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The legal framework of indonesia on the carbon market and implications for Vietnam in developing low-carbon agriculture

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Abstract
In the context of increasingly severe global climate change, agriculture is simultaneously one of the sectors most heavily affected and a significant source of greenhouse gas emissions, while also possessing substantial potential for emission reduction and carbon sequestration. Adopting the carbon market as a central legal economic instrument for the development of low-carbon agriculture, this article focuses on a comparative analysis of the legal frameworks governing carbon markets in Vietnam and Indonesia. Through an examination of core regulations on emissions trading mechanisms, carbon credits, registry and monitoring systems, and the coordinating role of the State under Indonesia's Presidential Regulation No. 98 of 2021, the article compares these provisions with the corresponding regulations under Vietnam's Law on Environmental Protection 2020 and its subordinate legal instruments. On this basis, the study elucidates similarities in the orientation toward the establishment of a domestic carbon market following a cautious and phased roadmap, while also identifying differences in the degree of institutional maturity, scope of application, and level of regulatory specificity with respect to the agricultural sector. Building upon this comparative analysis, the article proposes policy implications and normative recommendations of reference value for Vietnam in further refining its legal framework on carbon markets, particularly with a view to enabling the transformation of agricultural emission-reduction and carbon-sequestration activities into tangible economic benefits for producers.

Keywords: Low-carbon agriculture, environmental law, carbon market, climate change, Indonesia, Vietnam.

Introduction

Agriculture has long occupied a distinctive position in Viet Nam's development trajectory, not only in ensuring food security and providing livelihoods for a large proportion of the rural population, but also as a fundamental pillar for socio-economic stability and the preservation of national cultural identity. However, in the context of globalization and climate change, the traditional agricultural development model largely reliant on intensive resource exploitation, chemical inputs, and fossil energy, has revealed clear structural limitations. Crop cultivation, livestock production, and unsustainable land-use practices have contributed significantly to greenhouse gas emissions, thereby increasing environmental risks and threatening the long-term sustainability of agricultural ecosystems.

At the global level, green transition has emerged as a dominant development paradigm, widely recognized by many countries as an inevitable pathway toward achieving sustainable development goals. Green transition is not merely an environmental imperative, but also a new engine of economic growth, closely associated with technological innovation, productivity enhancement, and improved economic competitiveness. Within this broader trend, low-carbon agriculture has gained prominence as a critical development model, enabling the reconciliation of emission reduction objectives with food security and rural economic development.

In Viet Nam, the pursuit of low-carbon agriculture is driven not only by internal requirements of sustainable development, but also by international commitments to climate change mitigation, particularly the pledge to achieve net-zero greenhouse gas emissions by 2050. Nevertheless, the realization of this objective requires more than scientific, technological, and managerial solutions alone. Law plays a pivotal role in shaping policy direction, regulating conduct, and safeguarding the coherence and sustainability of the transition process.

In Indonesia, in order to give effect to its international commitments under the Paris Agreement, the Government promulgated Presidential Regulation No. 98 of 2021 on the "Implementation of Carbon Pricing Mechanisms to Achieve Nationally Determined Contribution (NDC) Targets and Control Greenhouse Gas Emissions in National Development." This regulation constitutes a foundational legal instrument, serving as the highest-level normative framework governing carbon pricing, emission control, and the development of a low-carbon economy.

1. Regulations on the Carbon Market in Low-Carbon Agriculture in Viet Nam

In the context in which climate change has emerged as a global challenge, carbon markets are increasingly recognized as an important legal economic instrument for controlling greenhouse gas emissions through the allocation and trading of emission rights. For Viet Nam, the establishment of a domestic carbon market is not only intended to fulfill international climate change commitments, but also entails the need to strengthen the legal framework governing emission, emission reduction, and carbon-sequestration activities across economic sectors, including agriculture. In this process, carbon market law plays a foundational role in establishing legal instruments, designing operational mechanisms, and ensuring the legality of carbon transactions.

The Law on Environmental Protection 2020 [1] is the first legal instrument in Viet Nam to formally recognize the domestic carbon market. Under the Law, the carbon market encompasses the trading of greenhouse gas emission allowances and carbon credits, and permits the implementation of domestic and international carbon credit

trading and offset mechanisms in accordance with international treaties to which Viet Nam is a party. This recognition is of significant legal importance, as it establishes the legal basis for the formation of new legal relationships concerning emission rights, compliance obligations with emission caps, and carbon credit transactions, core elements of carbon markets under international practice.

From a structural legal perspective, the Law on Environmental Protection 2020 [1] approaches the carbon market as an integral component of the greenhouse gas emission management toolkit, closely linked with other instruments such as greenhouse gas inventories, environmental standards, and the responsibilities of emitting entities. This approach demonstrates that Vietnamese law does not regard the carbon market as a purely economic mechanism, but rather as a legal institution subject to close State regulation to safeguard environmental protection objectives and the public interest.

The provisions of the Law on Environmental Protection are further specified in Decree No. 06/2022 [2]/ND-CP, which clarifies the key operational elements of the carbon market. This Decree establishes the legal linkage between greenhouse gas inventory activities, the measurement, reporting and verification (MRV) system, and the formation and management of emission allowances and carbon credits. Accordingly, inventory and verification results serve not only administrative management purposes, but also function as a legal basis for determining the rights and obligations of market participants, including the right to trade allocated emission allowances or valid carbon credits.

With respect to low-carbon agriculture, the existing legal framework opens up legal possibilities for emission-reduction and carbon-sequestration activities in crop cultivation, livestock production, forestry, and land use to be recognized and converted into carbon credits. On this basis, agriculture is no longer viewed solely as a source of emissions requiring control, but also as a sector capable of actively participating in the carbon market as a generator of carbon value. However, this potential is closely contingent upon the ability of agricultural activities to comply with national MRV requirements on measurement, reporting, and verification.

Regarding the implementation roadmap, Vietnamese law adopts a cautious and phased approach. Decree No. 06/2022 [2] /ND-CP clearly identifies a preparatory and pilot phase prior to the official operation of the carbon exchange. This orientation is further reaffirmed in Decision No. 232/QD-TTg of 2025 [3] approving the Scheme for the Development of the Domestic Carbon Market, which focuses on building legal and technical infrastructure, completing the national registry system, and enhancing the management and supervisory capacity of State authorities. From a legal perspective, this roadmap-based approach aims to mitigate legal and economic risks arising from the implementation of a novel mechanism, while allowing for policy adjustments based on practical experience.

From a legal-scientific standpoint, Viet Nam's carbon market legal framework can be regarded as being designed according to a relatively coherent logic. First, the law clearly establishes the core legal instruments of the carbon market, namely emission allowances and carbon credits. Second, the greenhouse gas inventory and MRV system is positioned as a mandatory legal foundation to ensure transparency, reliability, and environmental integrity of carbon units. Third, trading and offset mechanisms are designed to connect legal obligations related to emission control with economic incentives for market participants.

Nevertheless, with respect to low-carbon agriculture, the regulatory effectiveness of the current carbon market legal framework remains subject to certain limitations. Legal provisions largely remain at a framework level, while lacking specific legal and technical guidance tailored to different types of agricultural activities. Issues such as determining measurement methodologies suitable to Viet Nam's ecological and farming conditions, ensuring the quality and environmental integrity of agricultural carbon credits, or designing benefit-sharing mechanisms among actors in agricultural value chains have yet to be comprehensively and clearly regulated.

It can therefore be observed that, although Viet Nam has taken initial steps toward establishing a legal framework for the carbon market, further refinement is required for this market to function as an effective legal instrument for promoting low-carbon agricultural development. Such refinement should aim at greater specificity, enhanced feasibility, and closer alignment with the particular characteristics of agricultural production. This also provides a basis for comparative research with international experiences, in order to generate appropriate insights and recommendations for further legal development in the next stage.

2. Regulations on the Carbon Market in Low-Carbon Agriculture in Indonesia

The carbon market constitutes a central component of Indonesia's low-carbon development policy, reflecting a shift from an administrative command-and-control model toward market-based mechanisms for greenhouse gas emission control. The legal framework governing the carbon market is established in Chapter V (Articles 39–55) of Presidential Regulation No. 98 of 2021 [4], which lays the foundation for the formation and operation of the domestic carbon market, while also enabling linkage with international mechanisms under the Paris Agreement.

Pursuant to Article 39, Indonesia implements carbon pricing through four instruments: emissions trading, emissions offsetting, carbon taxation, and results-based payments (RBP). Among these, emissions trading and emissions offsetting constitute the two core pillars of the carbon market, allowing for the buying, selling, and transfer of emission allowances and carbon credits. This approach demonstrates Indonesia's adoption of a flexible policy framework that combines market instruments with state regulation in order to achieve environmental effectiveness alongside economic stability.

The emissions trading system (ETS) is regulated under Article 40, whereby the Government determines emission allowances for sectors, subsectors, or facilities based on baseline emissions and Nationally Determined Contribution (NDC) targets. Entities whose emissions fall below their allocated allowances are permitted to trade surplus units through the National Registry System for Climate Change Control (SRN PPI). In the agricultural sector, emission reduction projects such as methane (CH_4) reduction in rice cultivation or biogas systems in livestock farming may generate carbon credits, thereby creating additional income streams for farmers and cooperatives.

In parallel, the emissions offset mechanism under Article 41 allows emitting entities to use carbon credits generated by projects outside their operational boundaries to compensate for emissions exceeding their allocated allowances. These credits, once measured, reported, and verified in accordance with the MRV system, are registered as Emission Reduction Certificates (SREK) in the SRN PPI and may be traded on the carbon market.

Articles 42 and 43 govern the issuance and management of carbon units, with each unit corresponding to one ton of CO_2 equivalent (CO_2e) reduced or sequestered. Once issued, carbon units may be traded, held in registry accounts, or retired, thereby standardizing emission-reduction outcomes and facilitating the formal participation of low-carbon agricultural projects in the carbon market.

The organization and operation of the carbon exchange are regulated under Articles 44 and 45, and placed under the supervision of the Financial Services Authority (OJK), with a view to ensuring transparency and security in carbon transactions, including both compliance-based and voluntary trading. In addition, carbon taxation (Articles 47–50) is employed as a complementary instrument to incentivize the adoption of clean technologies and to reinforce the "polluter pays" principle.

Carbon market activities are coordinated centrally by the National Carbon Pricing Coordination Committee (Articles 51–55), which ensures inter-sectoral coordination and harmonization between environmental objectives and economic development goals.

Overall, the legal framework on the carbon market established under Presidential Regulation No. 98 of 2021 [4] provides a relatively comprehensive foundation for greenhouse gas emission management in Indonesia. With respect to agriculture, the carbon market functions not only as an emission control instrument but also as an economic driver promoting the transition toward low-carbon production models, thereby contributing to the realization of Indonesia's carbon neutrality target by 2060.

3. Assessment of Carbon Market Regulations in Low-Carbon Agriculture in Indonesia and Viet Nam

Indonesia and Viet Nam share a number of similarities in that both countries are currently in the process of establishing and gradually refining their carbon markets. In both jurisdictions, carbon markets remain largely experimental in nature, with a phased expansion in terms of scope and participating entities. Legal regulations tend to focus primarily on the establishment of foundational legal infrastructure such as national registry systems, measurement, reporting, and verification (MRV) mechanisms, and the formal recognition of emission-reduction outcomes rather than on the immediate operation of large-scale, highly mandatory carbon markets.

In Viet Nam, carbon market regulations are designed according to a clearly defined roadmap, progressing from pilot implementation to official operation, and combining emissions allowance trading, offset mechanisms, and other economic instruments such as results-based payments and carbon taxation. This approach reflects the State's cautious policy orientation, which is shaped by certain constraints in administrative capacity, the level of readiness among enterprises, and the broader socio-economic context of an economy in transition.

In the short term, Viet Nam's carbon market model may yield tangible benefits. A phased implementation helps mitigate the disruptive effects of abrupt policy changes on businesses, reduces the risk of carbon price volatility, and avoids adverse impacts on the competitiveness of the national economy. At the same time, the pilot phase allows regulatory authorities to accumulate practical experience, refine the MRV system, and enhance supervisory capacity before broader application.

Compared with Indonesia, Viet Nam enjoys certain advantages in designing a carbon market closely integrated with a national registry system and supported by a relatively clear legal framework. Nevertheless, both countries face common challenges, including limited market liquidity, a relatively small number of participants, and a high degree of dependence on State direction and regulation.

From an overall perspective, Viet Nam's carbon market regulations share substantial similarities with those of Indonesia in terms of objectives and basic structure, yet differ markedly in their level of development and operational effectiveness. While a cautious and incremental approach offers advantages in the early stages, in the long run, the absence of stronger mandatory elements, a broader scope of application, and more robust carbon price signals may prevent Viet Nam's carbon market from fully performing its role as a central instrument for emission control. Learning from international experience, while adapting such lessons to domestic conditions, will be critical to ensuring the sustainable development of Viet Nam's carbon market and its effective contribution to national greenhouse gas mitigation goals.

4. Recommendations for Improving Viet Nam's Legal Framework on Carbon Credit Markets in Low-Carbon Agriculture

The formal recognition of the carbon market in the Law on Environmental Protection 2020 [1] has opened an entirely new legal space for greenhouse gas governance in Viet Nam. However, a closer examination of the existing legal structure reveals that Viet Nam's carbon market currently exists primarily in the form of a "framework design," in which key components such as emission allowances, carbon credits, trading platforms, and offset mechanisms are established mainly at the level of legal principles rather than as a fully operational system. This gap is particularly evident in low-carbon agriculture, where much of the mitigation and sequestration potential lies in dispersed farming and land-management activities linked to land, crops, and livestock in rural communities, rather than in large-scale emission sources that are more readily regulated through administrative measures.

A comparison with Indonesia highlights a crucial common insight: carbon markets can become effective drivers of low-carbon transition only when the law recognizes carbon as an "asset with economic value," capable of being standardized, protected, and circulated within a State-guaranteed market. Conversely, if carbon is treated merely as an environmental indicator or reporting metric, even a highly developed MRV system will be insufficient for agriculture to function as a meaningful pillar in achieving national emission-reduction targets. On this basis, recommendations for improving Viet Nam's legal framework on carbon markets in low-carbon agriculture may be structured around four core pillars: (i) establishing

the legal status of agricultural carbon units as a form of asset; (ii) developing robust market infrastructure for trading such units; (iii) creating market demand through emission obligations and offset requirements; and (iv) integrating Viet Nam's carbon market into the global carbon market.

One of the most significant gaps in Viet Nam's current legal framework is the absence of a clear legal status for "carbon units" generated from agricultural activities. Decree No. 06/2022 [2]/ND-CP refers to carbon credits primarily as policy instruments, rather than as assets that may be registered, owned, transferred, or pledged. By contrast, Indonesia has advanced considerably further: Presidential Regulation No. 98 of 2021 [4] provides specific definitions of carbon units, distinguishes between emission-reduction units and carbon-removal units, and links them to the national registry system (SRN PPI). This legal linkage transforms each ton of CO_2 equivalent (CO_2e) reduced or sequestered into a "digital asset" that can be recorded, traded, and retired.

In the agricultural sector, this requirement is particularly critical because low-carbon agricultural activities such as water management in rice cultivation, soil conservation practices that enhance carbon sequestration, or livestock waste treatment are typically implemented on a small, fragmented scale by households, cooperatives, and ecological zones, and are closely tied to local land-use and production conditions. If the law does not allow agricultural emission-reduction and sequestration outcomes to be aggregated, standardized, and converted into legally recognized carbon units with clearly defined ownership rights, farmers and cooperatives will lack any effective mechanism to translate their low-carbon production efforts into tangible economic benefits. Accordingly, Viet Nam should adopt legal provisions requiring that all verified emission-reduction and carbon-sequestration outcomes in agriculture be converted into "agricultural carbon units" upon MRV verification, registered in a national system, and granted legal status as a form of digital asset. This approach can draw directly from Indonesia's SRN PPI model, in which each carbon unit is assigned a unique identifier, an owner, and a transaction history.

Furthermore, Viet Nam should design its carbon exchange as a hybrid financial environmental infrastructure subject to joint supervision by environmental authorities and financial regulators. A suitable model would involve coordination between the State Securities Commission or the State Bank of Viet Nam and the Ministry of Natural Resources and Environment, similar to Indonesia's assignment of supervisory authority to the Financial Services Authority (OJK). For the agricultural sector, this is of decisive importance: only when agricultural carbon credits are traded on a transparent market with guaranteed settlement and dispute-resolution mechanisms will cooperatives, enterprises, and even credit institutions be willing to treat such credits as genuine assets.

Indonesia's experience demonstrates that carbon markets can effectively promote low-carbon agriculture only when the law transforms carbon from an environmental metric into a tradable, protected, and internationally integrated commodity. Viet Nam has taken important initial steps in establishing a legal framework, but for the carbon market to become a genuine driver of agricultural transition, a deeper phase of legal refinement is required—one that prioritizes the standardization of agricultural carbon units, the construction of market infrastructure, the creation of enforceable demand, and international integration. Only under these conditions can Vietnamese agriculture convert its climate mitigation potential into sustainable economic value and contribute meaningfully to the national net-zero emissions objective.

Conclusion

In conclusion, both Vietnam and Indonesia are making significant strides toward establishing carbon markets as part of their low-carbon agriculture strategies, though their legal frameworks differ in terms of maturity and operational effectiveness. Vietnam has taken important initial steps by recognizing the carbon market in the Law on Environmental Protection 2020, but its framework remains in the early stages, requiring further refinement to effectively drive emission reductions and carbon sequestration in agriculture. Indonesia, on the other hand, has established a more developed model, where carbon credits are legally recognized as tradable assets, and the carbon market is integrated with financial systems.

For Vietnam to unlock the full potential of its carbon market, it must prioritize the establishment of clear legal status for agricultural carbon units, develop transparent market infrastructure, and create enforceable market demand. By drawing on lessons from Indonesia and other international experiences, Vietnam can refine its legal framework to enable a sustainable transition in its agricultural sector, turning climate mitigation efforts into tangible economic benefits for producers. This will be essential for achieving the country's long-term goal of net-zero emissions while ensuring economic growth and environmental sustainability.

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