative financial mechanisms, including green bonds, blended finance, credit guarantees, and debt for nature swaps, as potential tools for addressing funding gaps in ecological conservation and climate resilience across the Global South. Findings from the the International Institute for Sustainable Development (IISD) suggest that combining public and private capital through public private partnerships could strengthen investor interest in climate resilience in Kenya, Nepal, and Peru.[13] Evidence from global capital markets also points to a growing diversification of green financial instruments, with the issuance of green bonds and sustainability linked bonds and securities increasing between 2017 and 2023.[14]

In response to growing social awareness and financial risks, parts of the financial sectors are shifting capital away from fossil intensive industries

[9] Debora Laksmi Indraswari, "Upaya Pendanaan Perubahan Iklim di Indonesia," *Kompas* (Jakarta, Indonesia), February 4, 2022, https://www.kompas.id/baca/telaah/2022/02/04/upaya-pendanaan-perubahan-iklim-di-indonesia.

[10] Pratama et al., *Indonesia Blue Finance Policy Note*.

[11] Indonesia Ocean Justice Initiative, *Ekosistem Karbon Biru sebagai Critical Natural Capital: Penguatan Blue Carbon Ecosystem Governance di Indonesia*.

[12] World Economic Forum, "Targeted Financing Crucial for Ocean Health and Achieving SDGs, New Report Shows," News Release, June 10, 2022, https://www.weforum.org/press/2022/06/targeted-financing-crucial-for-ocean-health-and-achieving-sdgs-new-report-shows/?utm_source.

[13] Matt Gouett et al., *Innovative Financial Instruments and Their Potential to Finance Climate Change Adaptation in Developing Countries* (Canada: International Institute for Sustainable Development, 2023), https://www.iisd.org/system/files/2023-06/financial-instruments-climate-change-adaptation.pdf.

[14] Purity Maina et al., "Analyzing Trends in Green Financial Instrument Issuance for Climate Finance in Capital Markets," *Journal of Risk and Financial Management* 17, no. 4 (2024): 145, https://doi.org/10.3390/jrfm17040145. p. 2.

toward sustainable activities, creating new opportunities for private investment in environmental protection.[15] This shift also underscores the need for an economic model that works with natural cycles by reusing resources, reducing waste, and regenerating depleted ecosystems. This requires more effective policies, regulations, and institutions to redirect finance and investment from resource extraction toward regeneration.[16] Within this transition, blue carbon is increasingly recognized as a potential source of finance for ocean conservation and sustainable maritime industries because of its multiple benefits and growing market demand. Realizing this potential, however, requires investment and capacity building at both international and local levels, including simplified blue carbon accounting methods, effective ecosystem management, and fair benefit sharing.

Indonesia has demonstrated proficiency in sustainable financing. In 2018, it pioneered sovereign green sukuk, becoming the first country to issue such instruments globally and raising US$1.25 billion for environmentally sustainable initiatives in accordance with Sharia principles. In 2021, it again broke new ground in Southeast Asia by issuing sustainability-linked bonds internationally, raising €500 million (US$584 million). Yet these achievements have not extended to Indonesia's blue economy sectors.[17] This gap reflects a structural mismatch between the country's sustainable finance architecture and the legal conditions required for blue carbon projects to qualify. Green Sukuk and SDG Bonds favour large, bankable projects with standardized risks and verifiable returns, while community-based blue carbon initiatives face significant legal and administrative barriers. The absence of a comprehensive legal definition covering both mangroves and seagrass, declarative benefit-sharing rules, and

[15] WWF-Canada, *Financing Coastal Blue Carbon in Canada: Potential Tools for Supporting Protection, Restoration and Stewardship of Blue Carbon Ecosystems*.

[16] Christiana Figueres and Tom Rivett-Carnac, *The Future We Choose: The Stubborn Optimist's Guide to the Climate Crisis* (London: Manilla Press, 2021).

[17] Pratama et al., *Indonesia Blue Finance Policy Note*.

burdensome verification and registry requirements continue to limit access for small-scale coastal actors.[18] Indonesia has therefore developed sophisticated sustainable finance instruments without the legal infrastructure needed to channel them toward its most climate-critical coastal ecosystems.

The enactment of Presidential Regulation No. 110 of 2025 on the Implementation of Carbon Economic Value Instruments and National Greenhouse Gas Emission Control marks an important regulatory advance by formally recognizing blue carbon management as a distinct sub-sector of national climate mitigation under Article 9(3)(n), coordinated by the Ministry of Marine Affairs and Fisheries. This development renders obsolete the earlier criticism that Indonesia's carbon economic value framework entirely neglected the marine sector. Yet formal recognition does not resolve the deeper governance challenges. Presidential Regulation No. 110 of 2025 still delegates benefit-sharing arrangements to ministerial decrees without establishing a precise and legally binding methodology, reproducing a weakness found in its predecessor, Presidential Regulation No. 98 of 2021, which this study examines as part of Indonesia's evolving legal trajectory. As a result, coastal communities living in carbon-rich area may contribute directly to national mitigation targets, but the communities that sustain them still lack legally enforceable access to the financial benefits generated by that contribution.

Against this backdrop, this article asks what innovative and inclusive governance of blue carbon finance should require in practice. Here, innovative financing refers to mechanisms that move beyond conventional public fiscal distribution toward market-based and community-oriented approaches, including Payment for Ecosystem Services, Result-Based Payments, and carbon offset schemes. These mechanisms must remain legally accessible to small-scale coastal actors without excessive capital requirements or bureaucratic barriers.

[18] Indonesia Ocean Justice Initiative, *Ekosistem Karbon Biru sebagai Critical Natural Capital: Penguatan Blue Carbon Ecosystem Governance di Indonesia*.

Inclusive governance, meanwhile, requires a regulatory framework that ensures meaningful community participation in decision-making, transparent and enforceable benefit-sharing, and legal recognition of community-based blue carbon initiatives within Indonesia's carbon market. Inclusivity therefore depends not on formal provisions alone, but on whether they create measurable access and enforceable rights for communities that depend on coastal ecosystems.

With Presidential Regulation No. 110 of 2025 now formally recognizing blue carbon within Indonesia's climate governance framework, the analytical focus shifts. The central question is no longer whether blue carbon has been integrated into the regulatory framework, but whether the existing legal infrastructure can translate that recognition into accessible, innovative, and community-centered financing mechanisms. This question is both normative and practical. Without a functional legal framework, Indonesia's vast blue carbon resources cannot become a strategic climate and economic asset, while the coastal communities that protect them continue to bear the costs of conservation without receiving equitable returns.

B. RESEARCH METHOD

This study employs prescriptive normative legal research using statutory, conceptual, and comparative approaches, supported by perspectives from environmental finance and climate governance. The research examines the legal and institutional barriers to innovative and inclusive blue carbon financing in Indonesia through qualitative analysis of primary, secondary, and tertiary legal materials. Primary legal materials include the Paris Agreement (2015), Law No. 4 of 2023, Presidential Regulation No. 110 of 2025, which replaces Presidential Regulation No. 98 of 2021, Minister of Environment and Forestry Regulation No. 21 of 2022, and Financial Services Authority Regulation No. 14 of 2023. These materials are supplemented by scholarly publications, policy reports, regulatory guidelines, and official databases. The analysis focuses on identifying regulatory inconsistencies and legal uncertainties concerning carbon rights, benefit-sharing

arrangements, and coastal communities' access to climate finance. The comparative approach examines Kenya's Mikoko Pamoja initiative and Canada's Alternative Land Use Services program to assess community-based financing mechanisms, particularly Payment for Ecosystem Services and Results-Based Payments. Rather than adopting these models directly, the comparison provides a basis for evaluating their institutional applicability and informing context-sensitive legal reforms that strengthen transparency, community participation, and equitable benefit distribution within Indonesia's blue carbon governance framework.

C. RESEARCH RESULTS AND DISCUSSION

1. A Spectrum of Financing Options for Coastal Blue Carbon Ecosystem Conservation

The endeavor to conserve CBEs is contingent not only on the implementation of legal instruments and policies, but also on the establishment of various financial mechanisms. In global practice, a number of financing instruments have been developed to address the discrepancy between conservation funding needs and economic interests. These instruments include financial markets, ecosystem-based incentives, and institutional schemes. However, the effective deployment of these instruments within Indonesia's blue carbon governance context necessitates careful examination of their legal relevance, operational feasibility, and regulatory implications under the existing framework, particularly in light of the formal recognition of blue carbon management as a distinct sub-sector of national climate mitigation under Presidential Regulation No. 110 of 2025.

Bonds represent one of the most established conservation financing instruments, functioning as debt instruments issued by governments or institutions and tradeable through exchanges or brokers.[19] In the context of Indonesia's blue carbon finance, bonds carry particular legal relevance given Indonesia's pioneering issuance of

[19] WWF-Canada, *Financing Coastal Blue Carbon in Canada: Potential Tools for Supporting Protection, Restoration and Stewardship of Blue Carbon Ecosystems*.

green Sukuk and SDG Bonds, which demonstrate that the country possesses both the institutional capacity and market credibility to deploy debt-based sustainable finance instruments. However, the absence of a legally recognized blue carbon asset class within Indonesia's capital market architecture, compounded by the lack of standardized measurement methodologies for seagrass and mangrove carbon stocks, means that blue carbon projects currently cannot qualify as eligible underlying assets for bond issuance under POJK 14/2023.[20] Addressing this gap requires OJK to issue derivative regulations that explicitly classify verified blue carbon units as eligible securities, thereby creating the legal prerequisite for blue carbon-linked bond instruments to enter Indonesia's capital market.

Impact investing, characterized by its dual pursuit of financial returns alongside environmental or social objectives, represents a financing modality with significant potential for blue carbon ecosystems. WWF-Canada has documented the application of impact investing frameworks in coastal blue carbon contexts, demonstrating that private capital can be mobilized toward conservation outcomes when adequate return mechanisms and risk mitigation instruments are in place.[21] For Indonesia, the legal feasibility of impact investing in blue carbon is partially supported by the broad definition of carbon unit derivatives under Article 3 of POJK 14/2023, which authorizes the carbon exchange to develop new carbon unit-based investment products. Nevertheless, the absence of transparent and operationally enforceable benefit-sharing mechanisms under Perpres 110/2025, which continues to delegate this operationalization to ministerial regulations, creates investment uncertainty that structurally undermines private investor

[20] Agustinus Prajaka Wahyu Baskara, "Kerangka Hukum Bursa Karbon di Indonesia: Perkembangan Terkini dan Tantangan ke Depan," *Mimbar Hukum* 35, no. Special Issue (2023): 40–79, https://doi.org/https://doi.org/10.22146/mh.v35i0.11396. p. 45.

[21] WWF-Canada, *Financing Coastal Blue Carbon in Canada: Potential Tools for Supporting Protection, Restoration and Stewardship of Blue Carbon Ecosystems*.

confidence.[22] Legal reform must therefore prioritize the establishment of clear, enforceable benefit-sharing formulae as a prerequisite for attracting impact investment toward blue carbon ecosystems.

Payments for Ecosystem Services (PES) is the financing instrument most closely aligned with the inclusive governance principles advanced in this article. Under a PES framework, ecosystem users or beneficiaries remunerate those who manage and protect ecosystem services, directing funds toward sustainable conservation. Its legal relevance to Indonesia is significant because PES closely parallels the Result-Based Payment mechanism recognized under Article 70 of Perpres No. 110/2025, which allows payments to communities as part of performance-based climate finance. Kenya's Mikoko Pamoja demonstrates how this model can operate at the community level. Under the Plan Vivo certification standard, its PES arrangements create legally binding payment obligations to coastal communities without the prohibitive administrative infrastructure of Indonesia's current carbon registry system.[23] For Indonesia, however, the RBP provisions of Perpres No. 110/2025 remain insufficiently operationalized. By leaving benefit-sharing arrangements to future ministerial regulations, the regulation provides no concrete legal basis for community-based PES initiatives. Derivative regulations should therefore establish clear eligibility criteria for community actors, verification procedures proportionate to small-scale projects, and enforceable payment timelines that ensure measurable returns for communities managing and protecting blue carbon ecosystems.

Nature-based insurance solutions remain an emerging and legally underdeveloped instrument within Indonesia's blue carbon governance framework. The model insures natural assets such as wetlands or coral reefs against specific risks, including high wind speeds or elevated water levels,

[22] Indonesia Ocean Justice Initiative, *Ekosistem Karbon Biru sebagai Critical Natural Capital: Penguatan Blue Carbon Ecosystem Governance di Indonesia*.

[23] Lindsay Wylie et al., "Keys to Successful Blue Carbon Projects: Lessons Learned from Global Case Studies," *Marine Policy* 65 (March 2016): 76–84, https://doi.org/10.1016/j.marpol.2015.12.020. p. 78-79.

with payouts directed toward ecosystem restoration after damage. WWF-Canada has identified its potential for coastal blue carbon protection, although the instrument has yet to be implemented even within Canada's insurance portfolio, underscoring its early stage of legal and institutional development globally.[24] In Indonesia, no existing instrument under Perpres No. 110/2025, POJK No. 14/2023, or UU No. 4/2023 provides a framework for nature-based insurance in the blue carbon context. Developing such a mechanism would require OJK to establish dedicated rules recognizing natural assets as insurable objects, standardizing the valuation of blue carbon ecosystems, and defining the legal relationship between insurance payouts and restoration obligations. This regulatory architecture does not yet exist and would require substantial institutional investment to develop.

Trust funds, established as private legal entities to manage financial resources for conservation, represent a legally mature instrument with established precedent in Indonesia's environmental governance.[25] Their use in biodiversity financing is well documented globally, and their legal structure is compatible with Indonesia's existing framework for environmental fund management institutions. Article 74 of Perpres No. 110/2025 allows proceeds from carbon trading, result-based payments, and carbon levies to be channelled through environmental fund management institutions or designated bodies, providing a relatively strong legal basis for applying trust funds to blue carbon finance. The principal regulatory gap, however, lies in the absence of explicit rules requiring trust fund proceeds to reach coastal communities as primary beneficiaries of blue carbon conservation. Without such provisions, trust funds could reproduce the centralization and large-actor dominance of Indonesia's existing carbon finance architecture, directing resources toward institutional actors rather than the communities whose

[24] WWF-Canada, *Financing Coastal Blue Carbon in Canada: Potential Tools for Supporting Protection, Restoration and Stewardship of Blue Carbon Ecosystems*.

[25] Annabelle Bladon et al., *A Review of Conservation Trust Funds for Sustainable Marine Resources Management: Conditions for Success*, Working Paper (London: IIED, 2014). p. 7.

stewardship generates the ecological value underlying blue carbon finance.[26]

Across these five financing instruments, implementation experience varies significantly. Bonds and impact investing demonstrate strong market precedent but remain structurally inaccessible to blue carbon ecosystems under Indonesia's current regulatory architecture. Nature-based insurance solutions remain at an early stage of development even in jurisdictions such as Canada where the concept has been most actively explored.[27] Trust funds offer the most immediate legal compatibility with Indonesia's existing framework, though their community-inclusivity dimension remains unresolved. Payment for Ecosystem Services, by contrast, has demonstrated the most direct community benefit outcomes in practice, as evidenced by its implementation through the Mikoko Pamoja project in Kenya, the governance model that most directly informs the prescriptive recommendations this article advance.[28] As demonstrated above, the practice of implementing conservation financing instruments through voluntary markets suggests that this mechanism is more readily applicable to small community-based projects. The implementation of this mechanism can be accomplished with effectiveness, unencumbered by the constraints imposed by international administrative standards and the financial burdens associated with high costs.

Mikoko Pamoja, the world's first certified community-based blue carbon initiative in Gazi Bay, Kenya, offers a relevant reference for Indonesia's regulatory reform. Established under the Plan Vivo Carbon Standard, its legal foundation is a contractual Payment for Ecosystem Services agreement requiring at least 60% of income from Plan Vivo Certificate sales to be returned directly

[26] Erlangga Erlangga et al., *Challenges and Opportunities in Blue Carbon Mangrove Value Chain Financing in Indonesia*, Info Brief (Center for International Forestry Research (CIFOR), 2026), https://doi.org/10.17528/cifor-icraf/009468.

[27] WWF-Canada, *Financing Coastal Blue Carbon in Canada: Potential Tools for Supporting Protection, Restoration and Stewardship of Blue Carbon Ecosystems*.

[28] Wylie et al., "Keys to Successful Blue Carbon Projects."

to community members, creating an enforceable revenue-sharing obligation without state intermediation.[29] The project brings together the Scotland-based Association for Coastal Ecosystem Services as international coordinator, the government-recognized Mikoko Pamoja Community Organization for benefit distribution, and a Steering Group drawing expertise from institutions including the Kenya Marine and Fisheries Research Institute.[30] Participation is substantive, with nearly 500 residents involved in mangrove restoration and full-time community guards, funded through carbon revenue, protecting 117 hectares from illegal deforestation. The project generates approximately US$12,000 annually through the voluntary carbon market for education, clean water, and community wages benefiting 5,400 people, with more than 30% of carbon income reaching the community through contractually guaranteed arrangements.[31]

For Indonesia, the significance of Mikoko Pamoja lies in three principles. First, it shows that community-scale blue carbon finance can operate under an internationally recognized certification standard without the prohibitive verification requirements associated with Indonesia's current registry system. Second, it demonstrates that benefit-sharing can be made legally enforceable through contractual PES arrangements rather than left to ministerial discretion. Third, it establishes that registered community organizations can act as primary legal subjects in carbon finance. These features are particularly relevant to Indonesia, where the large-actor orientation of the framework under Perpres No. 110/2025 has yet to provide a comparable legal pathway for community-based participation.

[29] Plan Vivo Foundation, "PV Climate Certification Standard," Standard, Plan Vivo Foundation, 2022, https://www.planvivo.org/projects/certify-a-project/pvclimate.

[30] Ecological Benefits Framework, *Mikoko Pamoja Mangrove Ecosystem Conserve and Restore* (California: The Lexicon, 2023), https://ebfcommons.org/case-study/mikoko-pamoja.

[31] UNDP Kenya, "Mikoko Pamoja: Nurturing Nature, Empowering Communities," Essay, Medium, Medium, January 25, 2024, https://undp-kenya.medium.com/mikoko-pamoja-nurturing-nature-empowering-communities-b459993b817b.

Within the broader context of the climate change phenomenon, the concept of CBEs has emerged as a potential candidate for funding opportunities under the auspices of the United Nations (UN). This assertion is informed by the existing policy and regulatory framework established by the UN, which provides a structured framework for addressing climate-related issues on a global scale. The Paris Agreement constructs a normative foundation for climate finance governance, providing the overarching legal principles within which mitigation and adaptation programs across the globe are to be financed and implemented. Article 4.3 of the Paris Agreement operationalizes the common but differentiated responsibility principle by imposing an obligation on developed states to furnish financial assistance for climate action in developing nations, a provision that creates a legally grounded avenue for mobilizing international resources toward Indonesia's blue carbon governance agenda.[32] The allocation of financial resources from developed countries to developing countries has the potential to contribute to the enhancement of blue carbon governance funding.

The implementation of the CBDR principle is facilitated by the Clean Development Mechanism (CDM), which involves developed countries establishing and implementing greenhouse gas emission reduction projects in developing countries. These projects can be carried out through various activities, such as assistance for energy transition programs and reforestation programs in developing countries.[33] Moreover, the practice of carbon trading can be facilitated through the framework of an emissions trading scheme, a system that permits developed countries and industries to engage in the exchange of carbon credits with other industrialized nations. It is also possible to implement this strategy

[32] Sirazoom Munira et al., "Climate Finance in the UNFCCC Negotiations: Bridging Gaps with Lessons Learnt," in *Climate Change in Bangladesh*, ed. Md. Jakariya and Md. Nazrul Islam, Springer Climate (Cham: Springer International Publishing, 2021), 1–24, https://doi.org/10.1007/978-3-030-75825-7_1. p. 4.

[33] Rossi Margareth Tampubolon, "Perdagangan Karbon: Memahami Konsep dan Implementasinya," *STANDAR: Better Standard Better Living* 1, no. 3 (2022): 25–29. p. 26.

through a joint implementation scheme, which is a carbon trading mechanism between developed countries based on projects.[34] Perpres 110/2025 explicitly positions Indonesia's carbon trading framework within this international architecture, with Articles 68 and 69 governing cross-border carbon trading and international market linkages, thereby creating a legal bridge between Indonesia's domestic blue carbon sub-sector and international climate finance flows under the Paris Agreement.

Nevertheless, these international financing mechanisms must be adapted to Indonesia's legal, institutional, and community contexts rather than transplanted wholesale from developed country frameworks. Drawing on Mikoko Pamoja, Canada's Alternative Land Use Services program, and the broader literature on blue carbon governance, successful financing in Indonesia requires genuine community engagement, site-specific financing instruments, and adequate technical and institutional capacity. Governance arrangements must also recognize community-based organizations as legal participants in carbon finance, with the ability to enter agreements and receive payments. Reliable, long-term funding and rigorous systems for tracking and independently verifying ecological and social outcomes are equally essential.[35]

Financial resources should therefore be allocated in collaboration with indigenous communities, coastal communities, and justice-seeking groups, with their social, economic, and cultural well-being treated as a central consideration. Meaningful engagement with the communities where projects are implemented can better align financing with local needs and priorities, while strengthening the long-term prospects of conservation initiatives. In turn, this collaborative approach offers greater potential to improve the effectiveness of blue carbon governance.

[34] Nur Azizi Mj et al., "Perdagangan Karbon: Mendorong Mitigasi Perubahan Iklim Diantara Mekanisme Pasar Dan Prosedur Hukum," *Jurnal Selat* 10, no. 2 (2023): 91–107, https://doi.org/10.31629/selat.v10i2.4853. p. 99.

[35] Bladon et al., *A Review of Conservation Trust Funds for Sustainable Marine Resources Management: Conditions for Success*.

2. Regulating Blue Carbon Economic Activities in Indonesia

The economic value of carbon (EVC) has been regulated in Presidential Regulation No. 98 of 2021 concerning the Implementation of the Economic Value of Carbon for the Achievement of Nationally Determined Contribution Targets and Greenhouse Gas Emission Control in National Development. Article 47 paragraph (1) of the Presidential Regulation stipulates the mechanism for implementing (EVC), as follows:

1. Carbon Trading;
2. Results-Based Payment;
3. Carbon Tax; and/or
4. Other mechanisms in accordance with scientific and technological developments as determined by the Minister.

This Presidential Regulation enumerates three categories of economic activities that can be pursued within the carbon economy sector. However, it should be noted that this list is by no means exhaustive, as there are numerous alternative economic activities that could be incorporated into this regulatory framework. While this regulatory framework may facilitate the emergence of novel economic activities in alignment with technological and scientific advancements, it concomitantly poses a threat to investor confidence in the principle of legal certainty. Legal certainty is a foundational element for cultivating a conducive environment for economic activities in the carbon sector.[36] This approach has been demonstrated to enhance investment attractiveness, support long-term planning, and ensure the efficient operation of carbon markets.[37] Policymakers must endeavor to strike the optimal balance, striking the requisite stability in regulatory frameworks while cultivating the flexibility to adapt to evolving circumstances. This balanced approach will ensure the promotion of sustainable

[36] Bo Chen et al., "The Legal Governance of the Carbon Market: Challenges and Application of Private Law in China," *Carbon Management* 15, no. 1 (2024): 2288591, https://doi.org/10.1080/17583004.2023.2288591. p. 47.

[37] Adrian Jackson et al., "Networked Carbon Markets," in *Transforming Climate Finance and Green Investment with Blockchains* (Elsevier, 2018), 255–68, https://doi.org/10.1016/B978-0-12-814447-3.00019-7. p. 259.

economic growth and effective climate change mitigation.

This Presidential Regulation constitutes a commitment on the part of the Indonesian government to achieve the targets stipulated in the Nationally Determined Contribution (NDC). The establishment of this regulation is part of the Indonesian government's compliance measures following the ratification of the 2015 Paris Agreement. Subsequent to the issuance of the presidential regulation, Law Number 4 of 2023 concerning the Development and Strengthening of the Financial Sector was enacted. Article 23 of the law stipulates the provisions for the implementation of the carbon trading mechanism in Indonesia. Article 6 of the law stipulates that the Financial Services Authority (OJK) is responsible for implementing regulatory and supervisory functions in relation to carbon trading through a designated carbon exchange scheme. However, the law only follows up on the carbon trading mechanism from several EVC implementation mechanisms already mentioned in Presidential Regulation No. 98 of 2021.

Subsequent to the enactment of Law No. 4 of 2023, the OJK promulgated Financial Services Authority Regulation No. 14 of 2023, which pertains to the facilitation of carbon trading through the Carbon Exchange. This regulatory framework is comprised of nine chapters and thirty-six articles, the purpose of which is to provide a framework for entities interested in engaging in carbon trading through the Indonesia Carbon Exchange. The third chapter of the OJK Regulation addresses shareholders and key structures within the carbon exchange. In accordance with the legal framework established in Indonesia, the notion of carbon financing emphasizes the practice of impact investing. The utilization of blue carbon financing instruments in Indonesia remains constrained.

According to Article 3, Paragraph (1) of POJK 14/2023, Carbon Units are classified as Securities. In accordance with Article 22, Paragraph 1 of Law 4/2023 and Article 1, Paragraph (6) of POJK 14/2023, the definition of securities as negotiable instruments or investment contracts is reaffirmed. This definition encompasses conventional or

digital forms, as well as other forms that may emerge in accordance with technological developments. The holder of a security is entitled to obtain economic benefits directly or indirectly from the issuer or a specific party based on an agreement. This definition also encompasses derivatives of securities, which can be transferred and/or traded on the capital market. Article 1, Paragraph (6) of POJK 14/2023 stipulates that a carbon unit serves as substantiation of carbon ownership, manifesting as a certificate or technical approval. This certification is contingent upon the documentation of one ton of carbon dioxide, as recorded in the *SRN PPI* (National Registry System for Climate Change Control).

Regulations in Indonesia designate carbon units as financial instruments that represent the fulfillment of requirements related to the existence of economic rights and the transferability and/or tradability of these carbon units on the carbon exchange.[38] To date, the OJK has designated the carbon units traded on the carbon exchange as the Technical Agreement on Emission Caps for Business Actors (PTBAE-PU) and Greenhouse Gas Emission Reduction Certificates (SPE-GRK). Given the ample opportunities for the creation of carbon unit derivatives, the carbon exchange has been authorized by the OJK to develop new carbon unit-based investment products and undertake other activities following the acquisition of approval.[39] Nevertheless, the introduction of novel investment instruments and additional carbon financing activities will likely prove ineffective due to the absence of legal certainty.

According to Article 4, paragraph (1) of POJK 14/2023, business operators classified as carbon exchanges are defined as entities that have obtained a business license as a carbon exchange operator. POJK delineates the obligations that must be observed by carbon exchange operators in Indonesia through Article 7 of POJK 14/2023, as follows:

[38] Baskara, "Kerangka Hukum Bursa Karbon di Indonesia: Perkembangan Terkini dan Tantangan ke Depan.", p. 47.
[39] Ibid.

1. to organize regular, fair, and efficient trading of carbon units;
2. organizing and managing an electronic system to continuously match carbon unit transactions;
3. providing a Carbon Unit trading system that includes: (a) matching Carbon Unit bids and offers; and (b) settling Carbon Unit transactions, both in terms of funds and Carbon Units between parties.

Furthermore, Article 13 of POJK 14/2023 stipulates that carbon exchange operators are required to maintain a minimum paid-up capital of Rp100 billion. Given the obligations imposed on prospective carbon exchange operators, carbon trading in Indonesia tends to be oriented towards large-scale trading. The aforementioned regulations indicate that the implementation of small-scale, community-based carbon financing instruments lacks legal and policy support.

Presidential Regulation No. 98 of 2021 and POJK 14/2023 provide the regulatory framework for carbon trading mechanisms, result-based payments, carbon tax, and other related instruments. Nonetheless, these regulations remain broad in nature and lack the provision of technical specifics concerning the distribution of benefits to local or indigenous communities. This Presidential Regulation has indeed created an opportunity for community participation and the principle of benefit sharing. However, this opportunity is currently in the declarative stage and has yet to be operationalized. The provisions enumerated by Article 46 as well as Articles 57-59 are inadequate in delineating a concrete formula for the distribution of benefits, determining the beneficiaries of carbon units, or establishing a fair measurement of the contributions of local communities.

Moreover, blue carbon was only referenced in Presidential Regulation No. 98 of 2021 on the Implementation of Economic Value of Carbon for the Achievement of Nationally Determined Contribution Targets and Greenhouse Gas Emission Control in National Development, while remaining absent from two other relevant legal

instruments. This regulatory gap is particularly significant given Indonesia's substantial blue carbon potential. The country holds an estimated 17% of global blue carbon reserves, while its coastal wetlands account for approximately one-fifth of the world's blue carbon, making these ecosystems strategically important for climate change mitigation.[40] Indonesia also contains two of the three globally recognized blue carbon ecosystems, mangroves and seagrass beds. It is mangrove forests store an estimated 3.14 billion tons of carbon,[41] while seagrass beds contain approximately 0.39 billion tons.[42] Together, these ecosystems hold around 3.53 gigatons of carbon. At a carbon price of US$5 per credit, this stock represents an estimated economic value of US$17.65 billion, equivalent to approximately Rp2,867 trillion.

A systematic assessment of Indonesia's blue carbon regulatory framework across five dimensions reveals persistent structural gaps despite recent regulatory advances. Legal certainty remains weak, as Perpres No. 110/2025 continues to leave the technical implementation of carbon economic value instruments to future ministerial regulations, creating ambiguity that may undermine investor confidence and long-term planning, as Baskara (2023) notes.[43] Blue carbon is now formally recognized as a mitigation sub-sector under Article 9(3)(n), but remains legally undefined, leaving its scope and the inclusion of seagrass beds uncertain. Carbon unit ownership is likewise unresolved, as POJK No. 14/2023 and Perpres No. 110/2025 provide no mechanism for coastal communities to establish or enforce rights over units generated within their customary territories. Community access is further restricted by the Rp100 billion capital requirement under

[40] D. M. Alongi et al., "Indonesia's Blue Carbon: A Globally Significant and Vulnerable Sink for Seagrass and Mangrove Carbon," *Wetlands Ecology and Management* 24, no. 1 (2016): 3–13, https://doi.org/10.1007/s11273-015-9446-y. p. 5.

[41] Daniel Murdiyarso et al., "The Potential of Indonesian Mangrove Forests for Global Climate Change Mitigation," *Nature Climate Change* 5, no. 12 (2015): 1089–92, https://doi.org/10.1038/nclimate2734. p. 1090.

[42] Alongi et al., "Indonesia's Blue Carbon." p. 6.

[43] Baskara, "Kerangka Hukum Bursa Karbon di Indonesia: Perkembangan Terkini dan Tantangan ke Depan." p. 61.

Article 13 of POJK No. 14/2023 and the documentation and verification demands of the SRUK system. Finally, Article 72 of Perpres No. 110/2025 recognizes communities as eligible recipients of performance-based payments but leaves benefit-sharing arrangements to ministerial regulations yet to be issued. These five gaps show that formal recognition of blue carbon has not yet been matched by the legal infrastructure needed to provide certainty, define rights, enable community participation, and secure equitable benefit-sharing.

3. Towards a Regulatory Framework for Blue Carbon Conservation Financing in Indonesia

Legal clarity over what blue carbon encompasses is the foundation of an effective blue carbon finance regime. Perpres No. 110/2025 marks a meaningful step by formally recognizing blue carbon management as a distinct mitigation sub-sector under Article 9(3)(n), but it does not provide a substantive legal definition of blue carbon as a juridical category. This is more than a technical omission. Without a binding definition that expressly includes mangrove forests and seagrass beds as blue carbon ecosystems, the scope of regulatory protection remains uncertain, carbon unit eligibility can be contested, and the investment certainty required for blue carbon finance remains difficult to achieve. Indonesia's derivative regulations should therefore establish a comprehensive definition specifying the ecological components and geographic scope of blue carbon, together with the legal consequences for asset classification, financing eligibility, and community rights. A basis for such an approach already in Indonesia's regulatory practice. Presidential Regulation No. 73 of 2012 on the National Strategy for Mangrove Ecosystem Management demonstrates that ecosystem-specific legal frameworks can be incorporated into Indonesia's governance architecture, while a comparable framework covering both mangroves and seagrass beds could provide the definitional

foundation for a coherent blue carbon finance regime.[44]

The second pillar of the proposed regulatory framework concerns community access to blue carbon finance. As the preceding analysis shows, POJK No. 14/2023 and Perpres No. 110/2025 structurally limit coastal communities through capital requirements, verification burdens, and registry systems designed primarily for large institutional actors.[45] Reform should therefore establish a differentiated pathway for community-scale initiatives that operates alongside, rather than within, the existing carbon exchange system. Mikoko Pamoja demonstrates that community access can be achieved through contractual PES supported by internationally recognized certification, without requiring communities to navigate the full administrative apparatus of state carbon registries.[46] In Indonesia, derivative regulations under Perpres No. 110/2025 should establish simplified registration and verification procedures proportionate to project scale, provide technical assistance through relevant ministries, and recognize community-based organizations as legal subjects able to enter carbon finance agreements, receive payments, and hold carbon unit interests on behalf of their members. Article 57(2) already provides an embryonic legal basis by recognizing communities as climate mitigation actors; what remains is to translate this recognition into enforceable access rights. This does not require wholesale transplantation of the Mikoko Pamoja model. Its contractual PES structure and community organization approach are compatible with Indonesia's legal framework, but Plan Vivo certification cannot replace the System Registry Unit Karbon (SRUK), which also serves national NDC accounting functions. Indonesia therefore needs a simplified domestic certification pathway that remains interoperable with SRUK while

[44] Susanti and Yanti, "The Urgency to Strengthen Blue Carbon Ecosystem Settings Based on Theory Law Development to Use to Realize Sustainable Development in Indonesia.", p. 2.

[45] Indonesia Ocean Justice Initiative, *Ekosistem Karbon Biru sebagai Critical Natural Capital: Penguatan Blue Carbon Ecosystem Governance di Indonesia*.

[46] Plan Vivo Foundation, "PV Climate Certification Standard."

accessible to small-scale community actors.

The third pillar concerns benefit-sharing, arguably the most critical and deficient dimension of Indonesia's blue carbon governance. Article 72 of Perpres No. 110/2025 requires Result-Based Payment arrangements to account for the roles and contributions of each party, but leaves the formula and modalities to ministerial regulations yet to be issued. This repeats the weakness of its predecessor and provides insufficient protection for communities facing information asymmetries and institutional power imbalances. Two comparative models offer useful guidance. Canada's Alternative Land Use Services program demonstrates how standardized per-hectare payments to ecosystem stewards can provide transparent, measurable, and enforceable benefit-sharing without complex carbon market infrastructure.[47] Mikoko Pamoja similarly shows how minimum revenue-sharing thresholds can be secured through project certification, making benefit flows predictable and less dependent on state budgetary discretion.[48] For Indonesia, these approaches would require ministerial regulations under Perpres No. 110/2025 to establish a mandatory minimum benefit-sharing ratio, an independent escrow or trust mechanism, and an accessible grievance and enforcement mechanism for community claims. Such a ratio has precedent in Indonesian law, including mandatory CSR obligations under Law No. 40 of 2007 on Limited Liability Companies and revenue-sharing provisions under Law No. 3 of 2020 on Mineral and Coal Mining, both of which establish enforceable thresholds for distributing benefits to affected communities. Applying this established logic to blue carbon finance would therefore constitute a doctrinal development of existing Indonesian law rather than an entirely novel legal construct.

The fourth pillar concerns verification standards and institutional

[47] WWF-Canada, *Financing Coastal Blue Carbon in Canada: Potential Tools for Supporting Protection, Restoration and Stewardship of Blue Carbon Ecosystems*.

[48] UNDP Kenya, "Mikoko Pamoja: Nurturing Nature, Empowering Communities."

coordination, which are closely intertwined in Indonesia's blue carbon governance. Under Perpres No. 110/2025, the current MRV system applies uniform scientific and administrative standards across carbon sectors, creating verification burdens that community-based projects cannot realistically meet without external technical support. A tiered verification framework is therefore needed to distinguish large-scale commercial projects from community-based conservation initiatives, with simplified MRV protocols that preserve scientific integrity while keeping administrative costs proportionate to projected carbon revenues. This approach is consistent with ecosystem-based adaptation principles in the blue carbon governance literature, which emphasize aligning management and accountability systems with the institutional capacity of the communities they serve. Institutional coordination is equally important. Although Article 24(2)(f) of Perpres No. 110/2025 establishes the Ministry of Marine Affairs and Fisheries as the coordinating authority for blue carbon management, effective implementation requires structured coordination with the Ministry of Environment and Forestry, OJK, and local governments whose customary and administrative authorities extend to coastal ecosystems. A dedicated inter-ministerial blue carbon coordination unit, mandated to develop the derivative regulations proposed in this article, could help address the institutional fragmentation that has long hindered the implementation of carbon governance commitments in Indonesia's marine sector.

The fifth and final pillar concerns compliance mechanisms, which determine whether the proposed reforms become enforceable obligations or remain aspirational commitments. A credible blue carbon finance framework should operate at three levels. At the project level, carbon exchange operators and project developers should be required to disclose benefit-sharing flows, community consultation processes, and ecological outcomes, with OJK empowered to impose administrative sanctions, including written warnings, temporary suspension of carbon unit trading, and

revocation of carbon exchange operating licences for non-compliance. The legal basis for these measures already exists in OJK's supervisory authority under Article 6 of Law No. 4 of 2023 and the licensing framework established by POJK No. 14/2023. At the community level, the proposed grievance mechanism should be supported by legal standing provisions allowing community organizations to bring enforcement actions before administrative tribunals without facing the prohibitive standing requirements associated with ordinary civil litigation. At the systemic level, the inter-ministerial coordination unit should periodically review blue carbon governance against the inclusive financing objectives of Perpres No. 110/2025, with findings reported to the Steering Committee established under Article 96 and made publicly available to support civil society accountability. Together, these five pillars provide a coherent and institutionally feasible framework for blue carbon finance in Indonesia, translating the formal recognition established by Perpres No. 110/2025 into the substantive governance infrastructure required for financing that is both innovative and inclusive.

D. CONCLUSION

This article has examined whether Indonesia's regulatory framework can translate the formal recognition of blue carbon ecosystems into financing mechanisms that are genuinely innovative and inclusive. The answer is no, at least under the current framework. Perpres No. 110/2025 marks an important regulatory advance by recognizing blue carbon management as a distinct mitigation sub-sector under Article 9(3)(n) and designating the Ministry of Marine Affairs and Fisheries as its sectoral coordinator. Yet recognition alone does not resolve the underlying structural inequities. Benefit-sharing remains dependent on future ministerial regulations, capital and verification requirements continue to limit community participation in the carbon market, and no substantive legal definition of blue carbon expressly encompasses both mangroves and seagrass beds. These gaps are evident across five dimensions of governance,

namely legal certainty, blue carbon recognition, carbon unit ownership, community access, and benefit-sharing. Comparative evidence from Mikoko Pamoja in Kenya and Canada's Alternative Land Use Services program further shows that community-based blue carbon finance can be legally and operationally viable when supported by appropriate governance arrangements. Their models are not directly transplantable, but they provide practical reference points for the five regulatory pillars proposed here, covering legal definition, community access, benefit-sharing, tiered verification, and enforceable compliance. The article contributes to the literature in three respects. It offers a systematic legal assessment of Indonesia's blue carbon finance regime under Perpres No. 110/2025, identifies the gap between formal recognition and substantive operationalization as the central legal problem, and translates the principles of innovative and inclusive governance into legally grounded reform proposals. More importantly, it shows that the foundations for equitable blue carbon finance already exist within Indonesia's regulatory architecture. What is required is not wholesale legal reinvention, but targeted derivative regulation capable of turning those foundations into enforceable rights and workable financing mechanisms. Indonesia's ability to realize blue carbon as both a climate mitigation instrument and a source of coastal community resilience will ultimately depend on the political will to make that transition.

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