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Towards Integrated Green Credit and Carbon Market Regime in India: Legal and Policy Reforms for Nationally Determined Contributions Implementation

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Abstract

India's new Nationally Determined Contributions (NDCs) under the Paris Agreement (2015) set out ambitious targets for the country by 2030. For operationalisation of these commitments, two landmark market-based instruments have been launched in India, the Green Credit Programme (GCP) under the Green Credit Rules, 2023, under the Environment (Protection) Act, 1986, and the Carbon Credit Trading Scheme (CCTS), notified by India's Ministry of Power under the Energy Conservation (Amendment) Act, 2022, establishes the domestic Indian Carbon Market (ICM). While these are important legislative progresses, these mechanisms are autonomous, with different laws, different ministries and different institutional set-ups. Coordinated interaction is ongoing through mechanisms like the National Steering Committee for the Indian Carbon Market, but these mechanisms are not fully integrated into statutory frameworks or providing a unified registry for seamless interaction between them or with the overall NDC implementation commitments. This paper critically discusses this regulatory fragmentation, provides a comparative study of integrated climate market systems in the European Union, China and Singapore, and suggests a modified legal and policy approach for an integrated climate market system in India. It claims that the lack of a comprehensive legal framework and stringent Measurement, Reporting and Verification (MRV) parameters is a fundamental loophole that will severely affect India's ability to achieve its Paris Agreement targets by 2030. The paper suggests interlinked reforms, which form the bedrock of a credible, coherent, and NDC-aligned climate market regime for India: enactment of an Indian Climate Act, establishment of a Unified Climate Market Regulatory Authority, statutory interoperability and unified MRV standards between green credits and carbon credits, a domestic Article 6 implementation framework, and a phased integration roadmap.

Keywords: Green Credit Programme, Carbon Credit Trading Scheme, Nationally Determined Contributions, Paris Agreement, Article 6, Carbon Markets

1. INTRODUCTION

Climate change is no longer a distant threat for India; it is a reality today, and its impact is characterised by unpredictable monsoonal patterns, sea-level rise, and devastating floods (Meena, 2025). India is an

emerging economy and needs to strike a balance between growth and environmental protection, while simultaneously fulfilling its international climate commitments.

India has taken this balance forward in the Paris Agreement 2015, which was incorporated into its Nationally Determined Contributions. India's ambition rose further in its NDC update in 2022 when it set its ambition to 45% below 2005 levels by 2030 in terms of emission intensity of GDP (Ordonez et al., 2023). The revised NDC also has targets of achieving 50% of its electricity capacity from non-fossil fuels and sequestering between 2.5–3 billion tonnes of carbon dioxide equivalent through the growth of more forests and trees before 2030 (Kumar, 2023). To meet these targets, India needs strong domestic laws and systems to facilitate climate action.

India has recently put in place two main market-based mechanisms to convert these commitments to tangible results. The Green Credit Programme (GCP) under the Green Credit Rules, 2023, under the Environment (Protection) Act, 1986 by the Ministry of Environment, Forest and Climate Change (MoEFCC), aims to encourage voluntary environmental measures like water management, afforestation, and sustainable farming through the allocation of tradeable green credits to individuals, industries, and local authorities (Ministry of Environment, Forest and Climate Change, 2023). Simultaneously, The Energy Conservation (Amendment) Act, 2022, established the Carbon Credit Trading Scheme to provide a structured carbon market in India that allows entities with emissions reduction obligations to buy and sell carbon credits (Chawda & Sharma, 2024; Mukherjee, 2025; Vathsan, 2025). These mechanisms represent a paradigm shift in tapping into market mechanisms to cut down the emissions levels of greenhouse gases (Rakesh et al., 2022).

There is, however, a huge regulatory void. Although they are complementary, GCP and CCTS are in institutional silos. The GCP is operated by the Ministry of Environment, Forest and Climate Change (MoEFCC) as per the Act of 1986 (Kumar, 2024), while the CCTS was established under the Energy Conservation (Amendment) Act, 2022 and operated by India's Ministry of Power under the Energy Conservation (Amendment) Act, 2022 (Vathsan, 2025). This disconnection leads to different standards of verification for the two programmes and a lack of a statutory connection between them or a statutory relationship with the NDC fulfilment in India.

Such a division has serious implications, such as double counting environmental benefits, conflicting regulations, and international disreputability. This paper leads to addressing this problem in three main aspects. It first maps out and reviews the challenges to effective NDC implementation from a legal and institutional perspective, as well as the gaps between the GCP and the CCTS. In the second, it examines the lessons from successful models in the EU, China and Singapore that have effectively combined market-based instruments and national climate targets. Third, it suggests specific legal and policy changes to establish a single framework for incorporating the green credit and carbon market mechanisms into India's NDC commitments.

The main research question is: What are the necessary legal and policy changes to develop an integrated Green Credit and Carbon Market regime to help India's NDC implementation? Inclusive questions are: What are the current gaps in the statutory framework between GCP and CCTS? What have international legal instruments done to overcome similar divisions? And is the existing Indian structure capable of accommodating the obligations under the Paris Agreement, especially the international carbon trading rules under Article 6?

The paper notes that India's approach of not having dedicated legislation and institutions to streamline the fragmented approach will make it difficult to achieve its 2030 targets.

2. CONCEPTUAL FRAMEWORK

2.1 Green Credits and Carbon Credits: Definitions and Distinctions

To overcome the aforementioned regulatory fragmentation, the technical and legal scope of carbon credit and green credit needs to be determined. A carbon credit is a tradable instrument that represents a measurable and verifiable reduction, avoidance, or removal of GHG emissions. One carbon credit is equivalent to one metric tonne of reduced or offset CO_2 or its equivalent in other GHGs (CO_2e) (Rakesh et al., 2022). In essence, carbon credits look to give a monetary value to the reduction of emissions, promoting climate action most economically across the various sectors (Rakesh et al., 2022).

In contrast, the Green Credit Programme establishes a broader, multi-sector incentive system. Green credits, unlike carbon, are not only for emissions but for a wide variety of 'pro-planet' environmental measures across eight identified sectors – tree plantation, water conservation, sustainable agriculture, waste management, reduction in air pollution, mangrove conservation, eco-mark labelling and sustainable infrastructure (Kumar, 2024).

The GCP, however, has a lot of questions about its scientific integrity, especially related to land-based offsets. There is empirical evidence of significant shortcomings in the implementation of forest carbon projects, with studies indicating that forest carbon projects in Haryana and Himachal Pradesh achieved carbon sequestration rates of 37% and 3% of the projected carbon, respectively (Aggarwal, 2021). In addition, a systematic study found that about half of all registered voluntary afforestation projects in India have ceased operation, highlighting the question of the sustainability and reliability of these credits (Agarwal et al., 2025). The 28% disadoption rate of agricultural carbon projects, alongside these findings, further emphasises that such land-based projects are often not considered to be "permanent" as necessary for high-integrity credits (Cariappa & Krishna, 2024). Green credits, therefore, are not the same as carbon credits; not only are their measurement standards different, but their "intrinsic environmental reliability" is too. Carbon storage that is only temporary and biogenic can be treated the same as the permanent reduction of fossil fuel emissions, which creates a high risk of 'greenwashing' (Günther et al., 2024; Sasaki, 2025). If these reliability shortcomings are not addressed through a strong statutory bridge, they will persist and continue to put environmental integrity at risk for both systems.

2.2 Carbon Markets: Compliance, Voluntary, and International Mechanisms

There are two main market structures for carbon markets. **Compliance carbon markets** are regulatory measures in which "obligated entities" are required by law to comply with certain emission reduction obligations. The Carbon Credit Trading Scheme serves as the foundation for India's regulated domestic carbon market (Mukherjee, 2025; Vathsan, 2025). In this context, the entities that perform above their allowed emission limits are required to buy credits, and the entities that exceed their actual emissions are required to sell the unused amount so as to achieve the market equilibrium (Malik et al., 2024).

Voluntary carbon markets are not required ones, and companies and persons can buy offsets to offset their carbon footprints as part of their corporate social responsibility or sustainability projects (Nandhini & Venkataraman, 2025). Previously fragmented, India now appears to be moving towards a more regulated system for greater transparency and credibility (Mukherjee, 2025).

In addition to domestic markets, Article 6 of the Paris Agreement recognises the need for international cooperation for carbon trading in three ways: Article 6.2 creates the basis for trading in GHG emission reductions across countries. Article 6.4 establishes a centralised, UN-supervised carbon market known as the Paris Agreement Crediting Mechanism (PACM). Article 6.8 recognises non-market approaches to promote mitigation and adaptation. It introduces cooperation through finance, technology transfer, and

capacity building, where no trading of emission reductions is involved (World Bank, 2022). The key to these mechanisms is emissions reductions that have been "transferred" between countries, called Internationally Transferred Mitigation Outcomes (ITMOs), and the corresponding adjustments that stop the same reduction from counting twice in the transfer country and the receiving country. India needs to have a domestic legal framework that enables ITMO transfers, requires an adjustment to underpin them and has a single tracking registry for India to be a credible contributor to Article 6 mechanisms and to attract international climate finance. None of these elements is present in the Indian law as of now, as shown in Section 3 (Kumar, 2023).

2.3 NDCs as Legal Instruments: Requirements for India

Nationally Determined Contributions are at the very heart of the implementation of the Paris Agreement. The agreement is legally binding; parties should communicate and make successive NDCs, but the targets in an NDC are to be achieved via domestic policy and legislation. India made a significant leap in ambition for 2030 targets in its updated NDC 2022 with three major goals:

1. Reducing the emissions intensity of its GDP by 45% below 2005 levels (Ordonez et al., 2023).
2. Achieving 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources(Ordonez et al., 2023).
3. Increase forest and tree cover by creating an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent (Grassi et al., 2017).

The Paris Agreement requires countries to put in place domestic measures to meet these targets and to make the countries' progress visible and transparent (Winkler et al., 2017). This means that the GCP and CCTS are not policies that the government can choose to implement, but are domestic legal measures to achieve India's NDCs under its international commitments. The key question is whether these instruments are sufficiently connected to avoid accounting errors and to make sure there is real progress towards the 2030 targets.

2.4 Regulatory Coherence: The Analytical Lens

This paper assesses the effectiveness of India's climate architecture in terms of regulatory coherence. The principle is that the law and institutional structures in a given area should reinforce each other and be connected to the general goals of the nation. Regulatory coherence requires that different instruments—in this case, the GCP under the Ministry of Environment, Forest and Climate Change and the CCTS under the Ministry of Power—avoid contradictory standards or administrative silos (Vathsan, 2025; Kumar, 2024).

For India's climate governance, regulatory coherence requires a common measurement, reporting and verification framework that facilitates accurate reporting of the GCP and CCTS to NDC accounting. Presently, these programmes are not linked to the legal level, causing institutional tension. As a consequence, coherence is necessary for sustaining international credibility and for the effective implementation of market-based measures to support India's transition to a low-carbon economy.

3. INDIA'S EXISTING LEGAL FRAMEWORK: GCP AND CCTS

3.1 India's NDC Architecture

It is important to place the specific features of the Green Credit Programme and the Carbon Credit Trading Scheme within the broader institutional framework of India's climate commitments before considering the mechanisms themselves. India updated its NDCs under the Paris Agreement in 2015, making a significant increase in mitigation and adaptation commitments in 2022. In particular, India committed to

achieving a 45% emission intensity reduction in its GDP by 2030 compared to 2005 levels (Kumar, 2023; Ordonez et al., 2023; Zhang et al., 2023). Moreover, the revised NDC includes 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources and an additional carbon sink of 2.5–3 billion tonnes of CO_2 equivalent through increased forest/tree cover by 2030 (Ordonez et al., 2023; Kumar, 2023).

However, there is no single legislative basis for implementing the NDC in India. No comprehensive climate legislation exists that sets rules for these targets. On the contrary, the legal framework is fragmented by sectors, with distinct ministries having different laws for climate action (Rakesh et al., 2022). The lack of a specific statute that provides for NDC coordination is a basic weakness, which results in institutional fragmentation that directly affects the effectiveness and integration of the GCP and CCTS.

3.2 The Green Credit Programme — Promise and Problems

The Green Credit Programme was officially announced under the Environment Act, 1986 in October 2023. The programme is initiated by the Ministry of Environment, Forest and Climate Change and implemented by the Indian Council of Forestry Research and Education (ICFRE) as the Green Credit Administrator. The GCP framework has a Green Credit Registry and a trading platform for green credit trading (Ministry of Environment, Forest and Climate Change, 2023).

The GCP encompasses eight specific sectors eligible for generating tradable green credits:

1. Tree plantation (afforestation) on degraded lands;
2. Water conservation, harvesting, and use efficiency;
3. Natural and regenerative agricultural practices;
4. Waste management;
5. Air pollution reduction;
6. Mangrove conservation and restoration;
7. Eco-mark-based green credit adoption;
8. Sustainable buildings and infrastructure.

The GCP strives to make environmental action accessible to everyone by promoting positive externalities, but it faces structural and legal challenges. First, there is no cross-sectoral standardisation of the Measurement, Reporting and Verification methodology. The scientific soundness of benchmarks for measuring parity across different activities (e.g., comparing water saving with air pollution reduction) is not yet robust, and there are concerns about the environmental integrity of the credits. Secondly, as a voluntary tool, it can only superficially influence the behaviour of major industrial polluters compared with markets that require compliance. Thirdly, the GCP is not legally connected to India's NDC reporting process.

3.3 The Carbon Credit Trading Scheme — Architecture and Gaps

The Carbon Credit Trading Scheme (CCTS) was set up based on the Energy Conservation (Amendment) Act, 2022, which provides statutory recognition to the Indian Carbon Market. The CCTS is controlled by the Ministry of Power, where the Bureau of Energy Efficiency is the main administrator (Ministry of Power, 2023).

The scheme builds on the foundations of existing programs, such as the Perform, Achieve and Trade (PAT) scheme, which sets emission intensity caps on the "designated consumers," such as those in the steel, cement and power sectors (Kumar, 2023; Vathsan, 2025). But there are three gaps that the CCTS is working to address. First, its sectoral coverage is limited, with only obligated industrial units covered, and other high-emission sectors, such as transport and residential buildings, not included in the system (Kumar,

2023). Second, there are no statutory mechanisms in the framework for alignment with the Paris Agreement under Article 6. No existing legal framework allows for the authorisation of India's carbon credit as Internationally Transferred Mitigation Outcomes, and there are no guidelines for "corresponding adjustments" to avoid double counting in the Indian GHG inventory (Kumar, 2023; López-Vallejo, 2021). Third, there is institutional disintegration with the CCTS being separate from the MoEFCC, that has the mandate for the wider climate policy and international reporting, making it difficult to tie carbon trading to national climate targets (Kumar, 2024).

3.4 The GCP-CCTS Interface — Where the System Breaks Down

A close look at the GCP and CCTS together shows a trend toward regulatory fragmentation, not just limited to the deficiencies found in each scheme. At their interface, three structural failures are created.

The first is the ministry division. The GCP is part of the Ministry of Environment, Forest and Climate Change under environmental protection law, and the CCTS is part of the Ministry of Power under energy conservation law (K. V. N. P. Kumar, 2023; S. Kumar, 2024; Vathsan, 2025). Recent administrative developments, including the operationalisation of the National Steering Committee for the Indian Carbon Market and a dedicated Article 6 committee, try to coordinate market readiness, but these committees do not have statutory powers to address the issues of "institutional layering" (Pillai & Dubash, 2021). Historically, in India, the concept of climate governance has developed through a "politics of opportunism", which involves the creation of new climate rules that are simply superimposed on existing sectoral institutions without a new climate governance hierarchy being established (Dubash et al., 2023; Pillai & Dubash, 2021). These committees are, therefore, not a single, constitutionally entrenched body that can counter the "institutional inertia" of sectoral ministries but are rather an extra layer on top of the existing ministries (Dubash et al., 2023).

The second is that the standards for tracking are not consistent. The measurement of results in the two schemes is different, one for the "pro-planet" positive externalities, and the other for metric tonnes of CO_2 equivalent (Kumar, 2024; Rakesh et al., 2022). At present, however, there is a lack of methodology to ensure parity across different environmental sectors, and it is uncertain whether there is environmental effectiveness behind the credits (Kumar, 2024).

The third and most important failure is related to the technical integrity of land-based offset projects, characterised by three major weaknesses: lack of additionality, overestimation of emission reduction and double counting (López-Vallejo, 2021). Research across the globe indicates that popular offset programs often overvalue their climate impact by 5-10 times (Romm et al., 2025). In the Indian context, many projects fail to demonstrate additionality beyond business-as-usual scenarios, while high disadoption rates (up to 28%) threaten the "permanence" of sequestration (Cariappa & Krishna, 2024). Without a rigorous, unified approach to verifying these core technical requirements, the interface risks codifying systemic failures that damage India's international credibility and the scientific validity of its 2.5–3 billion tonne CO_2e carbon sink target (Ravindranath & Murthy, 2021).

4. COMPARATIVE LEGAL ANALYSIS

India's problems with integrating Green Credit and the Carbon Market are not alone. Harmonising market-based environmental instruments with national climate goals has been a challenge in many jurisdictions. Their experiences provide lessons for India. Three jurisdictions are explored in this section – the European Union, China and Singapore – because each has a different way of tackling the integration challenge. In combination, these provide a comprehensive view of effective legal integration in practice. Its goal is not

to import models from abroad and implement them 'as is' in India but to find design principles and legislation that are suitable for India's legal, institutional and developmental context.

4.1 The European Union

The European Union (EU) offers a model of a binding legal regime that provides clarity in a complex network of climate regulations. The basis of the EU's approach is the European Climate Law of 2021, which set a legally binding 2050 net-zero GHG emission target (Eriksson et al., 2023). This law also includes an intermediate target of a cut of at least 55% in net greenhouse gas emissions by 2030, which corresponds to the 1990 level (Eriksson et al., 2023). Importantly, the European Climate Law is a top-down legal framework that gives legal guidance and purpose to all the European climate laws in existence, such as the EU Emissions Trading System and carbon removal laws (Eriksson et al., 2023).

The EU Emissions Trading System (EU ETS), which was introduced back in 2005, is one of the most important elements in the EU's strategy for reaching climate neutrality goals (Wettestad, 2011). It accounts for around 40% of the EU's GHG emissions, mainly focusing on the energy, industry and aviation sectors (Dechezleprêtre et al., 2022). The importance of the EU ETS for India is that it is legally embedded and that it has a specific directive that is closely linked to the EU's overall climate goals (Skjærseth & Wettestad, 2009). Moreover, the EU has added nature-based solutions to its architecture with the Nature Restoration Law 2024 and work on carbon removal certification (Baran, 2024; Günther et al., 2024). These efforts are indicative of this novel awareness, which is germane to India's Green Credit Programme, that there must be a legal framework for ecological activities other than direct emission reduction to make a creditable contribution to climate targets. The big lesson from the EU is that the most effective way to achieve regulatory coherence is by having an overarching climate law, which has a higher standing in the hierarchy of laws, above all the sector-specific instruments. A critical limitation for India, however, is that the EU's model emerged within a supranational legal order with strong enforcement mechanisms and institutional homogeneity that differs significantly from India's federal constitutional structure and its developmental context as a country with substantial energy access deficits.

4.2 China

The management of the carbon market in China is relatively centralised to link its carbon market to the country's climate policy. In July 2021, China implemented its National Emissions Trading System, making it the world's largest market for emissions in terms of the volume of emissions traded (Chen & Chen, 2023). The legal underpinnings of the system were strengthened in 2024 with the introduction of the Interim Regulations on Carbon Emission Trading, which gave the system a clearer-cut legal foundation and strengthened enforcement (Mukherjee, 2025), initially focused on the power sector.

One key feature of the Chinese model is that the national ETS is managed by the Ministry of Ecology and Environment, which also has the authority to set rules for transactions, to monitor the local-level authorities of the ETS, and to coordinate with other ministries (Tang & Bao, 2023). Moreover, China has a voluntary scheme, the China Certified Emission Reduction scheme (Zhu et al., 2024), which was officially relaunched in January 2024. The CCER can also be used to create tradable credits for projects that are not subject to the ETS, such as forestry, renewable energy, and the use of methane (Belyaeva & Rovnov, 2022; Zhu et al., 2024). The legal framework of the relationship between CCER and the ETS is also clearly defined: participating companies can use the CCER credits to cover 5% of their compliance obligations (Li et al., 2022). This interoperability is exactly what India's existing GCP-CCTS is missing.

4.3 Singapore

Singapore provides lessons on carbon pricing and readiness for Article 6 of the Paris Agreement. In 2018,

Singapore enacted the Carbon Pricing Act, which sets a statutory carbon price for large facilities emitting over 25,000 MT of CO_2e per year (Liu et al., 2023). The Act was substantially amended in 2022 to progressively raise the carbon tax rate to S$25/t$CO_2$ in 2024 and 2025 and to S$80/t$CO_2$ by 2030 (Liu et al., 2023). These changes also gave rise to the possibility of International Carbon Credit (ICC) trading, which enables a facility paying its taxes to offset up to 5% of its taxable emissions (Liu et al., 2023).

Singapore has been working on bilateral agreements to implement Article 6.2, such as an agreement with Indonesia for carbon credit projects (Davenport & Jiang, 2024). In March 2022, for example, Singapore and Indonesia signed an MOU to cooperate on carbon pricing and nature-based solutions (Davenport & Jiang, 2024). Singapore's experience shows that targeted legislative changes are a way to develop a strong domestic framework for international carbon trading to help address gaps in implementing Article 6 in India.

5. LEGAL AND POLICY REFORMS: TOWARDS AN INTEGRATED FRAMEWORK

5.1 The Case for Legislative Reform

The systemic legislative reform that is proposed here has to take into account Indian governance logic, which is 'institutional layering' and 'politics of opportunism'. As Dubash et al. have noted, India's climate governance has traditionally been characterised by the creation of new climate rules on top of other sectoral governance systems like the forestry and energy sectors, instead of a single hierarchical climate governance system (Dubash et al., 2023). While politically pragmatic, this approach has created institutional inertia, where climate policies remain subordinate to the primary mandates of sectoral ministries (Pillai & Dubash, 2021).

This dynamic is not merely bureaucratic overlap but reflects a deeper political economy, as seen in the current partitioning between the GCP under the Environment Act, 1986 and the CCTS through the Energy Conservation (Amendment) Act, 2022 (Kumar 2024; Mukherjee 2025). The proposed reform therefore needs to adopt a governance structure that adopts sectoral co-benefits (as in air quality improvement, energy security and yield stability) as the primary basis for integrating these schemes into a common national NDC implementation framework, otherwise risking backlash from the incumbents in the sector (Mayrhofer & Gupta, 2015; Pillai & Dubash, 2021).

5.2 Enactment of an Indian Climate Act

The main condition for reform is the adoption of a specific Indian Climate Act. This Act needs to play a 'strategic framework' role and not a 'top-down ' role that undermines the existing sectoral authorities to overcome the historical resistance (Dubash et al., 2023). The Act can enable the current and disconnected policy landscape to become a coherent NDC implementation strategy by implementing a "multi-impulse" governance process, in which various impulses on a sectoral level are coordinated at a national level through a strong response. (Saerbeck et al., 2017).

This Act will codify the "co-benefits" logic that is already being used by sectoral ministries to justify climate action (Mayrhofer & Gupta, 2015; Pillai & Dubash, 2021). By explicitly codifying that compliance with the GCP and CCTS contributes to sector-specific developmental targets (e.g., meeting non-fossil fuel capacity goals or agricultural productivity mandates), the Act creates a "win-win" environment that minimizes ministerial resistance (Kumar, 2023; Ordonez et al., 2023).

5.3 A Unified Regulatory Authority

The current institutional landscape in India, marked by the creation of the National Steering Committee for the Indian Carbon Market and a dedicated Article 6 committee, represents an evolution from the purely

siloed governance of the past. A few such new institutions assist in the proper coordination between MoP, BEE and MoEFCC (Hanif, 2025), but are still in the nascent stage. The proposed Indian Climate Act needs to institutionalise these committees as a permanent and statutory Unified Climate Market Regulatory Authority in order to address the "institutional inertia" besetting India's climate response efforts. The Unified Authority will be the one that will be the functional integration of these committees by incorporating their functions in the Unified Statutory Framework. This transition solves the problem of 'institutional layering' whereby temporary climate councils are either eliminated or ignored when bureaucratic priorities change (Dubash et al., 2023).

A single regulator will help in removing the market fragmentation that hinders investment, and provide one platform to carbon and green credit (Mukherjee, 2025). One of the key requirements of the Unified Authority will be to align the domestic M&RV with international reporting frameworks. The MRV requirements of the Authority will explicitly be developed to provide the information required to the Paris Agreement's Enhanced Transparency Framework and the Biennial Transparency Reports (BTRs). The Authority's design is based on the idea that it would be possible to incorporate these global requirements into the domestic registry workflow, thereby enabling all GCP and CCTS credits to be "transparency-ready" and making it easier to connect the national policy with international accounting requirements (Elidrisy, 2024).

5.4 Statutory Interoperability and Unified MRV Standards

The third reform resolves the legal relationship between green credits and carbon credits by mandating a Unified Measurement, Reporting, and Verification Standard. To align with the Paris Agreement's Enhanced Transparency Framework and the mandatory reporting of Biennial Transparency Reports, this standard must supersede legacy MRV systems (Dale et al., 2020; Mulatu et al., 2023; Winkler et al., 2017). This transition is essential for India to fulfill its international reporting obligations under Article 13 of the Paris Agreement, which mandates a consistent and stringent approach across all parties (Dale et al., 2020; Zhang, 2024).

The proposed Unified MRV Standard will address the scientific integrity of GCP-generated credits through three core mandates:

- **Standardized Benchmarks for Permanence:** The framework must adopt verifiable metrics for forestry and soil-based sequestration, such as 100-year storage mandates or insurance-based buffer pools to mitigate against carbon reversal (Grimault et al., 2018),(G.J. et al., 2023).
- **Technically Robust Additionality Testing:** The Unified Regulator must limit eligibility to project types with high additionality likelihood and utilize causal inference methods that rigorously distinguish between project-driven mitigation and business-as-usual scenarios (Probst et al., 2024; Wheeler et al., 2025). This ensures that "regulatory additionality" is resolved by preventing the crediting of activities already mandated by sectoral laws (Probst et al., 2024).
- **Advanced Quantification Methodologies:** Verification must move beyond administrative classification and leverage multi-sensor remote sensing and machine learning to provide accurate, high-resolution maps of carbon stock changes (Sasaki, 2025; Wheeler et al., 2025).

By explicitly incorporating BTR reporting conventions, the Unified MRV Standard ensures that domestic project data contributes accurately to India's NDC tracking under the Paris Agreement (Mulatu et al., 2023). For activities generating both ecological and carbon benefits, the law may allow entities to earn both green credits and carbon credits, necessitating strict safeguards against double counting (Kumar, 2024). This framework seeks to provide the "strategic intent" needed to transform nascent administrative

committees into a permanent, transparent, and globally interoperable climate governance structure, addressing the historical lack of such institutional direction (Pillai & Dubash, 2021).

5.5 A Domestic Article 6 Implementation Framework

India must establish a domestic legal framework to operationalise Article 6 of the Paris Agreement, ensuring readiness for Internationally Transferred Mitigation Outcomes (ITMOs) (Kumar, 2023; Lebling et al., 2023). As demonstrated by Singapore's Carbon Pricing Act, participation in international markets requires specific domestic authorisations and registry tracking (Liu et al., 2023).

First, India requires a statutory authorisation mechanism for the transfer of ITMOs to other countries under Article 6.2 bilateral agreements (Lebling et al., 2023). Second, a corresponding adjustment mechanism must be embedded in law to ensure that when ITMOs are transferred, they are excluded from India's national inventory, preventing double counting between the host and acquiring nations (Lebling et al., 2023; Zetterberg et al., 2021). Third, the current registries for the GCP and CCTS must be consolidated into a National Carbon Registry capable of tracking the issuance, transfer, and retirement of both domestic credits and ITMOs in a unified platform (K. V. N. P. Kumar, 2023; S. Kumar, 2024).

6. CONCLUSION

India has taken some positive steps towards the introduction of market-based instruments for climate action. Genuine legislative progress is marked by the GCP and CCTS, which create a strong signal of India's willingness to leverage market mechanisms to achieve environmental and climate results and establish a more complex climate governance framework. But preparing for a building is not the same as building. Now what India has is two unfinished pillars, set apart from the structure they need to hold up, as well as one another. The legal framework that links them together, and which ties them to India's NDC goal to cut emissions, is indispensable to their functioning.

This was confirmed by the comparative analysis. The EU, China, and Singapore have shown, albeit in different ways, that sound integration of market-based climate instruments is possible only with conscious design of the legal framework, including overarching climate legislation, coherence in the institutional framework, and a clear division of the responsibilities between the various types of carbon credits, as well as the domestic legal framework for international carbon trading(Chen, 2015; Ranson & Stavins, 2015). These are not the privileges of rich and legalistic societies. These are fundamental elements of credible and accountable climate governance and India must have them as much as anybody else.

The three secondary research questions that inspired this paper are now directly addressed.

The first question was about the legal and institutional deficiencies between India's GCP and CCTS that hinder coherent NDC implementation. Three main gaps were identified, including the lack of a statutory coordination mechanism between the two ministries (MoEFCC and the Ministry of Power), MRV inconsistency between the two schemes that hinders coherent NDC accounting, and a double-counting risk due to the lack of a legal framework defining the relationship between green credits and carbon credits. All three have in common the lack of a more fundamental climate law that would position both mechanisms in a shared framework for NDC implementation.

The second question related to the extent to which comparisons have been made on how similar jurisdictions have incorporated environmental credit systems and carbon markets into their climate laws. The EU responded to this with a broad European Climate Law, which provides statutory guidance for all EU climate instruments such as its ETS and nature-based credit schemes. China responded to it in two ways: by institutionalising the centralisation of both the carbon market administration and the governance

of climate change, making them both fall under one ministry; and by clearly defining the legal link between the voluntary CCER and the mandatory ETS. Singapore responded with a targeted and well-designed Carbon Pricing Act to embed an Article 6-compatible international carbon credit framework directly into domestic law. Both approaches provide India with unique and practical lessons to be learned.

The third question was whether the present GCP-CCTS framework in India is suitable for the Indian commitments under the Paris Agreement in general, under Article 6 and under the Enhanced Transparency Framework (ETF). The answer is no — at least not yet. The current framework in India lacks any statutory provisions for approving ITMO transfers, for any changes in its national GHG inventory, and does not provide for the tracking of international carbon credit flows in a single registry. These are essential features for India to credibly engage in Article 6 mechanisms and ensure that its transparency under the Paris Agreement's Enhanced Transparency Framework.

This evidence, combined, verifies the core premise of the paper: that the lack of an encompassing legal framework that coherently connects India's GCP and CCTS with its NDCs represents a fundamental regulatory gap that would substantially affect India's capacity to keep its Paris Agreement commitments by 2030 without action on the legislative front and institutional integration.

References

1. Aamodt, S., & Stensdal, I. (2017). Seizing policy windows: Policy Influence of climate advocacy coalitions in Brazil, China, and India, 2000–2015. Global Environmental Change, 46, 114–125. https://doi.org/10.1016/j.gloenvcha.2017.08.006
2. Agarwal, S., Clark, B., Vaddi, U., Goveas, N., Nagendra, H., & DeFries, R. (2025). Achieving high-integrity tree-planting projects in the voluntary carbon market. Environmental Research Letters, 20(4), 44052–44052. https://doi.org/10.1088/1748-9326/adc3ac
3. Aggarwal, A. (2021). 'Carbon' in forest carbon projects: Evidence from India. Climate and Development, 14(7), 625–634. https://doi.org/10.1080/17565529.2021.1956873
4. Baran, M. (2024). Towards EU Nature Restoration Law: A Boost for Biodiversity and Climate? (pp. 113–140). https://doi.org/10.4000/12keq
5. Belyaeva, M. A., & Rovnov, Yu. Y. (2022). GREENHOSE GAS EMISSION CAP-AND-TRADE PROGRAMMES: THE CHINESE INCARNATION. Outlines of Global Transformations Politics Economics Law, 6. https://doi.org/10.31249/kgt/2022.06.08
6. Cai, L., Sampene, A. K., Agyeman, F. O., Ayisi, L. A., & Brenya, R. (2021). Empirical Analysis of BRICS Countries Pathway Toward Low-Carbon Environment. In Research Square. https://doi.org/10.21203/rs.3.rs-850439/v1
7. Cariappa, A. G. A., & Krishna, V. V. (2024). Carbon farming in India: are the existing projects inclusive, additional, and permanent? Climate Policy, 25(5), 756–771. https://doi.org/10.1080/14693062.2024.2416497
8. Chawda, S., & Sharma, S. (2024). An Overview of Strengthening India's Carbon Credit System through EV Aggregators. 1–6. https://doi.org/10.1109/piicon63519.2024.10995155
9. Chen, H. (2015). Towards a market-based climate regime in China?: A legal perspective on the design and implementation of greenhouse gas emissions trading. Data Archiving and Networked Services (DANS). https://doi.org/10.26481/dis.20151021hc

10. Chen, X., & Chen, X. (2023). The Development of China's Carbon Emissions Regulation System. International Organisations Research Journal, 18(2), 68–81. https://doi.org/10.17323/1996-7845-2023-02-04
11. Dale, T. W., Christiansen, L., & Neufeldt, H. (2020). Reporting adaptation through the biennial transparency report: A practical explanation of the guidance. https://backend.orbit.dtu.dk/ws/files/221266016/Reporting_adaptation_through_the_biennial_transparency_report_an_explanation_of_the_guidance_ICAT_UNEP_DTU_PARTNERSHIP.pdf
12. Davenport, T., & Jiang, Z. (2024). State Practice of Asian Countries in International Law (pp. 340–356). https://doi.org/10.1163/9789004718128_021
13. Dechezleprêtre, A., Nachtigall, D., & Venmans, F. (2022). The joint impact of the European Union emissions trading system on carbon emissions and economic performance. London School of Economics and Political Science Research Online (London School of Economics and Political Science), 118, 102758–102758. https://doi.org/10.1016/j.jeem.2022.102758
14. Dubash, N. K., Nilsson, L. J., Tosun, J., & Borbor-Cordova, M. J. (2023). National and Sub-national Policies and Institutions. In Cambridge University Press eBooks (pp. 1355–1450). Cambridge University Press. https://doi.org/10.1017/9781009157926.015
15. Elidrisy, A. (2024). DECIPHERING ARTICLE 6 OF THE PARIS AGREEMENT: MECHANISMS FOR ENHANCED CLIMATE COLLABORATION. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.17986950
16. Eriksson, F. A., Karlsson, A., Zetterberg, L., Bragadóttir, H., Bahr, J. von, Rootzén, J., Möllersten, K., & Kloo, H. (2023). Use of Economic Instruments in Nordic Environmental Policy 2018–2021. In TemaNord. https://doi.org/10.6027/temanord2023-520
17. G.J., N., Rachid, M., Abu, H., Assem, Mercedes, B., Harry, C., Petr, H., I., H., Joanna, Cheikh, M., N., N., Karachepone, Alexander, P., Stephanie, R., Brent, S., & Sirintornthep, T. (2023). Agriculture, Forestry and Other Land Uses (AFOLU). In Cambridge University Press eBooks (pp. 747–860). Cambridge University Press. https://doi.org/10.1017/9781009157926.009
18. Gope, S. (2024). Strengthening Global Environmental Governance: Analysing The Role Of International Legal Frameworks In Addressing Pollution And Climate Change. Revista Electronica de Veterinaria, 2915–2925. https://doi.org/10.69980/redvet.v25i1.1429
19. Grassi, G., House, J. I., Dentener, F., Federici, S., Elzen, M. den, & Penman, J. (2017). The key role of forests in meeting climate targets requires science for credible mitigation. Joint Research Centre (European Commission), 7(3), 220–226. https://doi.org/10.1038/nclimate3227
20. Grimault, J., Bellassen, V., & Shishlov, I. (2018). Key elements and challenges in monitoring, certifying and financing forestry carbon projects. In Prodinra (INRA Bordeaux-Aquitaine). Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement. http://prodinra.inra.fr/ft/02900DB2-2369-4D26-AFDB-FE4764B2D48C
21. Günther, P., Garske, B., Heyl, K., & Ekardt, F. (2024). Carbon farming, overestimated negative emissions and the limits to emissions trading in land-use governance: the EU carbon removal certification proposal. Environmental Sciences Europe, 36(1). https://doi.org/10.1186/s12302-024-00892-y
22. Hanif, M., Maqsood. (2025). An Analytical Study of the Carbon Credit Market in India Market Size, Key Players, Regulatory Framework and Trading Mechanisms. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.17706815

23. Kauneckis, D., & Huda, J. (2022). Polycentricity as a Framework for Understanding India's Climate Policy (pp. 285–303). https://doi.org/10.4324/9781003216476-17
24. Kumar, K. V. N. P. (2023). India's Action Plan for Power Sector Decarbonisation. OSTI OAI (U.S. Department of Energy Office of Scientific and Technical Information). https://www.osti.gov/biblio/1991214
25. Kumar, S. (2024). Will the Green Credit Programme Incentivize Positive Environmental Actions? Ecology Economy and Society–the INSEE Journal, 7(1), 3–11. https://doi.org/10.37773/ees.v7i1.1251
26. Lebling, K., Schumer, C., & Riedl, D. (2023). International governance of technological carbon removal: Surfacing questions, exploring solutions. https://doi.org/10.46830/wriwp.23.00013
27. Li, J., Yao, Y., & Wang, X. (2022). The first compliance cycle of China's National Emissions Trading Scheme: insights and implications. Carbon Neutrality, 1(1). https://doi.org/10.1007/s43979-022-00035-3
28. Liu, Y., Dong, L., & Fang, M. M. (2023). Advancing 'Net Zero Competition' in Asia-Pacific under a dynamic era: a comparative study on the carbon neutrality policy toolkit in Japan, Singapore and Hong Kong. Global Public Policy and Governance, 3(1), 12–40. https://doi.org/10.1007/s43508-023-00065-2
29. López-Vallejo, M. (2021). Non-additionality, Overestimation of Supply, and Double Counting in Offset Programs: Insight for the Mexican Carbon Market. In Springer climate (pp. 191–221). Springer International Publishing. https://doi.org/10.1007/978-3-030-82759-5_10
30. Malik, A., Chaturvedi, V., Sandhani, M., Das, P., Arora, C., Singh, N., Cui, R., Iyer, G., & Zhao, A. (2024). Implications of an emission trading scheme for India's net-zero strategy: a modelling-based assessment. Environmental Research Letters, 19(8), 84043–84043. https://doi.org/10.1088/1748-9326/ad64ec
31. Mayrhofer, J., & Gupta, J. (2015). The politics of co-benefits in India's energy sector. Environment and Planning C Government and Policy, 34(7), 1344–1363. https://doi.org/10.1177/0263774x15619629
32. Meena, S. (2025). Climate Change and its Impact on Regional Patterns in India. INTERNATIONAL JOURNAL OF INNOVATIONS & RESEARCH ANALYSIS, 5, 274–284. https://doi.org/10.62823/ijira/05.04(i).8460
33. Michaelowa, A., Hermwille, L., Obergassel, W., & Butzengeiger, S. (2019). Additionality revisited: guarding the integrity of market mechanisms under the Paris Agreement. Climate Policy, 19(10), 1211–1224. https://doi.org/10.1080/14693062.2019.1628695
34. Ministry of Environment, Forest and Climate Change. (2023). Green Credit Rules, 2023 (S.O. 4458 (E)). The Gazette of India: Extraordinary (Part II-Sec. 3(ii)). https://egazette.gov.in/WriteReadData/2023/249377.pdf
35. Ministry of Power. (2023). Carbon Credit Trading Scheme, 2023 (Notification No. S.O. 2825(E)). The Gazette of India: Extraordinary (Part II, Sec. 3(ii)). Government of India. https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2023/10/2023100519442899 22.pdf
36. Mónica, & Singh, A. (2023). Green Economic Policies, Strategies & Initiatives of India. EAI Endorsed Transactions on Energy Web, 10. https://doi.org/10.4108/ew.4659

37. Mukherjee, S. (2025). Carbon Credits as Property in India: Legal Status, Ownership, and Enforcement under Emerging Climate Regulation. International Journal of Innovative Research and Creative Technology, 11(6). https://doi.org/10.62970/ijirct.v11.i6.2512007
38. Mulatu, K. A., Nyawira, S. S., Herold, M., Carter, S., & Verchot, L. (2023). Nationally determined contributions to the 2015 Paris Agreement goals: transparency in communications from developing country Parties. Climate Policy, 24(2), 211–227. https://doi.org/10.1080/14693062.2023.2285519
39. Nandhini, V., & Venkataraman, R. (2025). Carbon Credit Mechanisms: A Market Based Approach to Climate Mitigation. Archives of Current Research International, 25(6), 1–14. https://doi.org/10.9734/acri/2025/v25i61246
40. Ordonez, J. A., Jakob, M., Steckel, J. C., & Ward, H. (2023). India's just energy transition: Political economy challenges across states and regions. Energy Policy, 179, 113621–113621. https://doi.org/10.1016/j.enpol.2023.113621
41. Pillai, A. V., & Dubash, N. K. (2021). The limits of opportunism: the uneven emergence of climate institutions in India. Environmental Politics, 30, 93–117. https://doi.org/10.1080/09644016.2021.1933800
42. Probst, B., Toetzke, M., Kontoleon, A., Anadón, L. D., Minx, J. C., Haya, B., Schneider, L., Trotter, P. A., West, T. A. P., Gill-Wiehl, A., & Hoffmann, V. H. (2024). Systematic assessment of the achieved emission reductions of carbon crediting projects. Nature Communications, 15(1), 9562–9562. https://doi.org/10.1038/s41467-024-53645-z
43. Rakesh, S., Kamalakar, J. A., Raju, B. V. S., Jannu, N., Pandit, V. B., Kunta, R., Balo, S., Baral, K., Sannagoudar, M. S., & Sarkar, D. (2022). Understanding carbon trading: Accomplishments and prospects in india and other countries. Climate Change and Environmental Sustainability, 10(2), 113–122. https://doi.org/10.5958/2320-642x.2022.00012.6
44. Ranson, M., & Stavins, R. N. (2015). Linkage of greenhouse gas emissions trading systems: learning from experience. Climate Policy, 16(3), 284–300. https://doi.org/10.1080/14693062.2014.997658
45. Ravindranath, N. H., & Murthy, I. K. (2021). Mitigation co-benefits of carbon sequestration from MGNREGS in India. PLoS ONE, 16(5). https://doi.org/10.1371/journal.pone.0251825
46. Romm, J., Lezak, S., & Alshamsi, A. (2025). Are Carbon Offsets Fixable? Annual Review of Environment and Resources, 50(1), 649–680. https://doi.org/10.1146/annurev-environ-112823-064813
47. Saerbeck, B., Jørgensen, K. S., & Jänicke, M. (2017). Multi-level Climate Governance: The global system and selected sub-systems. Environmental Policy and Governance, 27(2), 105–107. https://doi.org/10.1002/eet.1746
48. Sasaki, N. (2025). Addressing scandals and greenwashing in carbon offset markets: A framework for reform. Global Transitions, 7, 375–382. https://doi.org/10.1016/j.glt.2025.06.003
49. Skjærseth, J. B., & Wettestad, J. (2009). The Origin, Evolution and Consequences of the EU Emissions Trading System. Global Environmental Politics, 9(2), 101–122. https://doi.org/10.1162/glep.2009.9.2.101
50. Tang, T. H., & Bao, H. X. H. (2023). Political uncertainty and carbon emission trading: Evidence from China. Cities, 145, 104713–104713. https://doi.org/10.1016/j.cities.2023.104713
51. Vathsan, J. S. (2025). CARBON CREDIT TRADING IN INDIA: LEGAL FRAMEWORK AND ENVIRONMENTAL JUSTICE. LawFoyer International Journal of Doctrinal Legal Research., 3(1), 463–481. https://doi.org/10.70183/lijdlr.2024.v03.21

52. Wettestad, J. (2011). EU Emissions Trading: Achievements and Challenges. In Palgrave Macmillan US eBooks (pp. 87–111). Palgrave Macmillan. https://doi.org/10.1057/9780230119819_5
53. Wheeler, C., Begliomini, F., Holcomb, A., Keshav, S., Madhavapeddy, A., & Coomes, D. A. (2025). The path to robust evaluation of carbon credits generated by forest restoration and REDD+ projects. Remote Sensing of Environment, 332, 115041–115041. https://doi.org/10.1016/j.rse.2025.115041
54. Winkler, H., Mantlana, B., & Letete, T. (2017). Transparency of action and support in the Paris Agreement. Climate Policy, 17(7), 853–872. https://doi.org/10.1080/14693062.2017.1302918
55. World Bank. (2021). Country Processes and Institutional Arrangements for Article 6 Transactions. Washington, DC: World Bank. https://doi.org/10.1596/35392
56. World Bank. (2022). What you need to know about Article 6 of the Paris Agreement. https://www.worldbank.org/en/news/feature/2022/05/17/what-you-need-to-know-about-article-6-of-the-paris-agreement.
57. Zetterberg, L., Johnsson, F., & Möllersten, K. (2021). Incentivizing BECCS—A Swedish Case Study. Frontiers in Climate, 3. https://doi.org/10.3389/fclim.2021.685227
58. Zhang, H. (2024). The Paris Agreement's Enhanced Transparency Framework: state practices and compliance challenges. In Edward Elgar Publishing eBooks (pp. 279–295). Edward Elgar Publishing. https://doi.org/10.4337/9781800886742.00019
59. Zhang, J., Zou, X., & Muhkia, A. (2023). Reconsidering India's climate diplomacy and domestic preferences with a two-level approach. International Journal of Climate Change Strategies and Management, 15(5), 671–689. https://doi.org/10.1108/ijccsm-07-2022-0088
60. Zhu, L., WANG, M., Huang, D., & Lu, Y. (2024). The Current Development and Outlook of China Certified Emission Reduction Trading Scheme. Chinese Journal of Urban and Environmental Studies, 12(3). https://doi.org/10.1142/s2345748124500155