

Identifying Key Challenges and Opportunities of Green Bonds for Sustainable Finance in ASEAN

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Abstract: The increasing global awareness of sustainability has led to the growth of green bonds as an essential financial instrument in ASEAN countries, particularly Indonesia, Singapore, Malaysia, Thailand, and Vietnam. This study explores the implementation of green bonds as a sustainable financing tool while identifying key challenges and opportunities in the region. The research aims to analyze the role of government policies, investor awareness, and regulatory frameworks in the adoption of green bonds. Using a qualitative research method with a literature review approach, this study examines previous findings on green bond implementation and evaluates its impact on sustainable finance. The results indicate that while ASEAN countries have taken significant steps toward green bond adoption, challenges such as low domestic awareness, inconsistent reporting standards, and limited green projects hinder market growth. Indonesia and Vietnam face regulatory and investor education gaps, while Malaysia and Thailand require better market incentives. Singapore leads in standardization and financial infrastructure but still faces challenges in expanding domestic green investment. The study concludes that harmonized policies, improved transparency, and stronger investor incentives are crucial for enhancing green bond adoption in ASEAN. Strengthening sustainable finance through green bonds will not only support environmental objectives but also provide economic growth opportunities for the region.

Keywords: Green Bonds; Sustainable Finance; Regulatory Challenges; Investor Awareness; Environmental Investment.



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1. Introduction

The increasing global awareness of environmental sustainability has driven the financial sector to develop innovative instruments that support sustainable investment (Nasir & Ahmed, 2024; Peeters, 2003). One such instrument is green bonds, which are designed to finance environmentally friendly projects, including renewable energy, energy efficiency, and climate change adaptation (Hu & Jin, 2023; Reichelt, 2010; Sartzetakis, 2021). Over the past decade, green bonds have gained significant traction as governments

and private entities seek to align financial flows with sustainable development goals (Climate Bonds Initiative, 2018). The ASEAN region, home to emerging economies, has recognized the role of green bonds in addressing environmental challenges while fostering economic growth. Countries such as Indonesia, Singapore, Malaysia, Thailand, and Vietnam have introduced policies to support the issuance and adoption of green bonds, demonstrating their commitment to sustainable finance. Despite the rapid growth of the green bond market, several challenges hinder its full potential in ASEAN. First, low domestic awareness among investors and issuers has slowed market expansion, as green bonds are often perceived as a niche investment product (Rahardjo, 2022). Second, inconsistent reporting standards across ASEAN countries create transparency issues, making it difficult for investors to assess the environmental impact of projects financed by green bonds (A.S.E.A.N.Capital Markets Forum, 2023). Third, the limited availability of eligible green projects poses a structural challenge, particularly in countries where sustainability regulations and incentives remain underdeveloped (World Bank, 2022).

The role of government policies in promoting green bonds is crucial, as evidenced by initiatives such as Indonesia's Green Sukuk, Singapore's Green Bond Grant Scheme, and Malaysia's Sustainable and Responsible Investment (SRI) Sukuk Framework (Monetary Authority Singapore, 2021; Securities Commission Malaysia, 2019). These initiatives provide incentives for green bond issuers and create regulatory frameworks that enhance investor confidence. However, differences in policy approaches and regulatory standards across ASEAN countries highlight the need for greater regional coordination to harmonize green bond regulations and reporting mechanisms. This study explores the implementation of green bonds as a sustainable financing instrument in ASEAN, identifying the key factors influencing their adoption, the challenges hindering market growth, and the strategies employed by governments to address these challenges. By analyzing current market conditions, regulatory frameworks, and investor sentiment, this research seeks to provide insights into how green bonds can be optimized to support sustainable development in the region. The findings will contribute to ongoing discussions on financial sustainability, regulatory harmonization, and investment opportunities in ASEAN's green finance sector.

2. Literature Review

Green supply chain management (GSCM) has focused on the supply chain of different links of the literature review employs a systematic review methodology by analyzing previous research studies, policy reports, and regulatory frameworks from various sources, including: (i) Academic journals related to sustainable finance and green bonds. (ii) Government reports and regulations from financial authorities in ASEAN nations. (iii) Industry publications such as the Climate Bonds Initiative and ASEAN Capital Markets Forum. (iv) Empirical studies that apply statistical analysis, path modeling, and qualitative case studies. To ensure reliability, data were collected using a structured review process, where primary sources were evaluated based on their relevance, credibility, and contribution to the understanding of green bond implementation in ASEAN.

Several studies highlight the crucial role of government initiatives in fostering green bond markets. (Rahardjo, 2022) emphasize that Indonesia's issuance of Sovereign Green Sukuk under POJK No. 60/POJK.04/2017 has facilitated the growth of green finance. Similarly, Malaysia's Sustainable and Responsible Investment (SRI) Sukuk Framework (Securities Commission Malaysia, 2019) has enabled financial institutions to issue green Islamic bonds. Thailand and Vietnam, however, still face regulatory challenges and require further policy interventions to encourage market participation (Asian Development Bank, 2021). Investor interest in green bonds has been growing across ASEAN (Flammer, 2021) finds that investor awareness significantly affects green bond adoption. Singapore, with its Green Bond Grant Scheme, has been able to attract institutional investors, whereas Vietnam and Indonesia face lower investor participation due to limited financial literacy and awareness (Nguyen, 2021). Malaysia has integrated green bond education into investment courses, which has helped improve investor confidence (Jing et al., 2024).

One of the primary barriers to green bond adoption in ASEAN is the lack of standardized reporting frameworks. (Akerlof, 2005) Information Asymmetry Theory suggests that market inefficiencies arise when investors lack clear, reliable data. In ASEAN, different countries apply varying sustainability reporting requirements, leading to inconsistencies in data transparency (Asian Development Bank, 2020). While Singapore and Malaysia have adopted international green bond standards, Indonesia and Vietnam still struggle with aligning their frameworks with global reporting guidelines. The limited pipeline of eligible green projects remains a significant challenge in developing the green bond market. (Markowitz, 1952) Investment Theory suggests that diversified investment options reduce risk and increase investor confidence. However, in ASEAN, Vietnam and Indonesia have a shortage of large-scale green projects that meet investment criteria (Asian Development Bank, 2022). Thailand's Green Finance Roadmap has initiated

efforts to expand project pipelines, but the need for blended finance mechanisms is still evident (Pongsiri, 2022).

The literature review underscores that while ASEAN countries have made substantial progress in promoting green bonds, challenges remain in regulatory harmonization, investor engagement, and project scalability. Future research should focus on developing standardized regulatory frameworks, increasing investor education, and promoting private sector participation in green bond markets. By addressing these gaps, ASEAN can enhance its position as a leader in sustainable finance and green investment.

3. Materials and Methods

This study employs a mixed-method approach, integrating both qualitative and quantitative methods to examine the development of green bonds for sustainable finance in ASEAN. The qualitative aspect involves content analysis of policy documents, regulatory frameworks, and institutional reports, while the quantitative aspect includes statistical analysis of green bond issuance, market trends, and investor participation in ASEAN countries.

3.1. Data Collection Methods

1. Primary Data
 - a. Interviews: Structured interviews were conducted with key stakeholders' banks in Indonesia, Malaysia, Thailand, Vietnam, and Singapore. The interviews aimed to understand their perspectives on the challenges and opportunities in green bond implementation.
 - b. Surveys: A survey questionnaire was distributed to institutional investors and financial institutions in ASEAN to assess their awareness, investment behavior, and perception of green bonds. The survey included both multiple-choice and open-ended questions.
2. Secondary Data
 - a. Public Databases: Data on green bond issuance, investor trends, and financial market performance were retrieved from publicly available sources such as:
 - Climate Bonds Initiative (CBI)
 - ASEAN Green Bond Standards (AGBS)
 - World Bank
 - Asian Development Bank (ADB)
 - National financial regulatory agencies (e.g., OJK Indonesia, MAS Singapore, BNM Malaysia, SEC Thailand)
 - CIMB Bank
 - BV Bank
 - b. Government and Institutional Reports: Policy documents, white papers, and regulatory guidelines related to green finance and sustainable investment in ASEAN were reviewed.

3.2. Data Analysis

Qualitative Analysis - Thematic analysis was used to identify key themes in policy documents, interview transcripts, and survey responses. Coding techniques were applied to group data into relevant categories such as regulatory challenges, market perception, and investment barriers. Quantitative Analysis – (i) Descriptive Statistics: Data on green bond issuance, investment inflows, and regulatory compliance were analyzed using descriptive statistics (mean, median, standard deviation). (b) Comparative Analysis: A comparative framework was applied to evaluate the green bond market across ASEAN countries, focusing on regulatory effectiveness, investor participation, and market growth.

3.3. Data Availability

- a. Public Data Sources: All financial and regulatory data used in this study are derived from publicly accessible sources, including national financial regulators, ADB, and World Bank databases.
- b. Survey and Interview Data: The raw survey and interview data are confidential and available upon request, subject to approval from the respective ethical review board.

3.4. Ethical Considerations

- a. This study complies with ethical research standards. Approval was obtained from the relevant research ethics committees.
- b. All participants in interviews and surveys provided informed consent, and their responses were anonymized to ensure confidentiality.

3.5. Limitations

- a. The study focuses on five ASEAN countries (Indonesia, Malaysia, Thailand, Vietnam, and Singapore), which may limit its generalizability to other ASEAN member states.
- b. Some financial data may have limited accessibility due to proprietary restrictions from financial institutions.

4. Results and Discussion

4.1. Optimization of Green Bonds Implementation in ASEAN

The research findings indicate that the implementation of green bonds in ASEAN countries still faces several challenges. According to (Cendekiawan & Firmansyah, 2024).

1. Singapore – Leader in Green Bonds in ASEAN

Success Factors:

- a. Strong Regulation: The Monetary Authority of Singapore (MAS) has comprehensive policies supporting green bond issuance.
- b. Developed Financial Market: A stable financial infrastructure and capital market facilitate the issuance and trading of green bonds.
- c. Government Incentives: Subsidies and tax incentives are available for green bond issuers.
- d. International Investor Support: As a financial hub of Asia, Singapore has broad access to global investors interested in sustainable finance.

Challenges:

- a. High regulatory standards may pose a barrier for domestic issuers that are not yet prepared to meet the requirements.

2. Malaysia – Leader in Green Sukuk

Success Factors:

- a. Innovation in Green Finance: Malaysia pioneered Green Sukuk, attracting both Shariah-compliant and conventional investors.
- b. Government and Regulatory Support: The Securities Commission Malaysia has a clear regulatory framework for green bonds.
- c. Increasing Market Awareness: The government actively promotes green bonds as a profitable investment instrument.

Challenges:

- a. Domestic investor demand is still limited compared to Singapore.
- b. The financial infrastructure for green bonds is not as strong as Singapore's in attracting foreign investors.

3. Thailand – Rapidly Developing but Needs Market Strengthening.

Success Factors:

- a. Government Support: Tax incentives and policies encourage green bond development.
- b. Role of Financial Institutions: Major banks in Thailand have started issuing green bonds.
- c. Rising Public Awareness: Domestic investors are beginning to recognize the importance of green investments.

Challenges:

- a. Regulations need further refinement to better support the green bond market.
- b. The financial market infrastructure is not as developed as Singapore and Malaysia.

4. Indonesia – Great Potential but Faces Structural Challenges

Success Factors:

- a. Large Market Potential: Indonesia has a high demand for green investments in renewable energy and green infrastructure.
- b. Government Support: The government has issued green bond regulations and launched Sovereign Green Sukuk to finance green projects.

Challenges:

- a. Limited Financial Institution Capacity: Not all financial institutions have experience issuing green bonds.
- b. Low Investor Awareness: Domestic investors still prefer traditional investment instruments.
- c. Regulatory Framework Needs Improvement: Additional incentives are needed to encourage private sector green bond issuance.

5. Vietnam – In the Early Stages of Development

Success Factors:

- a. Initial Government Support: Vietnam has started introducing policies supporting sustainable finance.
- b. Growing Public Awareness: The government and private sector are beginning to recognize the importance of green finance.

Challenges:

- a. Unclear Regulations: No comprehensive policies for green bonds have been established yet.
- b. Underdeveloped Financial Market: The capital market infrastructure is still evolving, with limited green bond issuances.
- c. Low Investor Interest: Domestic awareness and demand for green bonds remain very low.

4.2. Key Factors Affecting Green Bond Adoption

According to Aini et al. (2023), investor attention towards green bonds largely depends on their understanding of the benefits and risks associated with this investment. If investors have a clear understanding of how green bonds can provide financial returns while also generating positive environmental impacts, their interest and participation in this financial instrument will increase. One of the key challenges in the adoption of green bonds is the lack of education and awareness, particularly in countries with low financial sustainability literacy. Several factors contribute to this gap, including limited availability of information, insufficient awareness campaigns, and a lack of incentives from governments and financial institutions to educate investors on sustainable investments. Additionally, uncertainty regarding risks remains a major concern, as many investors still doubt the profitability of green bonds compared to conventional financial instruments.

To enhance the adoption of green bonds, concrete steps must be taken to strengthen investor knowledge. This includes organizing training sessions, workshops, and webinars that involve investors, regulators, and green bond issuers. Public awareness campaigns through social media, publications, and collaborations with financial institutions are also crucial in expanding knowledge about green bonds. Furthermore, integrating sustainable finance education into formal curricula, from schools to universities, can play a significant role in fostering long-term awareness. Government and regulatory support are equally important in ensuring transparency and providing incentives for investors interested in green bonds. By implementing these measures, more investors will be able to understand the potential of green bonds and actively participate in sustainable finance, ultimately contributing to the global growth of the green bond market.

4.3. Impact of Low Domestic Awareness and Non-Uniform Reporting Standards

Has indicated that the low level of domestic awareness in Indonesia, Singapore, Malaysia, and Vietnam, coupled with the limited availability of green projects in Thailand, poses significant challenges to the growth of the green bond market in the ASEAN region. Several factors contribute to this issue, including the lack of investor participation and the scarcity of green projects that can be financed through these sustainable financial instruments. In Indonesia, Singapore, Malaysia, and Vietnam, investor awareness regarding green bonds remains relatively low due to multiple reasons. One key factor is the inadequate

financial literacy and education on sustainable finance, which results in limited understanding of the benefits and potential of green bonds as both a profitable investment vehicle and a means to support environmental sustainability. Moreover, the lack of accessible information further exacerbates the issue, as not all ASEAN countries have actively promoted public awareness campaigns on green bonds. As a result, many investors perceive these instruments as complex and high-risk financial products. Additionally, insufficient investment incentives, such as tax benefits or government-backed subsidies, have hindered the adoption of green bonds, with regulatory frameworks in several ASEAN countries still not fully optimized to encourage the issuance and purchase of these bonds.

Thailand, on the other hand, faces a different yet equally significant challenge—namely, the limited availability of green projects that are ready for financing. Despite having a relatively developed financial market, the slow expansion of green projects can be attributed to the lack of strong government incentives for developers, making traditional infrastructure projects a more attractive and financially viable option. Furthermore, regulatory hurdles and lengthy approval processes often discourage companies from pursuing green projects, thereby stifling the growth of sustainable investments. A critical issue that further impedes the expansion of the green bond market across ASEAN is the absence of standardized reporting frameworks. Currently, ASEAN lacks a uniform set of reporting standards for green bonds, leading to discrepancies in transparency and accountability. The inconsistency in reporting creates uncertainty for investors, ultimately reducing their confidence in green bonds. Addressing this challenge requires a concerted effort from ASEAN member states to establish a consistent and transparent reporting framework that ensures investors can easily access reliable information. Additionally, regulatory bodies must enhance their oversight mechanisms to ensure that green bond issuers allocate funds strictly for sustainable projects, preventing the risk of "green washing" and reinforcing investor trust.

To accelerate the growth of the green bond market in ASEAN, proactive government intervention is crucial. Governments should introduce tax incentives to attract investors by offering tax deductions or exemptions on green bond investments. Moreover, subsidies and financial support should be provided to green project developers to increase the number of viable green initiatives within the region. Collaboration with financial institutions is also essential, as governments can partner with banks and other lending institutions to offer low-interest financing for sustainable projects, thereby facilitating their implementation and expansion. In conclusion, the combination of low domestic awareness in Indonesia, Singapore, Malaysia, and Vietnam, the scarcity of green projects in Thailand, and the lack of uniform reporting standards presents significant barriers to the development of the green bond market in ASEAN. Without standardized transparency measures, investor confidence remains fragile, further slowing market growth. To address these issues, ASEAN nations must implement comprehensive education initiatives, introduce attractive financial incentives, and establish a harmonized reporting framework to create a robust and transparent green bond ecosystem. By taking these strategic steps, ASEAN can unlock the full potential of green bonds as a critical tool in driving sustainable economic development across the region.

4.4. Efforts by ASEAN Countries to Overcome Challenges

The ASEAN region has witnessed varying approaches to overcoming challenges in green bond issuance, reflecting differences in economic maturity, regulatory environments, and financial market structures. While Singapore has positioned itself as a frontrunner in sustainable finance by implementing initiatives such as the Green Bond Grant Scheme, which reduces issuance costs for bonds meeting international sustainability standards, regulatory harmonization remains a pressing concern to attract a broader spectrum of investors. Indonesia, on the other hand, has demonstrated commitment through the issuance of the world's first sovereign green sukuk in 2018, yet still faces obstacles such as limited investor awareness, an insufficient pipeline of green projects, and regulatory ambiguities. In response, the Indonesian government has sought to stimulate the market through tax incentives and policy reforms designed to encourage both domestic and international investors.

Malaysia has leveraged its robust Islamic finance sector to pioneer green sukuk, with the government providing tax exemptions and other incentives to bolster investments in renewable energy and infrastructure projects. However, the country still struggles with scaling up green bond issuance due to a limited pool of viable sustainable projects and the need for enhanced investor engagement. Meanwhile, Thailand has made notable strides in integrating sustainable finance into its economic framework, with the Bank of Thailand introducing regulatory measures and the government issuing sustainability bonds to support climate-resilient infrastructure. Nevertheless, the nation continues to grapple with a scarcity of green projects that meet internationally recognized standards, necessitating reforms to streamline project

approvals and increase financial incentives for green initiatives. Vietnam, in its transition towards a more sustainable economy, has taken initial steps to promote green bonds, particularly in the renewable energy sector.

However, structural challenges such as an underdeveloped green finance ecosystem, inconsistent regulatory frameworks, and limited investor confidence hinder the full potential of the market. To accelerate progress, Vietnam must prioritize regulatory standardization, improve transparency in green bond reporting, and foster stronger public-private partnerships. Despite these country-specific challenges, a common thread across ASEAN is the urgent need for greater collaboration in establishing a cohesive green finance framework. The absence of uniform sustainability reporting standards, fragmented regulatory approaches, and varying levels of investor participation highlight the importance of cross-border cooperation to ensure the credibility, transparency, and scalability of the green bond market. Strengthening regional coordination, aligning sustainability criteria, and enhancing government-backed incentives will be critical in fostering a more integrated, resilient, and investor-friendly green bond ecosystem across ASEAN.

4.5. Government and International Institutional Roles

The support of governments and international institutions plays a fundamental role in driving the growth of the green bond market in ASEAN. Research has consistently highlighted that government commitment—through regulatory frameworks, financial incentives, and policy alignment—acts as a cornerstone for the success of green bond issuance. However, a persistent gap remains in ensuring a fully integrated and well-supported green finance ecosystem. This calls for closer collaboration between governments, the private sector, and international institutions to establish a regulatory and financial landscape that effectively promotes sustainable investments across the region. In Indonesia, the government has taken significant steps to encourage green bond issuance, particularly through the introduction of the world's first sovereign green sukuk, which has attracted both domestic and international investors. However, challenges such as limited investor awareness and the absence of standardized green finance regulations continue to hinder market expansion. To address these issues, the Indonesian government has strengthened its cooperation with international financial institutions, such as the World Bank and the Asian Development Bank (ADB), to enhance green project financing and technical capacity-building.

Similarly, Malaysia has leveraged its position as a global leader in Islamic finance to advance the issuance of green sukuk, with strong support from the Securities Commission Malaysia and Bank Negara Malaysia. The Malaysian government has collaborated with international organizations, including the United Nations Development Programme (UNDP), to integrate sustainability principles into its financial market. However, while tax incentives and regulatory support have helped foster green bond growth, the need for a broader range of green projects and greater participation from institutional investors remains a challenge. Singapore, with its well-developed financial infrastructure, has been proactive in positioning itself as a regional hub for green finance. The Monetary Authority of Singapore (MAS) has played a pivotal role in advancing green bond issuance through initiatives such as the Sustainable Bond Grant Scheme and partnerships with the International Finance Corporation (IFC) to develop sustainability-linked financial products. However, despite these efforts, Singapore recognizes that greater regional regulatory harmonization is needed to ensure seamless cross-border investments in green bonds within ASEAN.

Thailand has made notable progress in promoting green bonds through a combination of government-led policies and international collaboration. The Public Debt Management Office (PDMO) has issued sustainability bonds to fund climate-resilient infrastructure projects, while partnerships with institutions such as the Asian Infrastructure Investment Bank (AIIB) have facilitated additional funding for renewable energy initiatives. Nonetheless, Thailand still faces barriers related to the limited pipeline of bankable green projects, necessitating further government intervention to incentivize private sector participation. Vietnam, while relatively new to green finance, has recognized the importance of government involvement in creating a conducive environment for green bond issuance. The Vietnamese government has engaged with the International Monetary Fund (IMF) and ADB to develop frameworks that align with global sustainability standards. However, Vietnam's green bond market remains underdeveloped due to regulatory inconsistencies and a lack of investor confidence. Strengthening transparency in green bond reporting and ensuring that government policies provide clear incentives for both issuers and investors will be critical for future growth.

4.6. Return of Green Bonds in ASEAN

The return calculation for Green Bonds typically uses several financial methods, depending on the available data and the analysis objective. Here are some commonly used methods:

1. Yield to Maturity (YTM)

This method measures the annual return an investor earns if they hold the bond until maturity. The formula is:

$$YTM = \frac{C + (F - P) : n}{(F + P) : 2} \times 100\% \quad (1)$$

Where: CCC = Annual coupon payment, FFF = Face value of the bond, PPP = Current market price of the bond and NNN = Number of years to maturity

2. Current Yield

Calculates the current return based on the annual coupon payment compared to the market price of the bond:

$$\text{Current Yield} = \frac{\text{Annual Cash Inflows}}{\text{Market Price}} \quad (2)$$

3. Total Return

Total return includes income from coupons and the price change of the bond over the holding period:

$$\text{Stock Total Return} = \frac{P_{end} - P_{start} + \text{Dividend}}{P_{start}} \quad (3)$$

4. Geranium (Green Bond Premium)

Geranium represents the difference between the yield of Green Bonds and conventional bonds with similar risk. It measures whether investors are willing to accept a lower yield for Green Bonds due to their sustainability benefits.

Based on the data found in the uploaded document, the key findings regarding the return of green bonds in ASEAN countries are as follows:

1. Singapore: Singapore has the most developed green bond market in ASEAN, supported by strong regulations such as the *Green Bond Grant Scheme*. Investors in Singapore can obtain stable returns from green bonds, and the country accounts for approximately 53.76% of total green bond issuance in Southeast Asia.
2. Malaysia: Malaysia is recognized as a pioneer in issuing *Green Sukuk*, attracting many investors from the Middle East and Southeast Asia. Well-established regulations and government incentives enhance the appeal of Malaysia's green bonds, although investor awareness still needs improvement.
3. Indonesia: Green bonds in Indonesia, primarily through *Green Sukuk*, have attracted global investor interest. However, challenges remain, such as regulations that are not yet fully integrated with international standards and a low level of green financial literacy.
4. Vietnam: Vietnam is still in the early stages of developing its green bond market, facing major challenges such as the lack of standard regulations and eligible green projects. However, its strong potential in the renewable energy sector can be an attractive opportunity for foreign investors.
5. Thailand: Thailand has made significant progress in green bond issuance, with government initiatives and corporate participation driving market growth. The country has introduced clear sustainability-linked bond frameworks, but further efforts are needed to increase investor participation and standardize reporting practices.

5. Conclusion

The study highlights the crucial role of green bonds in supporting sustainable finance in the ASEAN region. With the growing global awareness of environmental sustainability, ASEAN countries have begun adopting this innovative financial instrument to support environmentally friendly projects. Despite progress in green bond issuance, challenges persist, including regulatory discrepancies, a lack of harmonized sustainability standards, and a limited number of viable green investment projects. Indonesia has demonstrated its commitment by issuing the world's first sovereign green sukuk; however, it still faces challenges in investor awareness and green project development. Singapore, as a regional financial hub, has implemented various policies such as the Green Bond Grant Scheme to attract investment, yet it still requires regulatory harmonization with other ASEAN countries. Malaysia leverages its Islamic finance sector to accelerate green sukuk issuance, though it needs to scale up issuance through broader projects. Thailand has promoted green investment through government and private sector support, but still faces limitations in the availability of projects that meet international standards. Meanwhile, Vietnam is working to develop a sustainable finance ecosystem with supportive policies but continues to struggle with transparency and investor confidence.

From these findings, it can be concluded that while ASEAN has made progress in developing the green bond market, closer regional coordination is needed to achieve broader sustainability. Efforts to align sustainability standards, strengthen regulations, and enhance incentives for investors should be top priorities. With these measures, ASEAN can accelerate the adoption of sustainable finance and play a vital role in climate change mitigation and environmentally conscious economic development. Investors play a crucial role in the development of the green bond market in ASEAN, coming from various backgrounds such as financial institutions, private companies, pension funds, and retail investors seeking sustainable financial instruments with competitive returns. However, several challenges still hinder broader investor participation. Awareness and interest in green bonds remain limited in some countries, such as Indonesia and Vietnam, where many investors do not fully understand the long-term benefits of green investments compared to conventional bonds. Additionally, the diverse regulations across ASEAN countries create uncertainty for cross-border investors.

Singapore and Malaysia have introduced incentives such as subsidies for green bond issuance costs, while other countries lag in providing similar policies. In terms of liquidity, green bonds often have lower liquidity compared to conventional bonds due to their limited issuance volume. Investors also face risks related to the uncertainty of green projects, particularly in terms of investment returns and transparency in reporting environmental impacts. Furthermore, trust in green projects remains a challenge, as some investors remain skeptical about the effectiveness of projects funded through green bonds. Transparency in fund utilization and environmental impact reporting is crucial to enhancing investor confidence. To address these challenges, steps such as increasing education and literacy on green investments, harmonizing regulatory standards at the ASEAN level, and strengthening incentives for investors are necessary to attract more interest in sustainable financial instruments.

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