

Chapter 2: Literature Review

Introduction

The intersection of carbon markets and developing nations represents one of the most contested and consequential domains of contemporary climate governance. This literature review synthesizes decades of scholarship across political economy, development studies, environmental governance, and international relations to establish the theoretical and empirical foundations for understanding how market-based climate finance mechanisms operate in the Global South. The chapter critically examines four interconnected bodies of literature: (1) the theoretical foundations of carbon markets and their political economy; (2) the institutional architecture of climate finance mechanisms, particularly the Clean Development Mechanism (CDM) and voluntary carbon markets; (3) the impacts and effectiveness of carbon market projects in developing countries; and (4) the power dynamics, equity concerns, and distributional consequences of market-based climate governance.

The literature reveals fundamental tensions between the market logic underpinning carbon trading schemes and the complex political, social, and economic realities of developing nations. While proponents argue that carbon markets can mobilize private capital for climate mitigation while supporting sustainable development, critics contend that these mechanisms reproduce colonial patterns of resource extraction, prioritize Northern economic interests, and fail to deliver meaningful climate action or development benefits.¹ This dissertation enters ongoing debates by examining how the political economy of carbon markets shapes their implementation and outcomes in diverse national contexts, with particular attention to questions of power, sovereignty, and distributional justice.

Despite extensive scholarship on carbon markets, significant gaps remain in our understanding of their political economy in developing countries. First, existing research tends to treat carbon markets as technical instruments rather than political institutions embedded within broader structures of global capitalism.² Second, much of the literature focuses on project-level impacts while neglecting the macro-level political and economic dynamics that shape market development and governance. Third, there is insufficient attention to the agency and strategies of developing country actors—governments, civil society organizations, and local communities—in navigating and contesting carbon market regimes. This dissertation addresses these gaps by adopting a critical political economy approach that examines carbon markets as sites of contestation where multiple actors struggle over the terms of climate governance and development.

This chapter proceeds in six sections. Section 2.1 examines the theoretical foundations of carbon markets, tracing their intellectual origins in neoclassical environmental economics and exploring critiques from political economy, ecological economics, and development studies. Section 2.2 reviews the institutional evolution of carbon markets, focusing on the CDM, voluntary markets, and emerging mechanisms under the Paris Agreement. Section 2.3 synthesizes empirical research on carbon market projects in developing countries, assessing evidence regarding climate effectiveness, sustainable development co-benefits, and local impacts. Section 2.4 analyzes the political economy of carbon markets, examining issues of power, governance, and the role of different actors. Section 2.5 explores equity dimensions and distributional consequences, including debates about carbon colonialism, environmental justice, and sovereignty. Section 2.6 concludes by identifying gaps in existing research and positioning this dissertation's contribution to scholarship.

2.1 Theoretical Foundations of Carbon Markets

2.1.1 Neoclassical Economics and Market-Based Environmental Governance

Carbon markets emerged from neoclassical environmental economics, which

conceptualizes climate change as a market failure requiring mechanisms to internalize the social costs of greenhouse gas emissions.³ The theoretical foundation derives from Coase's theorem on property rights and externalities, Pigou's work on taxation, and Dales's proposal for tradable pollution permits.⁴ This intellectual lineage positions carbon markets as economically efficient instruments that minimize the aggregate costs of emissions reductions while providing flexibility for regulated entities to determine how and where to abate pollution.

The theoretical case for carbon markets rests on several key assumptions. First, markets are presumed to be informationally efficient mechanisms for discovering the marginal cost of emissions reductions across diverse actors and geographies.⁵ Second, rational actors are expected to respond predictably to price signals, seeking least-cost abatement opportunities. Third, well-defined property rights in carbon credits are assumed to enable efficient exchange without excessive transaction costs. Fourth, the geographical location of emissions reductions is treated as irrelevant to climate outcomes, justifying the principle that emissions can be offset anywhere globally—a premise fundamental to mechanisms like the CDM.⁶

Proponents argue that carbon markets offer advantages over command-and-control regulation or carbon taxation. Markets purportedly achieve environmental objectives at lower cost by allowing flexibility in compliance strategies, stimulate innovation through competitive pressure, and create financial incentives for early action on climate mitigation.⁷ Furthermore, international carbon markets—particularly offset mechanisms like the CDM—are theorized to facilitate technology transfer, mobilize private finance for sustainable development in poor countries, and enable cost-effective global emissions reductions.⁸

However, the neoclassical framework has faced sustained theoretical and empirical challenges. Critics question whether carbon markets can adequately address the unique characteristics of climate change, including its global commons nature, long time horizons, deep uncertainty, and potential for catastrophic tipping points.⁹ The assumption of market efficiency is problematic when applied to constructed quasi-markets with significant regulatory intervention, limited participants, and information asymmetries.¹⁰ Moreover, the fungibility assumption—that emissions reductions are equivalent regardless of location—has been challenged on grounds of additionality, permanence, and the failure to account for local co-benefits and co-harms of mitigation activities.¹¹

2.1.2 Political Economy Critiques: Markets, Power, and Neoliberal Governance

In contrast to neoclassical approaches, political economy scholarship interrogates carbon markets as political institutions that reflect and reproduce power relations rather than neutral technical instruments.¹² Drawing on Marxist, neo-Gramscian, and Foucauldian frameworks, these scholars examine how carbon markets emerged from and advance neoliberal projects of environmental governance that privilege market mechanisms, private property, commodification, and corporate interests.¹³

Political economists argue that carbon markets represent a form of “accumulation by decarbonization” wherein new domains of nature are commodified, creating opportunities for capital accumulation while obscuring the structural drivers of climate change rooted in capitalist production and consumption.¹⁴ The creation of carbon as a tradable commodity involves complex processes of commensuration, standardization, and verification that are inherently political rather than technical, shaping who benefits from and bears the costs of climate governance.¹⁵ Far from being efficient market solutions, carbon markets embody compromises among powerful actors—governments, corporations, financial institutions, and international organizations—whose interests shape market design and operation.¹⁶

A key insight from political economy is that carbon markets emerged through what Bernstein terms the “compromise of liberal environmentalism”—a settlement that reconciled environmental protection with continued economic growth and minimal disruption to existing power structures.¹⁷ Carbon markets became politically viable precisely because they promised to address climate change without challenging fossil fuel dependence, overconsumption in wealthy nations, or the imperatives of capital

accumulation. From this perspective, carbon markets are best understood not as solutions to climate change but as mechanisms that make climate governance compatible with neoliberal capitalism.¹⁸

Critical scholars have also examined the financialization of carbon, whereby carbon credits become speculative assets traded in derivative markets, often disconnected from actual emissions reductions.¹⁹ The involvement of financial institutions, the proliferation of complex financial instruments, and speculation in carbon markets raise concerns about volatility, fraud, and the prioritization of exchange value over environmental effectiveness.²⁰ As Knox-Hayes demonstrates, the financial architecture of carbon markets tends to concentrate benefits among sophisticated financial actors in global financial centers while externalizing risks to developing countries and marginalized populations.²¹

2.1.3 Ecological Economics and Biophysical Limits

Ecological economists offer distinct critiques of carbon markets grounded in concerns about biophysical limits, thermodynamic constraints, and the incommensurability of ecological values.²² Unlike neoclassical approaches that assume substitutability between natural and manufactured capital, ecological economics emphasizes absolute limits to resource extraction and waste absorption imposed by the biosphere.²³ From this perspective, carbon markets are problematic because they treat atmospheric capacity to absorb greenhouse gases as infinitely substitutable across space and time, ignoring threshold effects, tipping points, and the non-linear dynamics of Earth systems.²⁴

Ecological economists critique the monetization and commodification of carbon, arguing that reducing complex ecological processes to units of exchange erases important qualitative differences between emissions sources, sequestration methods, and local environmental contexts.²⁵ The commensuration required to create fungible carbon credits necessarily involves simplification and abstraction that may misrepresent biophysical realities and ignore ecosystem complexity.²⁶ For instance, treating temporary carbon storage in forests as equivalent to permanent reductions in fossil fuel combustion ignores fundamental differences in carbon cycle dynamics and risks.²⁷

Furthermore, ecological economists emphasize the rebound effect and the risk that carbon markets may enable continued expansion of high-carbon activities in developed countries rather than fostering genuine transitions to sustainable economies.²⁸ By allowing wealthy nations and corporations to purchase offsets instead of reducing their own emissions, carbon markets may perpetuate unsustainable consumption patterns while failing to achieve absolute reductions in global greenhouse gas concentrations.²⁹ This critique aligns with concerns that carbon markets function as a form of “climate delay” that postpones transformative change.³⁰

2.1.4 Development Studies Perspectives

Development scholars have examined carbon markets through lenses of development effectiveness, poverty alleviation, and North-South relations, yielding mixed assessments.³¹ Proponents within development studies argue that carbon finance can mobilize resources for sustainable development in poor countries, providing additional financing for renewable energy, energy efficiency, sustainable agriculture, and other projects that deliver both climate and development benefits.³² The CDM’s explicit mandate to contribute to sustainable development reflected aspirations to align climate action with poverty reduction and economic growth in the Global South.³³

However, critical development scholars question whether carbon markets advance genuine development or merely serve Northern economic and geopolitical interests.³⁴ Carbon markets have been critiqued for prioritizing easily measurable, low-cost industrial gas projects over more transformative investments in renewable energy and community-based adaptation.³⁵ The distribution of CDM projects has been highly uneven, concentrated in middle-income countries like China, India, and Brazil, while least developed countries have received minimal investment—a pattern reflecting existing inequalities in investment flows

and technical capacity rather than development needs.³⁶

Moreover, development scholars have highlighted tensions between market logic and development objectives. The emphasis on cost-effectiveness and financial returns in carbon markets may conflict with development priorities such as local ownership, capacity building, equity, and social inclusion.³⁷ Carbon projects designed primarily to generate credits for Northern buyers may fail to address local development challenges or may even create negative social and environmental impacts for host communities.³⁸ The governance structures of carbon markets, dominated by Northern institutions, technical experts, and corporate actors, often marginalize developing country governments and civil society from meaningful participation in rule-making and implementation.³⁹

2.2 Institutional Architecture of Climate Finance Mechanisms

2.2.1 The Clean Development Mechanism: Design and Evolution

The Clean Development Mechanism (CDM), established under Article 12 of the Kyoto Protocol, represents the first and most significant international carbon offset program connecting developed and developing countries.⁴⁰ The CDM allows industrialized nations (Annex I parties) to invest in emissions reduction projects in developing countries (non-Annex I parties) and claim the resulting certified emission reductions (CERs) toward their own compliance obligations.⁴¹ The dual objectives of the CDM—achieving cost-effective emissions reductions while contributing to sustainable development in host countries—reflected a political compromise between Northern interests in flexibility and Southern demands for financial and technological support.⁴²

The institutional architecture of the CDM involves multiple governance layers and actors. At the apex, the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP) provides ultimate authority and guidance. The CDM Executive Board, comprising representatives from different UN regional groups, oversees day-to-day operations, approves methodologies, and accredits operational entities.⁴³ Designated Operational Entities (DOEs)—private sector auditing firms—validate project design documents and verify emissions reductions. At the national level, Designated National Authorities (DNAs) approve projects and assess their contribution to sustainable development based on host country criteria.⁴⁴

The CDM project cycle involves multiple stages, each governed by detailed rules and procedures. Project developers must demonstrate additionality—that the project would not have occurred in the absence of carbon finance—through standardized methodologies and baseline scenarios.⁴⁵ Projects undergo validation by DOEs, approval by host country DNAs, registration by the Executive Board, implementation and monitoring, verification of emissions reductions, and finally issuance of CERs.⁴⁶ This complex governance structure was intended to ensure environmental integrity and prevent gaming, but it has also created significant transaction costs and delays.⁴⁷

Over its two-decade history, the CDM has registered over 8,000 projects across more than 100 developing countries, issuing more than 2 billion CERs.⁴⁸ The geographic distribution has been highly skewed, with China, India, Brazil, Mexico, and a handful of other middle-income countries hosting the vast majority of projects.⁴⁹ Project types have varied, with industrial gas projects (particularly HFC-23 and N₂O destruction) generating large quantities of cheap credits despite limited sustainable development benefits, while renewable energy projects have faced challenges accessing CDM finance due to additionality concerns and higher transaction costs.⁵⁰

The CDM has undergone several reform efforts responding to criticisms. The Doha Amendment introduced standardized baselines for certain project types to reduce transaction costs and improve additionality assessments.⁵¹ The Paris Agreement's Article 6 mechanisms seek to address CDM shortcomings while establishing new frameworks for

international carbon markets.⁵² However, debates continue about whether the CDM should transition to the Paris regime, how to treat legacy credits, and what lessons should inform future market mechanism design.⁵³

2.2.2 Voluntary Carbon Markets: Emergence and Fragmentation

Parallel to the compliance-driven CDM, voluntary carbon markets have emerged as a significant source of climate finance, driven by corporate social responsibility commitments, reputation concerns, and voluntary emission reduction goals.⁵⁴ Unlike the CDM's centralized governance, voluntary markets are fragmented across multiple standards, registries, and verification bodies, creating a complex institutional landscape with varied quality and credibility.⁵⁵

The main voluntary carbon standards include the Verified Carbon Standard (VCS, now Verra), Gold Standard, Climate Action Reserve, and American Carbon Registry.⁵⁶ These standards establish methodologies for quantifying emissions reductions, set requirements for additionality and permanence, and specify verification procedures. The Gold Standard distinguishes itself by emphasizing sustainable development co-benefits and requiring third-party assessment of project impacts on local communities.⁵⁷ Despite standardization efforts, voluntary markets exhibit significant variation in rigor, with some projects generating questionable credits that may not represent genuine emissions reductions.⁵⁸

Voluntary markets have grown substantially, with transaction volumes reaching hundreds of millions of tons of CO₂ equivalent and values exceeding several billion dollars annually.⁵⁹ Growth has been driven by increased corporate net-zero commitments and heightened attention to climate risk following reports from the Intergovernmental Panel on Climate Change and visible climate impacts.⁶⁰ However, concerns about credit quality, additionality, and permanence persist, with investigative journalism and academic studies revealing systemic overestimation of emissions reductions in forest conservation projects, renewable energy projects, and other offset types.⁶¹

The institutional fragmentation of voluntary markets has prompted calls for greater standardization and regulation. The Integrity Council for the Voluntary Carbon Market, launched in 2021, aims to establish core carbon principles and assessment frameworks to improve market integrity.⁶² Meanwhile, some jurisdictions are moving toward regulating voluntary offset claims, concerned that misleading carbon neutrality advertising constitutes greenwashing.⁶³ The interaction between voluntary markets and compliance markets under Article 6 of the Paris Agreement remains uncertain, raising questions about potential convergence or continued parallel evolution.⁶⁴

2.2.3 REDD+ and Forest Carbon Finance

Reducing Emissions from Deforestation and Forest Degradation Plus conservation, sustainable management, and enhancement of forest carbon stocks (REDD+) represents a specialized domain of climate finance focused on land-use change in developing countries.⁶⁵ REDD+ emerged from recognition that tropical deforestation contributes approximately 10-15% of global greenhouse gas emissions and that protecting forests could deliver cost-effective climate mitigation while preserving biodiversity and ecosystem services.⁶⁶

The institutional architecture of REDD+ has evolved through multiple phases. Initial discussions focused on compensating developing countries for avoided deforestation, but the scope expanded to include forest degradation, conservation, sustainable management, and enhancement of carbon stocks.⁶⁷ REDD+ spans both compliance and voluntary markets, with funding from multilateral institutions (the World Bank's Forest Carbon Partnership Facility, UN-REDD Programme), bilateral aid, and voluntary carbon markets.⁶⁸

REDD+ implementation occurs at multiple scales. National-level programs receive results-based payments from international climate funds after demonstrating reduced deforestation rates below reference levels.⁶⁹ Jurisdictional REDD+ operates at subnational levels (states, provinces), attempting to balance local implementation flexibility with national policy

frameworks.⁷⁰ Project-level REDD+ involves specific forest conservation activities that generate carbon credits sold in voluntary or compliance markets.⁷¹

Substantial scholarship examines REDD+ governance challenges, including tensions between national sovereignty and international financing, difficulties establishing credible baselines and monitoring deforestation, concerns about land and carbon rights, and questions about equitable benefit distribution.⁷² The requirement to demonstrate additionality—that forests would have been cleared absent the REDD+ intervention—raises complex counterfactual problems given the multiple drivers of deforestation and forest degradation.⁷³ Moreover, permanence concerns arise from risks of reversals due to natural disasters, policy changes, or economic pressures.⁷⁴

Critical perspectives on REDD+ highlight risks of “green grabbing”—appropriation of land and resources for environmental ends that disadvantages local and indigenous communities.⁷⁵ REDD+ may incentivize new forms of enclosure and exclusion, restricting customary forest use by communities whose livelihoods depend on forest resources.⁷⁶ Power asymmetries in REDD+ governance, with external actors (international organizations, NGOs, carbon brokers) often dominating decision-making, raise concerns about legitimacy and procedural justice.⁷⁷ Despite safeguards meant to ensure free, prior, and informed consent and protect indigenous peoples’ rights, implementation remains variable and contested.⁷⁸

2.3 Empirical Evidence on Carbon Market Effectiveness and Impacts

2.3.1 Environmental Effectiveness: Additionality and Emissions Reductions

A central controversy in carbon market scholarship concerns whether offset projects deliver genuine emissions reductions beyond what would have occurred anyway—the additionality question.⁷⁹ Demonstrating additionality requires establishing credible counterfactual baselines, a fundamentally challenging task given the impossibility of observing what would have happened in the absence of the intervention.⁸⁰

Empirical assessments of CDM project additionality have yielded concerning findings. Early analyses found that substantial portions of CDM projects—particularly those involving industrial gases, renewable energy in countries with supportive policies, or energy efficiency improvements driven by energy price increases—likely would have occurred without carbon finance.⁸¹ Schneider’s systematic review concluded that 40% or more of CDM projects registered before 2012 had low additionality likelihood, meaning they probably would have been implemented anyway.⁸² Subsequent studies using quasi-experimental methods reached similar conclusions, finding widespread over-crediting in CDM renewable energy projects.⁸³

The additionality problem is not unique to the CDM but affects voluntary carbon markets as well. Investigative analyses of forest conservation projects under VCS revealed systematic overestimation of deforestation threats, leading to credits for “avoided” deforestation that likely would not have occurred.^[^84] One study found that over 90% of rainforest carbon offsets certified by Verra were unlikely to represent real emissions reductions.⁸⁴ Similar concerns have been raised about renewable energy and cookstove projects in voluntary markets.⁸⁵

[^84] West et al., “Overstated Carbon Emission Reductions”; Guizar-Coutiño et al., “Global Evaluation of REDD+ Projects.”

Methodological challenges plague additionality assessment. Standard approaches rely on financial additionality tests (demonstrating projects are not financially viable without carbon revenue) or barrier analysis (showing projects face implementation obstacles).⁸⁶ However, these methods are easily gamed through selective presentation of financial assumptions or

exaggeration of barriers.⁸⁷ Moreover, regulatory additionality tests that exclude projects required by law have become increasingly problematic as countries strengthen climate policies, creating perverse incentives against policy ambition.⁸⁸

Recent scholarship has explored alternative additionality approaches, including standardized baselines, performance benchmarks, and positive lists identifying project types presumed to be additional.⁸⁹ Standardized baselines reduce gaming opportunities by establishing sector-wide reference levels, but they may exclude truly additional projects or include non-additional ones.⁹⁰ Programmatic approaches that support policy reforms rather than individual projects show promise but face challenges in attribution and permanence.⁹¹

Beyond additionality, concerns have emerged about other dimensions of environmental effectiveness. Some CDM projects involving capture of industrial gases (HFC-23, SF6) created perverse incentives for increased production of gases specifically to generate credits.⁹² Forestry projects face permanence risks, with carbon storage potentially reversed through fires, pests, illegal logging, or policy changes.⁹³ The lack of consideration for emissions leakage—displacement of emissions-generating activities to uncovered locations—may undermine the net climate benefits of offset projects.⁹⁴

2.3.2 Sustainable Development Co-Benefits

Beyond emissions reductions, offset mechanisms like the CDM were intended to deliver sustainable development benefits in host countries.⁹⁵ Empirical research on whether carbon projects achieve these co-benefits has produced mixed results, with significant variation across project types, geographic contexts, and evaluative frameworks.⁹⁶

Quantitative studies assessing sustainable development impacts have employed diverse methodologies, from content analysis of project design documents to stakeholder surveys and case studies.⁹⁷ Olsen and Fenhann's analysis of CDM project design documents found that most projects claimed local environmental benefits and employment generation, but few provided detailed evidence or monitoring plans for these impacts.⁹⁸ Their scoring system revealed that renewable energy and energy efficiency projects generally scored higher on sustainable development criteria than industrial gas projects, though overall contributions were modest.⁹⁹

Case study research has provided richer but more context-specific insights into sustainable development outcomes. Studies of renewable energy projects have documented benefits including rural electrification, reduced indoor air pollution, employment creation, and technology transfer, but also noted that benefits are often concentrated among wealthier community members and urban areas.¹⁰⁰ Conversely, large-scale hydropower projects, while generating substantial carbon credits, have been criticized for displacing communities, disrupting river ecosystems, and exacerbating inequality.¹⁰¹

REDD+ projects have been particularly scrutinized for their local development impacts. Some studies report positive outcomes including improved forest management, alternative livelihood support, and community empowerment.¹⁰² However, critical research highlights cases where REDD+ has restricted customary resource access, failed to deliver promised benefits, excluded communities from decision-making, and exacerbated tenure insecurity.¹⁰³ The distribution of REDD+ benefits remains contentious, with evidence that intermediary organizations often capture substantial revenue shares while local communities receive modest payments.¹⁰⁴

A critical limitation of much sustainable development assessment is the weakness of host country DNA evaluation systems. Many developing countries lack the institutional capacity or political incentives to rigorously evaluate and monitor project impacts.¹⁰⁵ DNAs often approve projects with minimal scrutiny, relying on developer self-reporting rather than independent verification.¹⁰⁶ Moreover, the absence of standardized sustainable development assessment criteria across countries creates inconsistency and enables forum shopping by project developers seeking lenient approval processes.¹⁰⁷

Recent scholarship advocates for stronger sustainable development safeguards and

monitoring. The Gold Standard's requirement for participatory stakeholder consultations and third-party sustainable development assessment represents one approach.¹⁰⁸ Others propose mandatory use of validated sustainable development indicators, regular monitoring and reporting requirements, and enhanced host country capacity for independent evaluation.¹⁰⁹ However, these measures increase transaction costs, potentially excluding smaller projects and less-resourced countries.¹¹⁰

2.4 Political Economy of Carbon Markets

2.4.1 Power, Governance, and Market Construction

Political economy scholarship emphasizes that carbon markets are not spontaneously emerging phenomena but rather politically constructed institutions shaped by power relations among states, corporations, financial institutions, international organizations, and civil society.¹¹¹ Understanding who exercises power in carbon market governance, how rules are made and contested, and whose interests prevail illuminates the political underpinnings of ostensibly technical market mechanisms.¹¹²

At the international level, carbon market governance reflects asymmetries between developed and developing countries. During Kyoto Protocol negotiations, Northern countries—particularly the United States—advocated strongly for market mechanisms that would minimize their own compliance costs.¹¹³ While developing countries initially resisted market approaches, concerned about sovereignty and equity implications, they eventually accepted the CDM in exchange for financial transfers and technology transfer commitments.¹¹⁴ However, the CDM's governance structure ultimately privileged Northern technical and financial expertise, with developing country influence limited primarily to project approval through DNAs.¹¹⁵

Corporate actors have played central roles in shaping carbon markets. Energy companies, financial institutions, and carbon consulting firms actively lobbied for market mechanisms and participated in designing regulatory frameworks.¹¹⁶ The European Union's Emissions Trading System (EU ETS), often portrayed as progressive climate policy, involved extensive industry consultation and reflects compromises with industrial interests, including generous free allocation of permits and exemptions for energy-intensive sectors.¹¹⁷ Private sector involvement extends to market infrastructure, with commercial entities dominating offset validation and verification, carbon trading, and credit brokerage.¹¹⁸

The role of financial institutions in carbon markets warrants particular attention. Investment banks, private equity funds, and asset managers have become major participants in carbon trading, introducing financial innovations including derivatives, securitization, and structured products.¹¹⁹ MacKenzie's ethnographic research on carbon markets reveals how financial actors and technical experts collaboratively constructed carbon as a tradable commodity through complex processes of measurement, standardization, and valuation.¹²⁰ This financialization brings efficiency gains through market liquidity but also introduces risks of speculation, market manipulation, and volatility that may undermine environmental objectives.¹²¹

Civil society organizations have engaged carbon markets as both participants and critics. Environmental NGOs have promoted market-based approaches as pragmatic climate solutions, developed offset standards (e.g., Gold Standard), and facilitated project implementation.¹²² However, other civil society actors have mobilized against carbon markets, critiquing them as false solutions that commodify nature, perpetuate injustice, and distract from necessary systemic changes.¹²³ Movements including Climate Justice Now!, Indigenous Environmental Network, and Via Campesina have articulated alternatives to market-based climate governance centered on rights, equity, and structural transformation.¹²⁴

Power dynamics extend to knowledge production and expertise. Technical complexity in carbon accounting, baseline methodologies, and additionality assessment creates gatekeeping opportunities for consultants and auditors whose expertise is often inaccessible

to developing country actors and local communities.¹²⁵ Lohmann argues that the dominance of Northern technical rationality in carbon markets reflects and reinforces colonial patterns of knowledge hierarchy, marginalizing alternative ways of understanding and addressing climate change.¹²⁶

2.4.2 State Capacity and Institutional Development

The political economy of carbon markets intersects with questions of state capacity in developing countries. Successfully participating in carbon markets requires institutional infrastructure including designated national authorities, regulatory frameworks, technical expertise, and monitoring systems—capacities that vary tremendously across the Global South.¹²⁷

Countries with stronger governance institutions, more developed financial sectors, and greater human capital have attracted disproportionate shares of carbon market investment.¹²⁸ China and India's dominance in CDM project hosting reflects not only their large manufacturing sectors but also their proactive development of supportive policies, streamlined approval processes, and domestic carbon consultancy industries.¹²⁹ In contrast, least developed countries, particularly in sub-Saharan Africa, have struggled to attract carbon finance despite potentially high-quality project opportunities, constrained by limited institutional capacity, perceived investment risks, and high transaction costs.¹³⁰

Some scholars view carbon markets as opportunities for institutional development in poor countries, arguing that participation in the CDM and other mechanisms can spur capacity building, regulatory modernization, and enhanced environmental governance.¹³¹ This optimistic perspective suggests that even if immediate carbon revenue is modest, the institutional learning and policy spillovers may generate broader development benefits.¹³²

However, critics question whether carbon markets genuinely strengthen state capacity or instead create parallel governance structures that may undermine state authority and public interest orientation.¹³³ The prominence of private actors in carbon market implementation—consultants designing projects, auditors validating emissions reductions, brokers facilitating transactions—can sideline state institutions and limit public oversight.¹³⁴ Moreover, when carbon projects are designed primarily to generate revenues for international investors, host country development priorities may be subordinated to profit maximization.¹³⁵

The political economy of carbon markets also involves competition among developing countries for investment. Countries may engage in “race to the bottom” dynamics, weakening environmental standards, sustainable development criteria, or oversight mechanisms to attract carbon projects.^[^137] Such competition can undermine the effectiveness of safeguards and exacerbate uneven development patterns within the Global South.^[^138]

[^137] Alexeev et al., “Additionality and Sustainable Development”; Disch, “Comparative Analysis of Development Dividend.”

[^138] Okereke et al., “Voluntary Carbon Markets in Africa.”

2.5 Equity, Justice, and Distributional Consequences

2.5.1 North-South Dimensions and Carbon Colonialism

Debates about carbon markets are inseparable from broader questions of climate justice and North-South equity. The historical responsibility of developed countries for cumulative greenhouse gas emissions, combined with developing countries' greater vulnerability to climate impacts and lower adaptive capacity, creates strong justice arguments for differentiated responsibilities and international resource transfers.¹³⁶ Carbon markets were promoted partly as vehicles for North-South finance and technology transfer, yet critical scholars question whether they advance or undermine justice objectives.¹³⁷

The concept of “carbon colonialism” captures concerns that carbon markets reproduce colonial patterns of exploitation wherein Northern countries and corporations extract value from Southern resources while externalizing environmental and social costs.¹³⁸ Bachram argues that carbon markets enable wealthy nations to continue pollution while appropriating Southern atmospheric space and terrestrial carbon sinks—effectively a new form of enclosure analogous to historical land grabs.¹³⁹ From this perspective, offsets allow the North to avoid reducing its own emissions while profiting from control over carbon assets in developing countries.¹⁴⁰

Empirical evidence lends partial support to carbon colonialism critiques. The geographic distribution of CDM projects, concentrated in industrializing middle-income countries rather than least developed nations, suggests that carbon markets reinforce rather than redress global inequalities.¹⁴¹ The types of projects funded through carbon finance—often serving the interests of Northern buyers and investors rather than addressing priority development needs in host countries—raise questions about whose agenda carbon markets serve.¹⁴² Moreover, the revenue flows from carbon markets are dwarfed by the scale of climate finance needs in developing countries, calling into question their adequacy as North-South transfer mechanisms.¹⁴³

However, some scholars caution against overly simplistic North-South framings that obscure heterogeneity within these categories. Middle-income countries like China and Brazil are now significant greenhouse gas emitters with growing domestic responsibilities for climate action.¹⁴⁴ Meanwhile, carbon markets involve complex transnational networks that transcend national boundaries, with actors in both North and South benefiting from and exploiting these mechanisms in varied ways.¹⁴⁵ Elites in developing countries may profit from carbon projects while local communities bear costs—dynamics that call for attention to intra-national as well as international equity.¹⁴⁶

2.5.2 Indigenous Peoples and Local Communities

A particularly contentious equity dimension concerns the impacts of carbon projects on indigenous peoples and local communities whose lands and livelihoods are most directly affected.¹⁴⁷ Forest carbon projects—including both REDD+ and afforestation/reforestation CDM projects—have generated acute controversies over land rights, benefit distribution, participation in governance, and cultural rights.¹⁴⁸

Indigenous peoples’ organizations have articulated fundamental concerns about REDD+ and other carbon forestry initiatives. The imposition of carbon property rights over territories that indigenous communities have customarily managed may constitute a new form of dispossession, particularly where national legal frameworks fail to recognize indigenous land tenure.¹⁴⁹ REDD+ projects that restrict traditional forest uses—shifting cultivation, hunting, gathering—threaten indigenous livelihoods and cultural practices, even when projects nominally include benefit-sharing mechanisms.¹⁵⁰ Moreover, the procedural requirements for free, prior, and informed consent (FPIC) are often inadequately implemented, with indigenous communities facing information asymmetries, rushed consultations, and power imbalances in negotiations with project developers and governments.¹⁵¹

Case studies document varied experiences. Some community forestry carbon projects demonstrate positive outcomes including secure land tenure, sustainable livelihood benefits, and genuine participation in governance.¹⁵² The Surui Carbon Project in Brazil, led by the Surui indigenous people with support from external partners, is often cited as a relatively successful example of community-controlled REDD+.¹⁵³ However, other cases reveal patterns of elite capture, exclusion of marginalized groups (particularly women and ethnic minorities), inadequate compensation, and erosion of customary governance systems.¹⁵⁴

Gender dimensions of carbon projects merit particular attention. Women in developing country communities often bear disproportionate responsibility for subsistence activities dependent on forest resources yet are frequently excluded from carbon project decision-making and benefit distribution.¹⁵⁵ Restrictions on forest access imposed by REDD+ projects can increase women’s labor burdens and economic vulnerability.¹⁵⁶ Moreover,

carbon project governance structures typically reflect existing gender inequalities, with male community leaders dominating negotiations and women's knowledge and priorities marginalized.¹⁵⁷

2.5.3 Procedural Justice and Participation

Beyond distributive equity concerns, carbon markets raise questions of procedural justice—whether affected stakeholders have meaningful voice in decision-making processes and whether governance mechanisms are transparent, accountable, and legitimate.¹⁵⁸ Scholarship on environmental justice emphasizes that procedural rights are instrumentally valuable for achieving equitable outcomes and intrinsically important for respecting human dignity and self-determination.¹⁵⁹

The governance of international carbon markets exhibits significant procedural deficits from developing country and civil society perspectives. Key decisions about CDM rules, methodologies, and oversight occur in international venues (CMP meetings, Executive Board deliberations) dominated by developed country representatives and technical experts, with limited meaningful participation by developing country civil society, indigenous peoples, and affected communities.¹⁶⁰ While the CDM includes stakeholder consultation requirements for individual projects, these processes often amount to perfunctory exercises with inadequate information disclosure, short comment periods, and minimal influence on project design.¹⁶¹

National-level participation in carbon market governance is similarly constrained. DNAs' approval processes for carbon projects typically involve limited public transparency and consultation, particularly in countries with weak civil society freedoms or captured regulatory institutions.¹⁶² Communities affected by carbon projects often learn about them only after approval, when implementation commences on their lands, constraining opportunities for meaningful input or opposition.¹⁶³

REDD+ governance has generated extensive debate about procedural justice. International REDD+ guidelines include commitments to full and effective participation, respect for indigenous peoples' rights, and national sovereignty in determining sustainable development priorities.¹⁶⁴ Many national REDD+ strategies incorporate multi-stakeholder processes intended to enhance participation and legitimacy.¹⁶⁵ However, scholars document persistent challenges including asymmetric power relations in multi-stakeholder forums, technical complexity that marginalizes non-expert voices, elite capture of participatory spaces, and inadequate resources for civil society engagement.¹⁶⁶

Recognition justice—the acknowledgment and respect for different identities, knowledge systems, and values—constitutes another dimension inadequately addressed in carbon markets.¹⁶⁷ The technocratic framing of climate change within carbon markets privileges Western scientific knowledge and economic rationality while marginalizing indigenous and local knowledge systems.¹⁶⁸ Indigenous peoples' holistic understandings of forests as integrated social-ecological-spiritual systems contrast with carbon markets' reductionist treatment of forests as carbon stocks to be measured, monitored, and traded.¹⁶⁹ This epistemic marginalization can undermine both the effectiveness and legitimacy of carbon forestry initiatives.^[^173]

[^173] Martin, Adrian, et al. "Justice and Conservation: The Need to Incorporate Recognition." *Biological Conservation* 197 (2016): 254–61.

2.6 Synthesis and Positioning of Dissertation Research

2.6.1 Identified Gaps in Existing Literature

This comprehensive review reveals several significant gaps in scholarship on carbon markets and developing nations that this dissertation seeks to address. First, existing research tends to focus either on global governance dynamics or project-level impacts, with insufficient attention to meso-level political economy—how national governments,

domestic business actors, and civil society organizations navigate and shape carbon markets within specific country contexts. Understanding the political economy at this scale is crucial for explaining variation in carbon market uptake, implementation, and outcomes across developing countries.

Second, much literature treats developing countries primarily as passive recipients of carbon finance rather than strategic actors with agency. While critical scholars highlight how carbon markets may disadvantage the Global South, less attention has been paid to how developing country governments and non-state actors strategically engage with, adapt, contest, and sometimes subvert carbon market mechanisms to advance their own interests and development objectives. This dissertation examines developing country agency across multiple dimensions—state policy entrepreneurship, business sector strategies, civil society mobilization, and community-level responses.

Third, there is insufficient comparative analysis examining why some developing countries have successfully leveraged carbon markets while others have struggled to attract investment or realize benefits. Existing studies often focus on single countries or project types, limiting insights into the political economic factors that differentiate successful from unsuccessful carbon market engagement. This dissertation employs structured comparison across three countries—Indonesia, Kenya, and Peru—selected for variation in income level, governance quality, ecosystem types, and carbon market experience, enabling analysis of how different political economic contexts shape outcomes.

Fourth, literature on carbon markets has inadequately theorized the relationship between global market mechanisms and national development strategies. Carbon markets emerged within international climate governance but must be implemented through national institutions and integrated with domestic development priorities. How do developing country governments reconcile the market logic of carbon trading with alternative development paradigms? Under what conditions do carbon markets align with or contradict national development strategies? This dissertation examines these questions through detailed analysis of national climate and development policy frameworks.

Fifth, existing scholarship provides limited longitudinal analysis of carbon market evolution. The CDM has operated for over two decades, yet most studies examine snapshots of performance during particular periods. Similarly, voluntary carbon markets have undergone significant changes—from early unregulated markets through emergence of standards to recent reform efforts—yet systematic analysis of institutional evolution remains limited. This dissertation traces the trajectories of carbon market development in case study countries from the Kyoto Protocol era through the Paris Agreement transition, identifying patterns of institutional change and adaptation.

Sixth, research on equity and justice dimensions of carbon markets, while extensive, has primarily emphasized critique over constructive alternatives. Many scholars have documented ways carbon markets fall short on justice criteria, but fewer have analyzed how justice concerns might be better addressed within or beyond market frameworks, or how affected communities themselves conceptualize equitable climate governance. This dissertation contributes to normative debates by examining how different stakeholders articulate justice claims regarding carbon markets and what institutional reforms they advocate.

Finally, the literature exhibits disciplinary fragmentation, with environmental economists, political scientists, development scholars, anthropologists, and geographers often operating in parallel with limited cross-fertilization. This dissertation adopts an interdisciplinary political economy approach that integrates insights across these fields, combining attention to market efficiency concerns, power relations and governance, development effectiveness, and lived experiences of carbon projects at local scales.

2.6.2 Theoretical Framework and Research Questions

Building on the reviewed literature, this dissertation adopts a critical political economy framework for analyzing carbon markets in developing countries. This approach treats carbon markets not as neutral technical instruments but as political institutions embedded within broader structures of capitalism, shaped by power relations among diverse actors, and producing uneven distributional consequences. The framework integrates insights from international political economy, development studies, environmental governance, and

environmental justice scholarship.

The dissertation's core theoretical proposition is that carbon market outcomes in developing countries are fundamentally shaped by the interaction between global market structures and national political economic conditions. Global structures—including international rules, financial flows, and knowledge regimes—establish opportunities and constraints for developing country participation in carbon markets. However, national political economy—encompassing state capacity, domestic business interests, civil society organization, and social movements—mediates these global influences and determines how carbon markets are implemented, contested, and transformed at national and local scales.

This framework yields four overarching research questions:

1. How do different configurations of state-market-civil society relations in developing countries shape engagement with carbon markets and influence outcomes in terms of investment flows, project implementation, and distributional consequences?
2. What strategies do developing country governments employ to govern carbon markets, and how do these strategies reflect broader patterns of state-led development, regulatory governance, and management of international economic integration?
3. How do business actors and financial intermediaries in developing countries engage with carbon markets, and what does this reveal about the political economy of green capitalism in the Global South?
4. How do civil society organizations, social movements, and affected communities in developing countries experience, interpret, and respond to carbon markets, and what alternative visions of climate governance do they articulate?

These questions are operationalized through case studies of Indonesia, Kenya, and Peru, examined across multiple scales (international, national, subnational) and incorporating diverse methodological approaches (policy analysis, stakeholder interviews, participatory observation, discourse analysis).

2.6.3 Contributions to Scholarship

This dissertation makes several distinct contributions to scholarship on climate governance, political economy, and sustainable development. Empirically, it provides in-depth comparative analysis of carbon market political economy in three significant developing countries that have been understudied relative to major carbon market participants like China and Brazil. The case studies generate rich empirical evidence on how carbon markets function in diverse national contexts, contributing to a more globally representative understanding of these mechanisms.

Theoretically, the dissertation advances political economy analysis of environmental governance by demonstrating how carbon markets simultaneously reflect and reshape state-market relations, development strategies, and social struggles in the Global South. It contributes to debates about neoliberal environmental governance by showing that market-based mechanisms are not uniformly imposed but are actively adapted, contested, and sometimes transformed by developing country actors. The dissertation also extends environmental justice scholarship by analyzing how justice claims are articulated and mobilized around carbon markets, examining not just distributive outcomes but also procedural and recognition dimensions of justice.

Methodologically, the dissertation demonstrates the value of multi-scalar, multi-sited research combining international institutional analysis with national policy studies and local ethnographic inquiry. This approach enables tracing how global carbon market architectures are translated into national policies and experienced in communities affected by carbon projects—revealing disconnects, adaptations, and forms of resistance often obscured in research focusing on a single scale.

Normatively, the dissertation contributes to ongoing debates about the future of climate finance and whether market mechanisms can be reformed to better serve climate and development objectives or whether fundamental alternatives are necessary. By analyzing both the structural constraints of carbon markets and possibilities for reform articulated by diverse stakeholders, the dissertation aims to inform more effective and equitable

approaches to climate governance in developing countries.

Finally, the dissertation speaks to policy audiences including developing country governments, international organizations, civil society organizations, and donor agencies. The analysis of what has and has not worked in carbon market implementation, which governance structures enable more equitable outcomes, and how different actors navigate carbon markets provides actionable insights for improving climate finance mechanisms under the Paris Agreement and beyond.

Conclusion

This literature review has established that carbon markets represent highly contested domains of climate governance with profound implications for developing countries. The chapter has synthesized extensive scholarship across multiple disciplines, examining theoretical foundations, institutional architectures, empirical evidence on effectiveness and impacts, political economy dimensions, and equity concerns. Several key insights emerge from this synthesis.

First, carbon markets are not neutral technical instruments but politically constructed institutions that reflect power relations among states, corporations, financial institutions, and civil society actors. Their design, governance, and operation embody compromises among actors with divergent interests, often privileging Northern economic concerns over Southern development priorities. Second, empirical evidence on carbon market effectiveness is mixed at best, with persistent concerns about additionality, permanence, and whether offset mechanisms generate genuine emissions reductions. Third, while carbon markets have delivered some sustainable development benefits, these outcomes are highly variable, often modest, and sometimes accompanied by negative social and environmental impacts. Fourth, carbon markets raise fundamental questions of justice, including North-South equity, impacts on indigenous peoples and local communities, and inadequate procedural participation and recognition.

Despite extensive scholarship, significant gaps remain in understanding the political economy of carbon markets in developing countries, particularly regarding national-level governance, developing country agency, comparative analysis, relationships between carbon markets and development strategies, institutional evolution over time, constructive approaches to equity, and interdisciplinary integration. This dissertation addresses these gaps through comparative political economy analysis of carbon markets in Indonesia, Kenya, and Peru.

The Paris Agreement's Article 6 mechanisms signal a new era for international carbon markets, creating both opportunities and risks for developing countries. Understanding how carbon markets have functioned under the Kyoto Protocol and in voluntary markets provides essential context for navigating this transition. This dissertation's analysis of past experiences, current dynamics, and future trajectories aims to inform more effective, equitable, and legitimate approaches to market-based climate governance in the Global South.

The following chapters build on this literature review's foundations. Chapter 3 details the dissertation's research design and methodology. Chapters 4, 5, and 6 present in-depth case studies of Indonesia, Kenya, and Peru, respectively, analyzing each country's carbon market engagement and outcomes. Chapter 7 offers comparative analysis across the cases, examining patterns and variations in political economy dynamics. The concluding chapter synthesizes findings, discusses theoretical and policy implications, and outlines directions for future research on climate finance and developing nations.

[End of Chapter 2]

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[Note: In a complete dissertation, this section would contain the full bibliographic citations for all 150+ references cited throughout the dissertation. For this example, representative entries are shown in Chicago 17th edition format.]

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