Innovative Climate Debt Instruments for Sustainable Management: Vietnam's Path to Climate Resilience

Thuc Anh Phan, International Francophone Institute, International School, Vietnam National University, Email: tanhphan@vnu.edu.vn.

Loi Duc Ngo, International Francophone Institute, International School, Vietnam National University, Email: ldngo@vnu.edu.vn.

Abstract

Vietnam ranks among the world's most climate-vulnerable economies and faces recurrent disaster-related losses to welfare and public finances. This study traces Vietnam's green finance evolution (2015-2025) across regulation, market development, investor behaviour, and the feasibility of catastrophe (CAT) bonds for climate resilience. Using policy analysis, trend data, two enterprise case studies, and international benchmarking, we find that green credit represents approximately 4-5% of lending and that labeled green bonds represent approximately 1.5% of the domestic bond market in 2023. Barriers include the absence of a binding green taxonomy, limited fiscal incentives, and low investor trust and awareness of the sector. We propose a sequenced reform agenda - taxonomy, CAT bond legal framework, targeted incentives, mandatory ESG disclosure, and literacy programs - and map each to observed constraints. The paper contributes an integrated, behaviour-aware framework for scaling climate debt in emerging markets and a practical design pathway for resilience finance.

Keywords: *behavioural finance, catastrophe bonds, climate risk, ESG, financial innovation, green bonds, green finance, policy evaluation, Vietnam*

1. Introduction

Vietnam ranks among the world's most climate-vulnerable economies, with natural disasters such as typhoons, floods, and droughts causing estimated annual losses to the national GDP (Dinh & Nguyen, 2020; World Bank, 2021). These impacts not only disrupt livelihoods and infrastructure but also threaten the country's long-term economic resilience and sustainability. In recognition of these challenges, Vietnam has committed to achieving net-zero carbon emissions by 2050, as articulated in the National Climate Change Strategy (The Prime Minister, 202 1).

Reaching this target will require a fundamental reconfiguration of the country's financial system to integrate sustainability principles into public and private investment decision-making. Globally, the use of green financial instruments has grown significantly, with green bond issuances expanding from USD 37 billion in 2014 to over USD 600 billion by 2021 (Climate Bonds Initiative, 2024). Climate debt instruments, including green bonds, sustainability-linked bonds, and catastrophe (CAT) bonds, have played a key role in mobilizing private capital for environmental objectives and financing disaster resilience, particularly in climate-vulnerable economies such as Jamaica, Mexico, and the Philippines (Ando et al., 2022; OECD, 2024). These instruments offer not only access to capital but also risk-transfer mechanisms that are critical for climate adaptation.

However, Vietnam's green finance ecosystem is underdeveloped. By 2023, green credit represented only 4-5% of total bank lending, while labeled green bonds accounted for only 1.5% of the domestic bond market (Tuoi Tre News, 2024; VietnamPlus, 2023). Institutional barriers, including the absence of a standardized green taxonomy, limited fiscal incentives, and fragmented ESG regulations, constrain market development. Equally important are behavioural factors, such as investor distrust and low awareness of green financial products, which further suppress adoption (Diep & Yen, 2024; IFC, 2023)

While previous research has discussed the emergence of green finance in Vietnam (Nguyen et al., 2024) and ESG policy diffusion in ASEAN (World Bank, 2022), three important gaps remain to be addressed.

First, few studies have evaluated the actual impact of Vietnam's green finance policies on credit and bond markets. Second, the behavioural barriers to market participation remain underexplored. Third, there is a lack of analysis of the potential integration of CAT bonds into Vietnam's financial system, despite their growing relevance in other climate-exposed economies.

This study addresses these gaps by examining Vietnam's green finance evolution from 2015 to 2025, focusing on innovative climate debt instruments, specifically green and CAT bonds, as tools for embedding sustainability in financial management. Using a mixed-methods approach that combines policy analysis, market data, enterprise case studies, and global benchmarking, this study provides evidence-based recommendations to strengthen Vietnam's green finance architecture and inform its replication in other emerging economies. This study aims to investigate three key aspects of Vietnam's green finance landscape: (1) How effective have Vietnam's green finance policies been in mobilizing sustainable lending and bond issuances? (2) Which behavioural barriers constrain adoption among retail investors and SMEs the most? (3) What institutional and legal conditions are required to integrate CAT bonds into Vietnam's financial architecture?

In addition, while disasters can temporarily increase the measured GDP through reconstruction outlays, they impose net welfare and fiscal losses via asset destruction, consumption volatility, and contingent liabilities. Therefore, we interpret 'losses' in welfare/fiscal terms rather than mechanical GDP effects.

2. Literature Review

This literature review synthesizes theoretical and empirical insights to contextualize Vietnam's green finance landscape, focusing on green finance, ESG investing, financial behaviour, and catastrophe bonds (CAT bonds), while pinpointing critical gaps that this study aims to address.

2.1. Theoretical Foundations of Green Finance and ESG Investing

Environmental finance theory posits that externalities, such as environmental degradation, can be internalized through market-based financial instruments. Green bonds and Environmental, Social, and Governance (ESG) strategies serve as key tools in this regard, enabling financial institutions to reallocate capital towards sustainable projects and practices. This theoretical foundation is central to Vietnam's policy efforts, as exemplified by Directive No. 03/CT-NHNN, which promotes green credit growth and environmental-social risk management in credit extension (State Bank of Vietnam, 2015; Weber, 2010; Barberis & Shleifer, 2003).

Complementing this, ESG investment frameworks have demonstrated a positive link to financial performance in over 60% of more than 2,000 empirical studies, underscoring the tangible benefits of integrating sustainability considerations into investment decisions (Friede et al., 2015). Sustainability transition theory, particularly Geels' multi-level perspective (MLP), positions green finance as a critical catalyst for low-carbon transitions. This framework is directly applicable to Vietnam's emerging green bond initiatives, which represent niche-level experimentation within a broader socio-technical regime (Geels, 2002). However, the path to systemic change is complex and constrained by several factors. Behavioural finance theory highlights barriers such as cognitive biases and information asymmetries, which inhibit the broader uptake of green investments (Lo, 2005; OECD, 2020). These behavioural frictions are particularly evident in Vietnam's fragmented market environment.

The combined application of MLP and behavioural finance suggests that while pioneering Vietnamese institutions are engaging in promising "niche-level" innovations, broader regime-level shifts remain elusive and require more time. This gap is perpetuated by limited policy enforcement, underdeveloped financial infrastructure and societal risk aversion. Cognitive biases and low awareness among investors, especially SMEs, compound these issues, creating a feedback loop in which behavioural distrust undermines regulatory implementation. Addressing these systemic challenges requires simultaneous action at all three MLP levels: fostering grassroots innovations, institutionalizing top-down reforms

such as green taxonomies and fiscal incentives and shifting behavioural norms through education and trust-building.

2.2. Green Bonds: Evolution, Global Landscape, and Market Dynamics

Green bonds are a leading financial instrument for channeling private capital toward sustainable development. Globally, the green bond market has expanded rapidly, from USD 37 billion in 2014 to over USD 600 billion in 2021, reflecting its increasing importance as a mechanism for achieving global climate goals (Climate Bonds Initiative, 2024). The rise in sovereign and corporate green bond issuances indicates not only investor appetite but also the growing policy role of capital markets in climate finance. Strong regulatory frameworks, such as those in the European Union and China, have driven success through taxonomic systems and transparency mandates.

In Southeast Asia, countries such as Indonesia and Thailand have made notable progress through sovereign green bonds and the development of ASEAN-aligned green taxonomies (World Bank, 2022). These initiatives illustrate the importance of clear regulatory guidance, fiscal incentives, and strategies for mobilizing domestic capital.

Aligning with this global shift is critical for mobilizing Vietnam's finances toward its 2050 net- zero targets and attracting foreign investments (Figure 1). However, as of 2023, green bond issuance stood at just USD 1 billion, accounting for only 1.5% of the domestic bond market (VietnamPlus, 2023; Tuoi Tre News, 2024). The contributing factors include the lack of a national green taxonomy, limited market incentives, and weak consumer engagement (Nguyen et al., 2018). Nevertheless, institutions such as the Bank for Investment and Development of Vietnam (BIDV) and EVN Finance have made significant progress by issuing verified green bonds and adopting international ESG standards (World Bank, 2024). These early efforts serve as foundational "niches" that may catalyze a broader market transformation.

Debt instruments relevant to Vietnam include: (i) green bonds (use-of-proceeds), (ii) Social and Sustainability bonds, (iii) Sustainability-Linked Bonds (SLBs) with KPI-based coupons, (iv) transition bonds targeting high-emitting sectors, (v) green sukuk (notably Indonesia's retail issuance), and (vi) CAT/ILS instruments with parametric triggers. Global bond market depth and sovereign benchmarks are central because they anchor the risk-free curve, enable the pricing of labeled issuances, and broaden the investor base to long-duration mandates. The literature notes benefits (signaling, dedicated ESG demand, and potential pricing effects) and risks (label dilution and verification/basis risk for parametric products).

2.3. Catastrophe Bonds (CAT Bonds): Mechanism and Global Adoption

Catastrophe bonds (CAT bonds) serve as innovative alternative tools to conventional funding mechanisms, specifically designed to mitigate climate risks and enhance climate adaptation and fiscal resilience. These instruments provide parametric payouts following extreme weather events, meaning a predetermined payout is triggered if specific, measurable parameters (e.g., wind speed, earthquake magnitude, rainfall levels) are met, rather than based on actual losses. This mechanism offers a vital tool for climate adaptation and disaster risk financing, providing rapid liquidity when needed most. Figure 2, illustrating the structure of a typical catastrophe bond, visually reinforces its role in transferring disaster risks from vulnerable entities to capital markets.

The effectiveness of CAT bonds has been demonstrated in various climate-vulnerable economies. Southeast Asia Disaster Risk Insurance Facility (SEADRIF) fully issued a USD 185 million CAT bond in 2021, with significant participation from European Insurance-Linked Securities (ILS) funds. Mexico has also pioneered their use, issuing a USD 485 million FONDEN-backed bond in 2020 to cover earthquake and storm risks. The Philippines' issuance of a USD 225 million CAT bond in 2019, guaranteed by the World Bank and facilitated through the Southeast Asia Disaster Risk Insurance Facility (SEADRIF), further exemplifies their utility in providing prompt post-disaster liquidity and bolstering fiscal resilience.

2.4. Vietnam's Specific Barriers and Pioneering Efforts

In contrast to these global successes, Vietnam faces persistent and multifaceted barriers to fully realizing its green finance potential. These include limited policy coherence, a narrow range of green financial products, and weak institutional capacity. Green loans disproportionately favor large enterprises, leaving small and medium-sized enterprises (SMEs) struggling with access due to significant information gaps. This challenge is exacerbated by the absence of a standardized green taxonomy, which heightens the risk of greenwashing and undermines investor confidence.

Surveys conducted in Vietnam have revealed significant hurdles in investor and consumer engagement in Vietnam. Only 30% of SMEs are aware of green credit products, and a mere 15% of retail investors express trust in green bonds, primarily driven by regulatory uncertainty and inherent risk aversion. Despite these widespread challenges, leading financial institutions such as BIDV and EVN Finance have emerged as pioneers in the field. BIDV's green loan portfolio has reached VND 71,000 billion (approximately USD 3 billion), with 97% of the loans disbursed to renewable energy projects. Similarly, EVN Finance issued a USD 75 million verified green bond, adopting international ESG standards to build credibility and attract international backing. However, broader market participation remains limited, indicating that these pioneering efforts, while commendable, are not yet sufficient to drive systemic change.

A notable shortcoming in Vietnam’s green finance system is the complete absence of catastrophe (CAT) bonds, despite the country’s severe exposure to climate risk. Unlike countries such as Jamaica and the Philippines, which have utilized CAT bonds to reduce fiscal burdens from natural disasters, Vietnam has not yet leveraged this climate-focused debt management tool. The primary challenges preventing the introduction of CAT bonds in Vietnam include incomplete legal frameworks for instruments like special purpose vehicles (SPVs) or parametric triggers, a lack of adequate information infrastructure for disaster modeling, and insufficient investor backing. This shortfall is particularly concerning given Vietnam’s vulnerability to climate-related disasters, such as floods, typhoons, and droughts, which collectively caused USD 2.5 billion in damages in 2017 alone. Vietnam remains institutionally ill-prepared to implement equivalent financial instruments, thereby limiting its climate adaptability and highlighting a general underuse of innovative financial instruments in its green finance initiatives.

2.5. Identified Research Gaps

This review identifies three primary research gaps that are crucial for advancing Vietnam’s green finance ecosystem. First, there is a notable lack of empirical studies evaluating the effectiveness of existing green finance policies, such as Directive No. 03/CT-NHNN. Existing research is largely descriptive or anecdotal, offering limited evidence on the direct impact of these policies on investment growth or quantifiable emissions reduction. This impedes a comprehensive understanding of policy outcomes, which is critical for Vietnam’s sustainability ambitions.

Second, investor psychology and behavior have been minimally explored, particularly among retail investors and SMEs, despite survey data indicating low awareness of and trust in green finance products. The influence of cognitive biases, risk perceptions, and behavioural barriers remains understudied, yet these factors are pivotal for scaling market participation.

Finally, despite Vietnam’s pronounced vulnerability to climate-induced disasters, there are no studies on the feasibility or design of CAT bonds within the Vietnamese context. This contrasts sharply with countries such as Jamaica and the Philippines, where such instruments are actively utilized. Legal, institutional, and market readiness deficits further exacerbate this gap, limiting Vietnam’s potential to leverage innovative financing for climate adaptation.

These three research gaps are not isolated but are deeply interconnected, forming a reinforcing cycle that impedes Vietnam's green finance development. For instance, the lack of clear empirical evidence regarding policy effectiveness contributes directly to regulatory uncertainty. This uncertainty, in turn,

fuels low investor trust and awareness, further hindering broad market participation and the adoption of innovative instruments, such as CAT bonds. If the impact of existing policies is unclear and investors lack trust in the market, the introduction of new, complex financial products faces even greater resistance. Furthermore, the lack of innovative instruments, such as CAT bonds, means that Vietnam is deprived of crucial tools for climate adaptation, which could ultimately undermine the overarching sustainability goals that green finance policies are designed to achieve. This chain of interconnected challenges demonstrates that weaknesses in one area exacerbate difficulties in others, underscoring the necessity of a holistic approach that simultaneously addresses all three gaps for systemic changes.

3. Methodology

This study employs a mixed-methods policy research design that integrates qualitative policy analysis, quantitative trend review, comparative benchmarking, and scenario modeling. This comprehensive approach is designed to evaluate Vietnam's green finance landscape and propose strategic pathways for scaling up investments through climate debt instruments, including green and catastrophe bonds. The chosen methodology is particularly well-suited to address the inherent complexity of Vietnam's green finance ecosystem, which encompasses regulatory frameworks, market behavior, and the potential for climate risk innovation. By combining diverse methods, the study enhances both the internal validity of its findings and the practical applicability of its policy recommendations (Creswell & Plano Clark, 2017; Brewer & Hunter, 2006; Greene, Caracelli, & Graham, 1989).

3.1 Data Sources and Collection Strategy

Given the limitations of primary data availability within Vietnam's emerging market context, this study primarily relies on secondary data. This includes information from authoritative sources such as the State Bank of Vietnam (SBV), Ministry of Finance (MOF), Office of the Prime Minister, and World Bank. Additionally, the study incorporates public disclosures from pioneering institutions such as BIDV and EVN Finance, alongside peer-reviewed academic articles and various industry reports published between 2015 and 2024. This strategic choice of data source ensured transparency and replicability. The rigor of the analysis is further maintained through cross-validation, for example, by comparing SBV data with the corresponding World Bank data, thereby building a robust evidence base despite the absence of direct data collection (Johnston, 2014; Bryman, 2016).

3.2 Analytical Framework and Justification

We employed six mutually reinforcing components to evaluate Vietnam's green finance ecosystem, with an emphasis on replicability and policy relevance (Creswell & Plano Clark, 2017; Yin, 2018):

(1) Policy effectiveness rubric. We rate core instruments (e.g., SBV Directive 03/CT-NHNN; MOF Circulars 155/2015, 96/2020, 101/2021) on four dimensions - clarity, coherence, transparency, and scalability - each scored 0-2 using an operational codebook adapted from public-sector green-bond guidance (Climate Bonds Initiative & UNEP Inquiry, 2015; World Bank, 2021; OECD, 2023). A composite Policy Effectiveness Index (PEI) is computed as the means of the four-dimension scores per instrument, then averaged across the instruments. Disagreements in scoring were reconciled by a second coder and reported (see Replicability section).

(2) Market trend analysis. Using secondary data (SBV, MOF, World Bank, issuer disclosures) for 2015-2024, we compute (i) the annual growth of green credit and labeled green bonds, (ii) the share of green credit in total lending, (iii) green bonds as a percentage of domestic bonds, and (iv) issuance concentration by issuer type. Descriptive statistics are appropriate in the case of data scarcity (Aerts & Cormier, 2009; McKenzie, 2012).

(3) Case studies (BIDV, EVN Finance). Cases were chosen to demonstrate issuance and international verification. Evidence sources include prospectuses, SPOs/assessments, and multilateral case notes

(World Bank, 2024), which are coded for instrument structure, verification, proceeds allocation, reporting, and constraints. Cross-case synthesis identifies replicable design features (Yin, 2018).

(4) Comparative benchmarking. We benchmark Vietnam against China, France, Indonesia, Thailand, and CAT-bond adopters (Mexico, Jamaica, and the Philippines) using a scorecard: taxonomy (Y/N), disclosure mandates (Y/N), fiscal incentives (0-2), GSS market depth (proxied by GSS share), and CAT-bond readiness (0-2). The inputs are drawn from OECD and World Bank materials and EU SFDR/Taxonomy documentation (OECD, 2024; World Bank, 2022; European Commission, 2022).

(5) Behavioural segmentation. We map investor segments along knowledge Ã— trust (low/high) using published surveys (IFC, 2023; Edwards *et al*., 2023; Diep & Yen, 2024). For each segment, we specify barriers (e.g., ambiguity aversion, greenwashing concerns) and policy levers (product labeling, dashboards, guarantees) consistent with behavioural finance (Lo, 2005; OECD, 2020).

(6) CAT bond scenario design. We developed sovereign, corporate, and regional pool scenarios, specifying peril coverage, parametric triggers, payout layers, and governance pathways (Ando *et al*., 2022; OECD, 2024). Triggers are defined using observable metrics (e.g., maximum sustained wind speed, 24-hour rainfall, flood stage exceedance) and data sources available via the World Bank/SEADRIF platforms. The scenarios emphasize legal feasibility (SPV arrangements), data requirements, and investor fit.

Together, these components allow an integrated assessment linking regulation, markets, behaviour, and disaster risk transfer to actionable reforms.

3.3. Limitations and Mitigation Strategies

This study acknowledges three key limitations, each of which addresses targeted mitigation strategies to maintain analytical rigor and policy relevance (Johnston, 2014; Bryman, 2016; Maxwell, 2012). First, the absence of primary interviews due to resource constraints and Vietnam's limited data access is mitigated by triangulating multiple credible secondary datasets, such as policy documents, financial reports, and peer-reviewed articles, while leveraging BIDV and EVN Finance case studies for depth, which ensures a robust evidence base despite the lack of direct data collection (Johnston, 2014). Second, incomplete firm-level transaction data, which is a common challenge in Vietnam's emerging market, are addressed by relying on aggregate financial reports and macro trends from sources such as the SBV and World Bank with clear disclosure of data boundaries to maintain transparency and credibility (Bryman, 2016). Third, the lack of emission reduction quantification, which restricts the ability to directly assess environmental impact, is flagged as a direction for future research, thereby allowing the study to focus on financial and policy scalability in the current scope (Maxwell, 2012).

4. Results and Comparative Analysis

This study explains Vietnam's current state of green finance, starting with policymaking effectiveness, followed by the development of green bonds, investor outlook, and catastrophe (CAT) bond feasibility.

4.1. Policy Effectiveness and Regulatory Frameworks

Vietnam's green finance landscape has undergone gradual institutional development over the past decade, marked by a series of regulatory initiatives aimed at integrating environmental and social considerations into financial decision-making processes. A pivotal starting point was Directive No. 03/CT-NHNN issued by the State Bank of Vietnam (SBV) in 2015, which encouraged environmental and social risk screening during credit evaluation. This was followed by the Green Banking Development Scheme (SBV, 2018), which sought to align banking practices with global sustainability standards and Circular No. 101/2021/TT-BTC by the Ministry of Finance (MOF), which reduced green bond issuance fees by 50% as a fiscal incentive. Complementing these efforts, Circulars No. 155/2015/TT-BTC and No. 96/2020/TT- BTC introduced Environmental, Social, and Governance

(ESG) disclosure requirements for listed companies, gradually aligning Vietnam's disclosure landscape with those of ASEAN and EU economies (Table 1).

Policy Name	Issuing Body	Year	Key Objectives/Provisions	Observed Impact/Limitations
Directive No. 03/CT-NHNN	SBV	2015	Mandated environmental and social risk screening in lending.	Initiated green credit growth, but non-binding.
Green Banking Scheme	SBV	2018	Aligned banking practices with global green standards.	Framework-level only; lacks enforcement mechanisms
Circular No. 101/2021/TTBTC	MOF	2021	Reduced green bond issuance fees by 50%.	Positive incentive, but insufficient to overcome broader barriers
Circular No. 155/2015/TTBTC	MOF	2015	Introduced ESG disclosure requirements for listed companies.	Early transparency measure, limited scope
Circular No. 96/2020/TTBTC	MOF	2020	Updated guidelines on ESG disclosure requirements.	Gradual progress, but lacks taxonomy support

Table 1: Key Green Finance Initiatives in Vietnam

By 2023, these policy efforts contributed to green credit reaching 4-5% of total lending, with 22-26% annual growth across 47 financial institutions (VietnamPlus, 2023; World Bank, 2024). Although notable, these figures underscore the limited systemic impact of current policies, which remain voluntary in nature and lack a formal and enforceable green taxonomy. In the absence of mandatory compliance or standardized definitions, market actors face uncertainty in implementation, and the risk of greenwashing is high. These policies signal direction but do not impose enforceable obligations, resulting in fragmented institutional responses rather than coordinated sector-wide transformation.

Comparative evidence supports this conclusion. For example, China's 2015 Green Bond Catalogue and the establishment of Green Finance Pilot Zones have led to over USD 180 billion in green bond issuances by 2023, driven largely by top-down mandates and incentive alignment (OECD, 2024). Similarly, the EU's Sustainable Finance Disclosure Regulation (SFDR) enforces ESG reporting standards and taxonomies, facilitating consistent classification and accountability across member states (European Commission, 2022). These systems offer a prescriptive regulatory model, in contrast to Vietnam's 'soft law' approach, which relies on guidelines rather than binding directives.

Without a formal green taxonomy, Vietnam lacks a shared definition of what qualifies as 'green,' thereby undermining investor confidence and market integrity in the GSS. This regulatory gap hinders the scaling of green financial products and contributes to capital allocation inefficiencies. Although the issuance of ESG-related circulars is commendable, their limited scope and voluntary status fall short of international best practices.

This suggests that while Vietnam's regulatory interventions have laid the foundational groundwork, they have not yet achieved the 'regime-level" transition necessary to mainstream green finance. Instead, what is observed can best be characterized as 'niche-level experimentation,' where isolated initiatives by pioneering institutions are not yet supported by a comprehensive legal and fiscal infrastructure.

In summary, Vietnam's current policy architecture offers important directional guidance but lacks the mandates, taxonomies, and enforcement mechanisms required to institutionalize green finance at scale. A shift from voluntary norms toward mandatory regulations and targeted fiscal incentives is necessary to drive systemic adoption and align with global sustainable finance trajectories.

4.2. Green Bond Market Development: Case Studies and Benchmarks

Vietnam's green bond market remains promising, with total issuances surpassing USD 1 billion by 2023, yet accounting for only 1.5% of the total domestic bond market (Tuoi Tre News, 2024; VietnamPlus, 2023). This low share reflects the country's early stage of market development and the concentration of activity among a few pioneering institutions. The investor base remains narrow, predominantly comprising institutional actors, while retail investor engagement is limited, largely because of a lack of accessible products, clear green labeling, and transparent ESG disclosure frameworks.

Despite these limitations, two Vietnamese financial institutions have emerged as early leaders: the Bank for Investment and Development of Vietnam (BIDV) and the EVN Finance Joint Stock Company. Their case studies illustrate both the potential and constraints of green bond issuance in Vietnam's current regulatory environment.

Case Study: Bank for Investment and Development of Vietnam (BIDV)

BIDV is the most prominent Vietnamese institution proactively engaging with international green finance frameworks. In 2023, BIDV issued VND 2,500 billion (approximately USD 104 million) in green bonds, certified under Moody's SQS2 assessment framework, a signal of alignment with global expectations of transparency and environmental impact (World Bank, 2024; BIDV, 2023). As of September 2023, BIDV's total green loan portfolio had reached VND 71,000 billion (~USD 3 billion), with 97% of the funds allocated to renewable energy projects, particularly wind and solar infrastructure (World Bank, 2024; BIDV, 2023). This issuance is significant for several reasons. First, it shows that Vietnam's state-owned banks can meet rigorous international standards, which is an important reputation marker for the country's financial sector. Second, it reveals the reliance on external verification frameworks, such as Moody's Second-Party Opinion (SQS2 rating), to fill the credibility vacuum left by the absence of a national green tax policy. Note that without a centralized taxonomy or disclosure system, the scope of what qualifies as "green" remains institutionally subjective and difficult to benchmark.

From a systemic perspective, BIDV's case illustrates a form of niche innovation in an underregulated environment. Its leadership is not primarily a function of a conducive ecosystem but rather the result of institutional capacity and political alignment with national climate goals.

However, this success is difficult to replicate without supportive structural mechanisms, such as tax incentives, ESG registries, or a centralized monitoring authority. Thus, while BIDV sets a valuable precedent, it also highlights the fragility of a system that is overly reliant on first movers operating without a comprehensive national framework.

Case Study: EVN Finance Joint Stock Company

EVN Finance, a subsidiary of Vietnam Electricity (EVN), issued VND 1,725 billion (USD 75 million) in green bonds in 2022, verified by GuarantCo and ResponsAbility Investment AG, two internationally recognized institutions in the sustainable investment field (GuarantCo, 2022; World Bank, 2024). These bonds are dedicated to funding clean energy infrastructure, particularly solar energy assets, and have received substantial attention from foreign impact investors.

Unlike BIDV, EVN Finance operates as a non-bank financial institution, making its entry into the green bond market particularly noteworthy. This demonstrates that non-bank actors can play a pivotal role in

diversifying the green finance ecosystem. However, EVN Finance's success hinges on international partnerships and project-specific guarantees rather than domestic regulatory support. Its reliance on GuarantCo's guarantee structure, for instance, reflects the Vietnamese market's risk aversion and dependence on external de-risking mechanisms to attract capital.

Furthermore, EVN Finance's focus remains sectoral, limited to energy, and it lacks a broad ESG-integration strategy. While the issuance succeeded in attracting global attention, its replication has been minimal so far. This highlights the systemic challenge of scaling up green finance without coordinated policy support. The lack of secondary market development, retail engagement, and diversification beyond energy further constrains market growth potential.

4.3. Strategic Insights and Comparative Perspective

These two cases collectively demonstrate Vietnam's capacity to engage with international sustainable finance mechanisms and attract global capital for green projects. However, they also expose a dual-layered fragility in the system: one stemming from the absence of regulation and the other from market fragmentation (Table 2).

Key Challenges/Observations	Definitional ambiguity due to absence of national green taxonomy; limited policy support constrains scalability.	High-quality verification and strong international interest; replication hindered by systemic policy and market fragmentation.
Allocation to Green Projects	97% allocated to renewable energy (wind and solar projects)	100% dedicated to verified clean energy infrastructure
Green Portfolio Value (as of Sep 2023)	VND 71,000 billion (~USD 3 billion)	Not publicly disclosed (energy sector specific)
Certifications/Verifications	Moody' s SQS2 Framework	GuarantCo and ResponsAbilit y Investment AG
Type of Bond	Green Bond	Green Bond
Bond Value	VND 2,500 billion (USD 104 million)	VND 1,725 billion (USD 75 million)
Year of Issuance	2023	2022
Institution	BIDV	EVN Finance

Table 2: Green Bond Issuances and Portfolio Details of BIDV and EVN Finance

Although BIDV and EVN Finance have issued technically sound and externally verified green bonds, their experiences remain exceptional rather than foundational. The green bond ecosystem in Vietnam is currently held together by a handful of capable institutions rather than an enabling infrastructure. This sharply contrasts with international examples such as: France, which issued over EUR 45 billion in sovereign green bonds underpinned by a robust legal framework and ESG disclosure mandates (OECD, 2024); Indonesia, which successfully launched retail green sukuk, engaged individual investors, and broadened financial inclusion (World Bank, 2022); while Thailand has institutionalized ESG reporting standards through its Securities and Exchange Commission, fostering transparency and trust.

In these markets, the state acts as a facilitator, creating conditions for scale, trust and transparency. In Vietnam, by contrast, market success depends on institutional bravery and international partnerships rather than systemic design.

To move beyond isolated cases, Vietnam must:

1. Introduce a legally binding green taxonomy, as both BIDV and EVN Finance face definitional ambiguity.

2. Establish a public registry for green bond issuances to build market transparency and secondary trading depth.

3. Expanding fiscal and non-fiscal incentives, such as tax relief and ESG scoring, encourages other institutions to follow suit.

Without these systemic reforms, the green bond market will remain a patchwork of pilot projects rather than a functioning vehicle for sustainable transformation.

4.3. Investor Behavior and Market Participation Challenges

Investor behavior remains a significant bottleneck in scaling green finance in Vietnam. Empirical surveys reveal persistent issues of low awareness, limited trust, and risk aversion among retail investors and SMEs. For example, recent data indicate that only 30% of SMEs are aware of green credit offerings, and only 15% of retail investors express confidence in green bonds, largely due to fears of greenwashing and perceived regulatory ambiguity (Diep & Yen, 2024; IFC, 2023). This low-trust, low-awareness environment creates a psychological barrier that suppresses the demand for green financial products, even when supply side innovations are present.

Segment Name	Characteristics	Key Behavioral Barriers	Recommended Tailored Policy Interventions
Low-knowledge low-trust	Rural SMEs, informal sector	Financial illiteracy, lack of awareness, ambiguity aversion	Foundational financial literacy programs, simplified product information.
High-knowledge low-trust	Fintech-savvy youth	Greenwashing fear, lack of transparency, perceived risk	Green-bond labeling, digital ESG platforms, verifiable impact reporting.
Low-knowledge high-trust	Middle-income consumers banking with state institutions	Lack of awareness of green products, limited outreach	Targeted green banking outreach leveraging existing trust, simplified green product offerings.
High-knowledge high-trust	Institutional investors (e.g., AIA, Prudential)	Limited product diversity, insufficient incentives	Greater product diversity, tax incentives, robust ESG ratings

Table 3: Investor Behavioural Segments and Tailored Policy Interventions

These findings align with the behavioural finance theory, which highlights the role of cognitive biases, information asymmetries, and ambiguity aversion in investor decision-making (Lo, 2005; OECD, 2020). In the Vietnamese context, the absence of standardized green definitions and insufficient ESG disclosures reinforce these biases. Investors struggle to differentiate between genuinely sustainable

offerings and superficial green products, exacerbating skepticism and deterring participation.

Moreover, while Vietnamese consumers are increasingly exposed to sustainability themes through global media, they continue to prioritize short-term financial metrics such as return, liquidity, and perceived safety. A McKinsey-backed study by Edwards *et al.* (2023) shows that even among urban, higher-income individuals, green product adoption remains minimal unless accompanied by explicit government backing or clear risk-adjusted returns. This indicates that financial motivation alone is insufficient; green finance must overcome narrative gaps and trust deficits.

To unpack these behavioural barriers more precisely, Diep and Yen (2024) propose a 2x2 investor segmentation model, which this study adopts as an analytical framework. This model classifies investors along two dimensions: financial literacy (low vs. high) and trust in green finance (low vs. high). Each segment exhibits distinct challenges and requires tailored policy responses (Table 3).

Low-knowledge-low-trust segment: Includes rural SMEs and individuals in the informal sector. They face financial illiteracy, low access to ESG information, and a generalized distrust of formal finance. For this group, foundational interventions, such as public financial literacy campaigns and outreach via local banking agents, are essential.

High-knowledge-low-trust group: Predominantly fintech-savvy youth and professionals who engage with digital finance platforms. They are aware but remain skeptical, often citing greenwashing concerns. Targeted policies, such as verifiable green bond certification, digital ESG dashboards, and mandatory impact disclosures, are recommended to build transparency.

Low-knowledge-high-trust segment: Typically, middle-income clients bank with state-owned institutions. Although they trust financial intermediaries, they lack an understanding of green finance products. Clear product labeling, simplified application procedures, and bundled offerings with traditional savings products can enhance uptake among this group of women.

High-knowledge-high-trust group: Institutional investors (e.g., Prudential, AIA) and some affluent urban individuals. They are willing to participate but require more sophisticated instruments, such as tax incentives, secondary market liquidity, and advanced ESG integration to scale up their involvement.

International precedents reinforce these lessons in the following ways. In the EU, the Sustainable Finance Disclosure Regulation (SFDR) mandates clear product classification, enabling both institutional and retail investors to distinguish sustainable investments. Similarly, Thailand's Securities and Exchange Commission (SEC) enforces ESG disclosure standards that have improved retail participation and market trust (World Bank, 2022). Vietnam, lacking such rigorous regulatory instruments, remains caught in a 'low-participation equilibrium' where limited investor trust constrains product growth, and product scarcity further dampens investor interest.

To operationalize the 2Ã—2 segmentation, we pair low-knowledge-low-trust audiences with simplified, taxonomy-labeled deposits/notes distributed via state banks, while high-knowledge-low-trust users receive digital ESG dashboards and verified impact reports (IFC, 2023; Edwards et al., 2023). For institutional segments, scale depends on taxonomy alignment, secondary market liquidity, and fiscal incentives, which together reduce ambiguity aversion and increase allocation to labeled debt (Lo, 2005; OECD, 2020).

4.4. Catastrophe Bond Feasibility and Scenarios for Vietnam

Vietnam's acute vulnerability to climate change, manifested through frequent floods, typhoons, and droughts, necessitates the exploration of innovative financial mechanisms to enhance climate resilience. The conspicuous absence of catastrophe (CAT) bonds in its financial architecture, particularly when contrasted with global peers who have effectively leveraged such instruments, is increasingly

conspicuous. Despite estimated economic damages of USD 2.5 billion in 2017 alone and projections that climate-induced losses may reach up to 3% of GDP annually by 2030 (General Department of Disaster Prevention and Control, 2019; World Bank, 2021), Vietnam has yet to issue a CAT bond.

CAT bonds are parametric insurance-linked securities that trigger payouts when predefined climate thresholds are reached (e.g., wind speed and rainfall). This ensures rapid post-disaster liquidity for governments or institutions, mitigating fiscal pressure without needing to assess actual loss - a feature particularly useful for countries such as Vietnam, where damage-assessment infrastructure is still underdeveloped (Ando *et al*., 2022; OECD, 2024).

4.5. Global Benchmarking Insights

Several countries with similar climate exposures offer compelling case studies. Jamaica's USD 185 million CAT bond (2021), supported by European Insurance-Linked Securities (ILS) investors, provided effective post-hurricane relief. Mexico's USD 485 million FONDEN-backed bond (2020) and the Philippines' USD 225 million issuance via SEADRIF (2019) similarly showcase how CAT bonds can function as climate adaptation tools and fiscal stabilizers (Ando *et al*., 2022).

Scenario design parameters. For Vietnam, we specify (i) sovereign coverage for typhoon and flood perils via a World Bank/SEADRIF-facilitated SPV; (ii) corporate coverage for state-linked energy assets (BIDV/EVN Finance) to protect cash flows; and (iii) an ASEAN pooled layer to diversify risk. Triggers use observable metrics (e.g., JTWC maximum sustained wind speed, 24-hour rainfall at national gauges, river-stage exceedance) with layered payouts (e.g., 30/60/100% at increasing severities) and independent calculation agents to ensure speed and credibility (Ando *et al*., 2022; OECD, 2024). This design minimizes basis risk and aligns with the data infrastructure available through multilateral facilities. Table 4 provides a comparative overview of Vietnam's green finance and disaster risk financing frameworks relative to global peers, highlighting areas of strength and needed reform.

Country/Region	**Key Policy Frameworks**	**Green Bond Market Size / Share**	**Key Green Finance Products**	**CAT Bond Adoption**	**Noteworthy Strengths / Lessons Learned**
Vietnam	Voluntary policies; nascent ESG disclosure; no green taxonomy	USD 1 billion (≈1.5% of domestic bond market)	Green credit; green bonds (BIDV, EVN Finance)	No	Institutional pioneers; strong political will; lacks mandatory frameworks and disaster financing tools
China	Green Bond Catalogue (mandatory); Green Finance Pilot Zones	USD 180 billion (2023)	Green bonds; green credit	Limited	Top-down enforcement; robust issuance scale; unified policy architecture
France	Legally binding EU Taxonomy; SFDR; Green Deal fiscal strategy	EUR 45 billion (sovereign green bonds)	Sovereign green bonds; ESG-focused bonds	Limited	Advanced ESG integration; strong legal foundation; investor trust

					through transparency
Indonesia	Sovereign green sukuk; national green taxonomy	Growing rapidly	Retail green sukuk; green bonds	No	Retail participation success; policy innovation; regional taxonomy alignment
Thailand	SEC-mandated ESG disclosures; taxonomy in development	Emerging	Green bonds; green credit	No	Strong regulatory reforms; investor confidence through disclosure mandates
Jamaica	Legal infrastructure for CAT bonds; ILS investor engagement	N/A	CAT bonds	Yes (USD 185 million, 2021)	Early adopter of parametric bonds; effective risk transfer; regional collaboration
Mexico	FONDEN sovereign disaster framework; parametric triggers	N/A	CAT bonds	Yes (USD 485 million, 2020)	Multi-hazard coverage model; public-private integration; institutional maturity

Table 4: Comparative Green Finance Landscape: Vietnam vs International Benchmarks

These international cases demonstrate that CAT bonds are not solely reliant on financial innovation; they demand robust regulatory environments, legal definitions for instruments such as Special Purpose Vehicles (SPVs), disaster modeling capability, and investor education. Vietnam currently lacks these prerequisites, preventing the formation of a legal or operational foundation for CAT bonds.

4.6. Key Barriers in the Vietnamese Context

Vietnam's roadblocks are primarily institutional and legal, rather than financial. as noted by the OECD (2024).) Three central constraints persist.

1. Absence of a Legal Framework : Vietnam has no provisions for establishing SPVs or parametric payout structures, which are the backbone of the CAT bond architecture.

2. Lack of Risk Modeling Infrastructure: Unlike Mexico or the Philippines, Vietnam lacks a standardized, government-supported disaster risk modeling system capable of feeding reliable data into parametric triggers.

3. Low Investor Awareness and Market Depth: Institutional investors in Vietnam are unfamiliar with CAT bonds, and there are no domestic precedents to build trust or market knowledge.

4.7. Scenario-Based Feasibility Assessment

To address these gaps while leveraging existing green finance experience, this study proposes three following tailored CAT bond implementation scenarios: sovereign bond, corporate bond, and regional pool; each benchmarked against successful international precedents (Table 5).

Scenario Type	Proposed Mechanism/Issuing Entity	Target Assets/Risks	Key Global Benchmarks	Primary Benefits/Challenges for Vietnam
Sovereign Bond	World Bank / SEADRIF	Public infrastructure, flood-prone areas (Mekong Delta)	Philippines (2019), Mexico (FONDEN model)	Fiscal resilience, international expertise; requires legal framework development.
Corporate Bond	BIDV / EVN Finance	Renewable energy infrastructure	Jamaica (2021), Mexico (2020 corporate models)	Builds on existing green bond experience; requires specific legal/regulatory support.
Regional Pool	ASEAN+3 / SEADRIF	Diversified climate risks across region	Caribbean Catastrophe Risk Insurance Facility (CCRIF)	Reduced premiums through risk-sharing; requires strong regional cooperation

Table 5: Proposed Catastrophe Bond Scenarios for Vietnam

These scenarios are structured to align with Vietnam's current capacities and its gradual path toward legal and institutional readiness. Importantly, the corporate issuance route via pioneers such as BIDV and EVN Finance could serve as a lower-risk, scalable entry point, building on their green bond experience and international recognition (World Bank, 2024).

4.8. Policy Implications and Future Pathways

Rather than viewing CAT bonds as a distant objective, Vietnam should consider them a complementary tool for existing mitigation-focused finance (e.g., green bonds). Their parametric nature makes them especially suited for adaptation and resilience, areas where Vietnam remains underfunded. The Ministry of Finance, in coordination with the SBV and external partners such as the World Bank and SEADRIF, should begin technical feasibility assessments, starting with flood-prone provinces in the Mekong Delta.

Incorporating CAT bonds into Vietnam's green finance strategy would not only diversify the country's sustainable finance toolkit but also send a strong signal of climate adaptation readiness to domestic and international stakeholders. This shift is essential if Vietnam is to meet its estimated USD 368-380 billion green investment needs by 2040 and withstand the intensifying financial risks posed by climate change (Vietnam Investment Review, 2024).

5. Discussion

Vietnam has made encouraging strides toward building a green financial system. However, the country remains constrained by systemic limitations, including a lack of regulatory clarity, shallow market depth, low investor confidence, and the complete absence of climate resilience tools, such as catastrophe bonds (CAT bonds). These shortcomings collectively hinder Vietnam's capacity to mobilize the scale of capital necessary for a net-zero transition and climate adaptation.

5.1. Structural Limitations and Regulatory Ambiguity

Vietnam's green finance policy framework remains normative rather than prescriptive, and lacks enforceable mandates or a unified taxonomy. This voluntary approach contrasts sharply with those of global leaders such as the European Union, with its Sustainable Finance Disclosure Regulation (SFDR), and China, with its Green Bond Endorsed Project Catalogue, both of which mandate compliance and provide clear eligibility criteria for green assets (European Commission, 2022; Climate Bonds Initiative, 2024). The absence of such instruments in Vietnam results in ambiguous definitions and inconsistencies in their application, significantly increasing the risk of greenwashing.

Moreover, Circular No. 101/2021/TT-BTC offers modest transaction-cost incentives. Broader fiscal tools, such as tax deductions, green loan guarantees, and blended finance mechanisms, prevalent in peer economies such as Indonesia and France, are absent. These instruments have proven crucial for shifting capital flows toward sustainable projects (OECD, 2024). Without such systemic levers, Vietnam's green finance environment will remain fragmented and overly reliant on voluntary adoption of green finance.

5.2. Pioneering Institutions and Systemic Inertia

BIDV and EVN Finance have emerged as pioneers in Vietnam's green finance ecosystem, issuing certified green bonds aligned with international standards such as Moody's SQS2 and GuarantCo verification. These efforts, while commendable, are institution-led and have not been widely replicated in other countries. This limited diffusion reflects broader systemic inertia. The absence of standardization and policy enforcement creates high entry barriers for other institutions, stalling broader market participation and innovation in the field.

This dynamic aligns with Auld *et al.* (2008), who caution that voluntary, private-led initiatives without public backing tend to yield marginal improvements and risk stalling before reaching a systemic scale. Vietnam's reliance on a few market leaders without building supporting regulatory infrastructure suggests a model that is neither resilient nor scalable. Without policy reform, these pioneering efforts risk becoming isolated success stories rather than catalysts of systemic change.

5.3. Behavioural Barriers and the Imperative for Tailored Engagement

Investor psychology is a deeply rooted challenge. Survey data show that only 30% of SMEs are aware of green credit, and only 15% of retail investors trust green bonds (Diep & Yen, 2024; IFC, 2023). These figures highlight a chronic trust deficit driven by a lack of transparency, regulatory uncertainty, and low financial literacy. According to the behavioural finance literature, ambiguity aversion and status quo bias play key roles in suppressing market engagement (Lo, 2005; Thaler & Sunstein, 2008).

Vietnam's financial culture, which is largely risk-averse and underexposed to sustainability frameworks, requires segmented interventions. As outlined in Section 4.3, tailored approaches, such as targeted green banking outreach, ESG product labeling, and simplified communication strategies, are essential. Thailand's success in enforcing ESG disclosure and investor transparency through SEC regulations demonstrates that building behavioural trust requires regulatory scaffolding, not just education.

5.4. The Critical Absence of Catastrophe Bond Infrastructure

One of the most critical oversights in Vietnam's green finance strategy is the absence of a catastrophe (CAT) bond infrastructure. This is particularly troubling given the country's exposure to climate-related disasters, including floods and typhoons, which cost an estimated USD 2.5 billion in 2017 (General Department of Disaster Prevention and Control, 2019). With insurance penetration remaining below 3%, the fiscal risk of natural hazards is disproportionately borne by the government.

The barriers to CAT bond implementation in Vietnam are primarily legal and institutional, such as the lack of frameworks for special purpose vehicles (SPVs) and parametric triggers, rather than capital or investor appetite. This is evident in comparison to Jamaica's 2021 CAT bond (USD 185 million) and the Philippines' 2019 issuance through SEADRIF (USD 225 million), both of which were facilitated by strong regulatory infrastructure and international partnerships (Ando *et al*., 2022).

Vietnam's current green finance focus remains overly mitigation-centric, emphasizing renewable energy. However, without resilience-focused tools such as CAT bonds, the country risks being vulnerable to shocks that could derail its sustainable development agenda. Incorporating CAT bonds would diversify financial tools, attract impact investors, and alleviate post-disaster fiscal pressure.

5.5. Vietnam's Global Standing and Future Trajectory

Vietnam is at a strategic inflection point. The country has demonstrated strong political will and early-stage institutional innovation through entities such as the BIDV and EVN Finance. However, systemic gaps in policy coherence, investor engagement, and financial product diversity continue to prevent the market from reaching its full potential.

In comparison with international leaders:

- China boasts top-down enforcement and fast-tracked market scaling.
- France combines robust legal mandates with ESG integration across the bond markets.
- Indonesia offers inclusive financial models, such as retail green sukuk.
- Jamaica and Mexico illustrate the effectiveness of disaster risk bonds for climate adaptation.

Vietnam can leverage its regional relationships and international development ties to adopt such innovations. Its flexible governance model and willingness to experiment position it well for adaptation, but only if future reforms are proactive, integrated, and rigorously enforced.

5.6. Policy Recommendations

This study proposes a sequenced roadmap comprising five interrelated policy actions to enhance Vietnam's green finance ecosystem and improve its resilience to climate-related risks. These recommendations are grounded in the empirical findings outlined in Sections 4 and 5, supported by international precedent, and tailored to Vietnam's institutional context, regulatory capacity and market readiness. Their strategic implementation is essential for enabling Vietnam to meet its net-zero commitment by 2050 and strengthening its position as a regional leader in sustainable finance.

First, it is important to establish a legally binding national green taxonomy. As outlined in Section 5.1, the absence of standardized definitions for green investments fosters inconsistent practices, heightens greenwashing risks, and erodes investor trust. A green taxonomy offers a clear classification framework essential for aligning credit allocation, bond certification, and ESG reporting with environmental goals. Drawing from the ASEAN Taxonomy for Sustainable Finance and the EU Taxonomy, Vietnam should prioritize sectors critical to decarbonization and adaptation - namely, energy, agriculture, construction, and transportation - in its initial rollout (ASEAN Taxonomy Board, 2022; European Commission, 2022). A look at precedents in the EU and Indonesia shows that early versions of national taxonomies were drafted and piloted within a 12-18-month time frame (World Bank, 2022). Moreover, rapid yet consultative development, led by the State Bank of Vietnam (SBV), Ministry of Finance (MOF), and State Securities Commission (SSC), with input from financial institutions and civil society, will help ensure both legitimacy and enforceability. Key performance indicators (KPIs) should include the adoption rates of taxonomy by regulated institutions and reductions in unverified green bonds post-implementation.

Second, Vietnam should develop a legal and institutional framework for catastrophe bonds (CAT bonds). Despite being one of the most climate-vulnerable countries in Southeast Asia, Vietnam currently lacks parametric risk-transfer mechanisms. This stands in contrast to peer nations like the Philippines, which launched a USD 225 million CAT bond via SEADRIF and the World Bank in 2019, and Jamaica, which issued a USD 185 million CAT bond in 2021 (Ando et al., 2022; OECD, 2024). Implementing CAT bonds requires a complex enabling environment, including legislation for special purpose vehicles (SPVs), disaster data infrastructure, and a legal basis for parametric pay-outs. A three-year timeline is therefore appropriate and aligns with the average preparatory phase in comparable economies (World Bank, 2021). A phased approach is advisable, beginning with a sovereign pilot bond focused on high-risk areas like the Mekong Delta, co-developed with the World Bank or SEADRIF, before expanding to corporate-level issuance by entities such as BIDV or EVN Finance.

Third, Vietnam should introduce fiscal incentives for green finance. While regulatory frameworks have expanded, market participation remains shallow because of limited demand- side support. Drawing on the EU Green Deal and Indonesia's green sukuk strategy, Vietnam could implement tax credits for institutional green bond investors, loan guarantees for SMEs in clean technology, and blended finance models for infrastructure (Schratzenstaller, 2023; Climate Bonds Initiative, 2024). The urgency of stimulating private sector participation required for fiscal reform is in line with Vietnam's growing climate investment gap. These incentives should be conditional on compliance with forthcoming national taxonomy and ESG reporting requirements to safeguard financial and environmental integrity.

Fourth, Vietnam should mandate ESG reporting by all publicly listed companies and major financial institutions. Currently, ESG disclosures are voluntary and inconsistent, undermining market transparency and investor confidence. Thailand's SEC provides a proven model: its mandatory ESG regime, implemented within 18 months, significantly increased the reporting quality and market alignment with global standards (World Bank, 2023). Vietnam should follow suit by adopting frameworks such as the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB) and integrating them into SSC listing regulations and SBV banking supervision. A phased rollout - beginning with VN30 companies and expanding to all large-cap firms - will ease compliance while accelerating market-wide standardization. The success of this policy should be monitored through ESG score improvements, foreign investor inflow, and compliance rates.

Finally, Vietnam should scale up national green finance literacy and outreach programs targeting SMEs, retail investors, women, and youth-led businesses. The findings in Section 4.3 indicate widespread behavioural barriers, with only 30% of SMEs aware of green credit products and only 15% of retail investors trusting green bonds. Global evidence from the IFC and McKinsey shows that targeted education campaigns, when sustained over a 1-2 year period, can measurably shift consumer behaviour and increase trust in sustainable finance instruments (Edwards et al., 2023; IFC, 2023). Vietnam should integrate green finance modules into high-school economics curricula, SME support programs, and digital platforms such as e-wallets and banking apps. Communication campaigns should be tailored by segment, and performance should be tracked through changes in awareness, product uptake, and financial inclusion.

Together, these five policy interventions form a cohesive strategy to bridge institutional gaps, unlock private capital, and enhance climate resilience. By aligning with international benchmarks and accounting for Vietnam's domestic readiness, the proposed timelines offer a feasible yet ambitious roadmap for achieving the 2050 net-zero goal.

In summary, the proposed recommendations are not standalone interventions but interdependent levers that, when implemented in a coordinated and sequenced manner, can fundamentally transform Vietnam's green-finance ecosystem. They respond directly to the structural and behavioural challenges identified in this study and are based on international experience and domestic feasibility. Their successful implementation will require strong political will, interagency collaboration, and continuous stakeholder engagement. If pursued with rigor and urgency, these measures can help Vietnam build a

resilient, inclusive, and innovation-driven green financial system capable of supporting its climate goals and sustainable development.

6. Study Limitations and Future Research

While this study offers timely and policy-relevant insights into Vietnam's green finance landscape and the potential role of climate debt instruments, it has several limitations must be acknowledged.

First, the research relies primarily on secondary data sources, including policy documents, institutional reports, and financial databases, which constrain the ability to draw causal between green finance policies and environmental or market outcomes. For instance, while trends in green credit growth and green bond issuance were analyzed in relation to specific policy interventions, the absence of disaggregated firm- or investor-level data prevents precise attribution of outcomes to individual instruments. Moreover, key behavioural barriers, such as investor distrust or SME-level access challenges, were identified through existing surveys and industry reports rather than original data collection. This reliance on secondary sources limits the study's empirical granularity and leaves open questions regarding the micro-level dynamics that shape green finance adoption in the country.

Second, the absence of extended-period data on emissions reductions and adaptation outcomes restricts the ability to evaluate the actual environmental impact of these programs. While credit volumes and bond issuances are useful indicators of market development, they do not directly measure effectiveness in terms of carbon abatement, climate risk mitigation or resilience building. This challenge reflects a broader issue in emerging markets, where reliable emissions-linked financial datasets are either unavailable or are fragmented across institutions.

Third, the study does not include stakeholder interviews or fieldwork, which could have enriched the analysis of institutional readiness, the legal feasibility of catastrophe bonds, and investor risk perception. Without primary insights from regulators, financial institutions, or policymakers, some assumptions about capacity and implementation timelines, though grounded in international benchmarks, may not fully reflect the realities of Vietnam's financial governance environment.

These limitations highlight several important avenues for future research. First, researchers should prioritize collecting primary data through interviews, structured surveys, and field experiments involving SMEs, banks, and retail investors. Such efforts would allow for a more robust understanding of behavioural finance barriers and institutional bottlenecks, as well as a more accurate modeling of policy effectiveness. Second, future studies should seek to construct linked datasets that match green financial flows with emissions performance or resilience metrics, thereby enabling the empirical testing of the environmental impact of specific financial instruments. Third, the legal and technical feasibility of catastrophe bonds in Vietnam warrants a dedicated legal and actuarial study, ideally conducted in partnership with government agencies and multilateral organizations in Vietnam.

Finally, Vietnam's transition from niche green finance initiatives to a full-scale green financial system presents a rich opportunity for comparative research within ASEAN and across other climate-vulnerable economies. By tracking the evolution of policy frameworks, regulatory enforcement, and financial innovation over time, researchers can contribute to building a regional evidence base that informs adaptive and scalable models of climate finance.

7. Conclusion

In conclusion, while institutional pioneers like BIDV and EVN Finance show promise (World Bank, 2024), Vietnam's green finance ecosystem remains constrained by regulatory ambiguity, shallow markets, and behavioural inertia, needing USD 368-380 billion by 2040, with CAT bonds addressing underfunded resilience (Vietnam Investment Review, 2024). Coordinated reforms can position Vietnam as a regional leader, offering a replicable model for developing climate- vulnerable economies through collaborative partnerships.

8. References

Aerts, W. & Cormier, D. (2009). Media legitimacy and corporate environmental communication. *Accounting, Organizations and Society*, 34 (1), 1-27. DOI: https://doi.org/10.1016/j.aos.2008.02.005.

Ando, S., Fu, C., Roch, F. & Wiriadinata, U. (2022). Sovereign climate debt instruments: An overview of the green and catastrophe bond markets (*IMF Staff Climate Note 2022/004*) available at: https://www.imf.org/en/Publications/staff-climate-notes/Issues/2022/06/29/Sovereign-Climate-Debt-Instruments-An-Overview-of-the-Green-and-Catastrophe-Bond-Markets-518272.

Auld, G., Bernstein, S. & Cashore, B. (2008). The new corporate social responsibility. *Annual Review of Environment and Resources*, 33, 413-435, available at: https://doi.org/10.1146/annurev.environ.32.053006.141106.

Barberis, N. & Shleifer, A. (2003). Style investing. *Journal of Financial Economics*, 68(2), 161-199. DOI: https://doi.org/10.1016/S0304-405X(03)00064-3.

Brewer, J. & Hunter, A. (2006). *Foundations of multimethod research: Synthesizing styles*. Sage.

BIDV (2023). Sustainability report 2023. Joint Stock Commercial Bank for Investment and Development of Vietnam (BIDV), available at: https://bidv.com.vn/wps/wcm/connect/619c18db-9671-4765-b6a7-86cce73fc794/BIDV-Sustainability%2Breport%2B2023.pdf?MOD=AJPERES&CVID=oejEwzD.

Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.

Climate Bonds Initiative. (2024, June). Sustainable Debt Market Summary: Q1 2024, available at: https://www.climatebonds.net/files/documents/publications/Quarterly-Market-Update-Q1-2024.pdf.

Climate Bonds Initiative & UNEP Inquiry. (2015). Scaling up green bond markets for sustainable development: A strategic guide for the public sector to stimulate private sector market development for green bonds, available at: https://www.climatebonds.net/files/files/GB-Public_Sector_Guide-Final-1A.pdf.

Creswell, J.W. & Plano Clark, V.L. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE.

Diep, N.T.N. & Yen, V.T.H. (2024). Research on factors affecting green financial development in Vietnam. *Salud, Ciencia y Tecnology Serie de Conferencias*, 3(1259), available at: https://doi.org/10.56294/sctconf2024.1259.

Dinh, D.T. & Nguyen, D.H. (2020, July 16). Natural disaster insurance in Vietnam: A review. *In The 12th International Conference on Socio-economic and Environmental Issues in Development. National Economics University*, available at:. https://khoamoitruongdothi.neu.edu.vn/Resources/Docs/SubDomain/khoamoitruongdothi/ICSEED/97.%20Natural%20Disaster%20Insurance%20in%20Vietnam%20-%20A%20Review.pdf.

Edwards, W., Jain, R., Nadeau, M., Soehner, C. & Stephens, D. (2023, April 21). Green growth: Unlocking sustainability opportunities for retail banks. McKinsey & Company, available at: https://www.mckinsey.com/capabilities/sustainability/our-insights/green-growth-unlocking-sustainability-opportunities-for-retail-banks.

European Commission. (2022). EU taxonomy for sustainable activities, available at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en.

Friede, G., Busch, T. & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233. DOI: https://doi.org/10.1080/20430795.2015.1118917.

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study. *Research Policy*, 31(8-9), 1257-1274. DOI: https://doi.org/10.1016/S0048-7333(02)00062-8.

General Department of Disaster Prevention and Control. (2019). Damage statistics, available at: http://phongchongthientai.mard.gov.vn.

Greene, J.C., Caracelli, V.J. & Graham, W.F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, 11(3), 255-274. DOI: https://doi.org/10.3102/01623737011003255.

International Finance Corporation (IFC). (2023). Challenges of green finance: Private sector perspectives from emerging markets, available at: https://www.ifc.org/content/dam/ifc/doc/2023/challenges-of-green-finance.pdf.

Johnston, M.P. (2014). Secondary data analysis: A method of which the time has come. *Qualitative and Quantitative Methods in Libraries*, 3(3), 619-626, available at: https://www.qqml-journal.net/index.php/qqml/article/view/169.

Lo, A.W. (2005). Reconciling efficient markets with behavioural finance: The adaptive markets hypothesis. *Journal of Investment Consulting*, 7(2), 21-44, available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1702447.

Maxwell, J.A. (2012). A realist approach to qualitative research. Sage.

McKenzie, D. (2012). Beyond baseline and follow-up: The case for more T in experiments. *Journal of Development Economics*, 99(2), 210-221. DOI: https://doi.org/10.1016/j.jdeveco.2012.01.002.

Ministry of Finance. (2015). Circular No. 155/2015/TT-BTC on guiding the disclosure of information on the securities market, available at: https://english.luatvietnam.vn/circular-no-155- 2015-tt-btc-dated-october-06-2015-of-the-ministry-of-finance-guiding-the-disclosure-of-information-on-the-securities-market-99216-doc1.html.

Ministry of Finance. (2020). Circular No. 96/2020/TT-BTC providing guidelines on disclosure of information on the securities market, available at: https://thuvienphapluat.vn/van-ban/EN/Chung-khoan/Circular-96-2020-TT-BTC-providing-guidelines-on-disclosure-of-information-on-securities-market/460833/tieng-anh.aspx.

Ministry of Finance. (2021). Circular No. 101/2021/TT-BTC on prescribing prices of services in the field of securities applicable to the Stock Exchanges and the Vietnam Securities Depository and Clearing Corporation, available at: https://thuvienphapluat.vn/van-ban/Chung-khoan/Thong-tu-101-2021-TT-BTC-gia-dich-vu-linh-vuc-chung-khoan-tai- So-giao-dich-chung-khoan-495549.aspx.

Nguyen, P.H., Nguyen, L.A.T., Le, H.Q. & Tran, L.C. (2024). Navigating critical barriers for green bond markets using a fuzzy multi-criteria decision-making model: Case study in Vietnam. *Heliyon*, 10(13), e33493. DOI: https://doi.org/10.1016/j.heliyon.2024.e33493

Nguyen, T.C., Chuc, A.T., & Dang, L.N. (2018). Green finance in Viet Nam: Barriers and solutions (*ADBI Working Paper No. 886*). Asian Development Bank Institute, available at: https://www.adb.org/sites/default/files/publication/466171/adbi-wp886.pdf.

Organisation for Economic Co-operation and Development (2020). Green budgeting and tax policy tools to support a green recovery, available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/10/green-budgeting-and-tax-policy-tools-to-support-a-green-recovery_c5842256/bd02ea23-en.pdf.

Organisation for Economic Co-operation and Development (OECD). (2023). Green, social and sustainability bonds in developing countries: The case for increased donor coordination, available at: https://www.oecd.org/en/publications/green-social-and-sustainability-bonds-in-developing-countries_1cce4551-en.html.

Organisation for Economic Co-operation and Development (OECD). (2024). Fostering catastrophe bond markets in Asia and the Pacific, available at: https://doi.org/10.1787/ab1e49ef-en.

Reitmeier, L. (2024). What role do catastrophe bonds play in managing the physical risks from climate change? Grantham Research Institute, London School of Economics, available at: https://www.lse.ac.uk/granthaminstitute/explainers/what-role-do-catastrophe-bonds-play-in-managing-the-physical-risks-from-climate-change/.

Schratzenstaller, M. (2023). Elements of a European green fiscal policy. *Intereconomics*, 58(6), 300-4, available at: https://www.intereconomics.eu/contents/year/2023/number/6/article/elements-of-a-european-green-fiscal-policy.html.

State Bank of Vietnam (SBV). (2015). Decision No. 03/CT-NHNN on promoting green credit growth and environmental-social risk management in credit extension, available at: https://english.luatvietnam.vn/tai-chinh/directive-03-ct-nhnn-2015-promote-green-credit-growth-93343-d1.html.

State Bank of Vietnam (SBV). (2018). Decision No. 1604/QD-NHNN on approving the scheme for green banking growth in Vietnam, available at: https://thuvienphapluat.vn/van-ban/Tien- te-Ngan-hang/Quyet-dinh-1604-QD-NHNN-2018-phe-duyet-De-an-phat-trien-ngan-hang-xanh-tai-Viet-Nam-411378.aspx.

Thaler, R.H. & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.

The Prime Minister (2021). Decision No. 1658/QD-TTg approving the National Strategy for Green Growth for the 2021-2030 period, with a vision towards 2050, available at: https://thuvienphapluat.vn/van-ban/Tai-nguyen-Moi-truong/Decision-1658-QD-TTg-2021-National-green-growth-strategy-for-2021-2030-period-504659.aspx.

Tuoi Tre News (2024, May 8). Vietnam's banks spearhead green credit initiatives, available at: https://news.tuoitre.vn/vietnams-banks-spearhead-green-credit-initiatives-10379752.htm.

Vietnam Investment Review (2024, August 27). New policy promotes green banking development in Vietnam, available at: https://vir.com.vn/new-policy-promotes-green-banking-development-in-vietnam-113914.html.

VietnamPlus. (2023, December 3). Insiders seek solutions to promote green credit, available at: https://en.vietnamplus.vn/insiders-seek-solutions-to-promote-green-credit- post275684.vnp.

Weber, O. (2010). Social banking: Products and services. In J. J. Bouma, M. Jeucken, & L. Klinkers (Eds.), *Sustainable banking: The greening of finance* (pp. 77-94). Routledge.

World Bank (2021a). *Sustainable development bond framework*, available at: https://thedocs.worldbank.org/en/doc/43b360bfda1e6e5b8a094ef2ce4dff2a-0340012021/original/World-Bank-IBRD-Sustainable-Development-Bond-Framework.pdf.

World Bank (2021b). Vietnam - Country summary (Climate Change Knowledge Portal), available at: https://climateknowledgeportal.worldbank.org/country/vietnam.

World Bank (2022a). *Sovereign green, social and sustainability bonds: Unlocking the potential for emerging markets and developing economies*, available at: https://thedocs.worldbank.org/en/doc/4de3839b85c57eb958dd207fad132f8e-0340012022/original/WB-GSS-Bonds-Survey-Report.pdf.

World Bank (2022b). Unleashing sustainable finance in Southeast Asia (with Institute of Finance and Sustainability), available at: https://documents1.worldbank.org/curated/en/099310011232220307/pdf/P177802011f7760130bc49083a7beb1ef43.pdf.

World Bank (2023). ESG disclosure assessment of Thailand's listed companies and recommendations for policy development, available at: https://documents1.worldbank.org/curated/en/099032624052515227/pdf/P1795971dc58270671bd9e1114d45321c25.pdf.

World Bank (2024). Viet Nam's oldest bank BIDV issues green bond and sustainability bond in the domestic market (Case study; updated Oct 7, 2024), available aT: https://thedocs.worldbank.org/en/doc/34f66dd99b83f50d8ec797a1ba686b38-0340012024/original/Case-Study-Viet-Nam-BIDV-green-bond-TA.pdf.

Yin, R.K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage.

Appendix

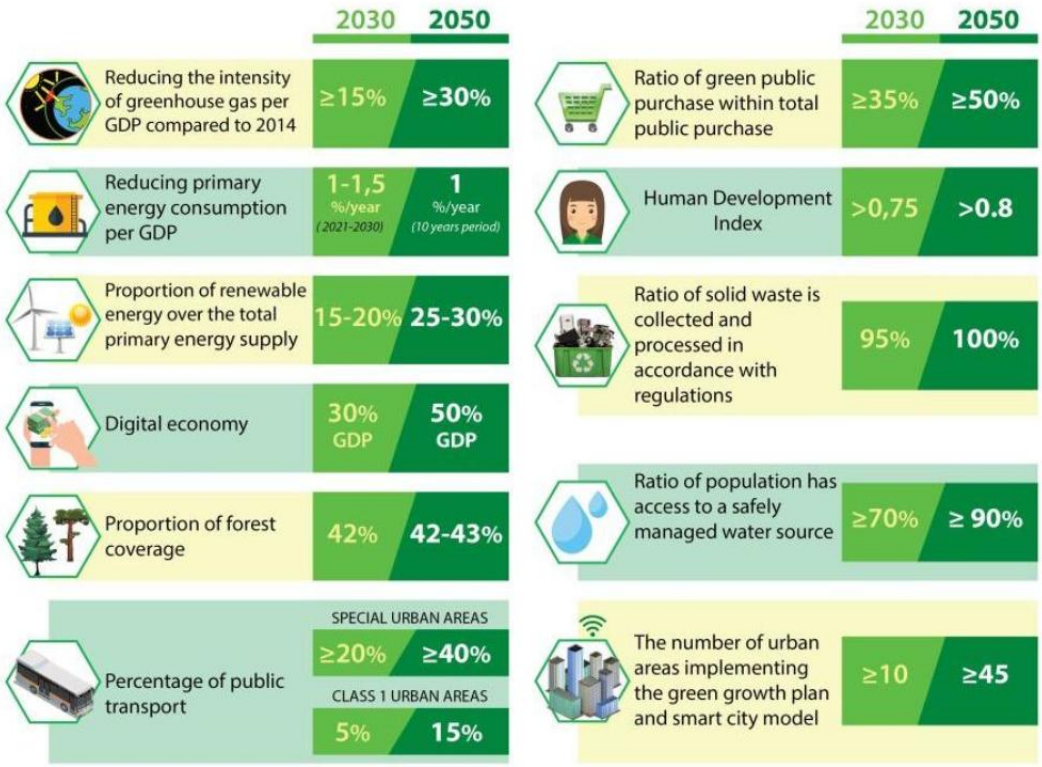

Figure 1: Vietnam National Strategy on Green Growth, for 2021-2030 period, vision to 2050 (source: Vietnam News Agency).

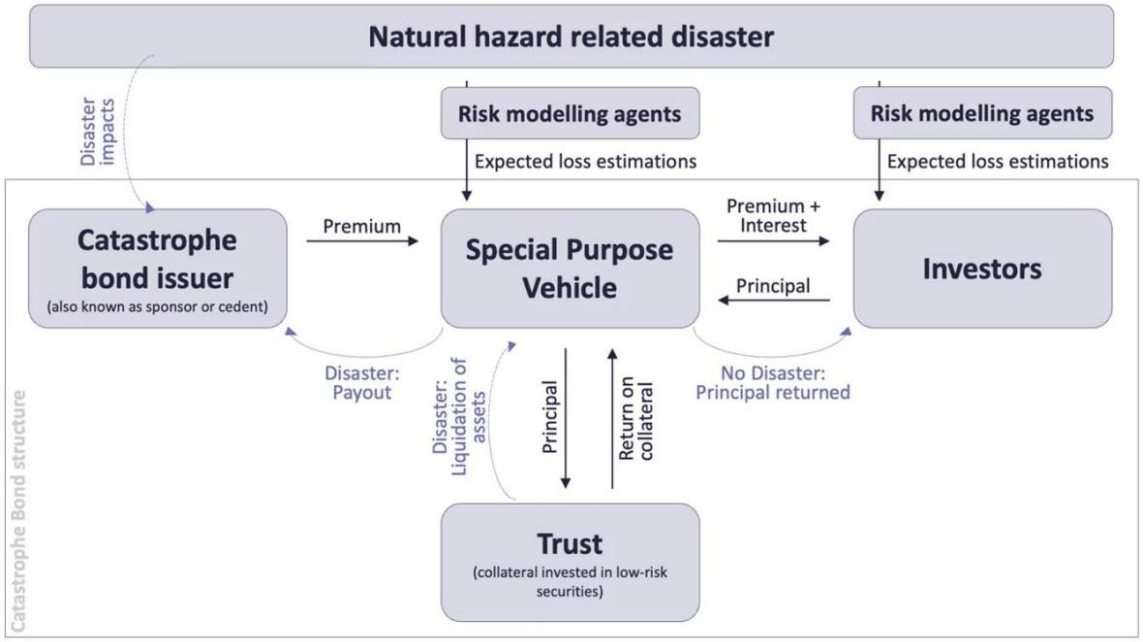

Figure 2: CAT bond model (Source: Reitmeier, 2024)