

Navigating Climate-Related Risks and Sustainable Finance: A Critical Review of ESG Transformation in Malaysian Palm Oil Industry

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ABSTRACT

The climate change has become a critical global challenge for environmental sustainability, economic development, and corporate performance in industries. The plantation sector, particularly the palm oil industry, is highly exposed to climate-related risks because it depends on environmental stability and favourable weather conditions. This case study is about SD Guthrie Berhad, a leading global producer of palm oil, and how they manage climate-related risks through sustainable finance and Environmental, Social and Governance (ESG) practices. The study discusses major concerns related to environment and climate change due to plantation activities, including deforestation, biodiversity loss, greenhouse gas emissions, water pollution and climate change-induced operational disruptions. It also looks at SD Guthrie Berhad's challenges on sustainability transformation, regulatory compliance, climate governance and operational resilience. The study also evaluates the company's sustainability efforts, including its commitment to net-zero emissions, methane capture activities, renewable energy projects, biodiversity preservation programs, NDPE (No Deforestation, No Peat, No Exploitation) guidelines, and ESG reporting standards. The analysis is guided by the Stakeholder Theory, Legitimacy Theory and Risk Management Theory. Research findings indicate that climate-related risks are increasingly impacting the operational continuity, financial sustainability, investor confidence and environmental accountability of the plantation sector. Therefore, effective ESG governance and sustainable finance practices are critical to increasing organisational resilience and long-term competitiveness. Based on the findings, this study proposes an ESG Transformation Roadmap (ETR) as a conceptual framework for integrating climate risk management, ESG governance, sustainable finance and stakeholder engagement to support climate-resilient decision-making. The study concludes that continuous sustainability transformation, climate adaptation strategies and closer collaboration among companies, regulators, investors and stakeholders are crucial in supporting sustainable development in Malaysia's plantation industry.

Keywords: Climate-Related Risk, Sustainable Finance, ESG Transformation, Environmental Sustainability, Plantation Sector

INTRODUCTION

Climate change is now one of the major challenges to environmental sustainability, economic development and corporate governance around the world. Global temperatures are rising, biodiversity is declining, flooding, droughts and extreme weather events are increasingly disrupting business operations and posing significant risks for organisations across a range of industries. Climate-related risks are no longer considered only as environmental risks but as material business and financial risks affecting operational continuity, investment decisions and long-term sustainability. The plantation sector is particularly exposed to climate-related risks as agricultural output is highly sensitive to environmental stability and benign weather conditions. The palm oil industry is a major contributor to economic growth, export earnings and employment in Malaysia. However, the issues of deforestation, greenhouse gas emissions, biodiversity loss and environmental degradation have created pressure for plantation companies to improve sustainability governance and environmental accountability.

SD Guthrie Berhad (formerly known as Sime Darby Plantation Berhad) is one of the world's largest palm oil producers and an appropriate case study to explore the nexus of climate-related risk, sustainable finance and ESG transformation. The company is highly exposed to environmental and climate related issues due to its wide plantation and downstream operations in Malaysia, and several international markets. The increasing relevance of sustainable finance has driven organisations to incorporate ESG issues into their strategic decision-making processes. Investors, regulators and stakeholders are demanding more climate governance, more sustainability disclosures and more environmental responsibility from companies. Therefore, to protect their long-term competitiveness and sustainability, plantation companies must continuously adapt their business strategies to mitigate climate risks.

Problem Statement

Despite the progress made in sustainability governance, plantation companies still struggle to manage climate-related risks and to balance environmental responsibility and business performance. The palm oil industry is still associated with environmental problems such as deforestation, loss of biodiversity, greenhouse gases emissions, water pollution and land degradation. At the same time, physical risks from climate change, such as floods, droughts, rising temperatures and shifting rainfall patterns are increasingly threatening plantation productivity, operational efficiencies and supply chain stability. As one of the largest palm oil producers in the world, SD Guthrie Berhad is facing growing ESG expectations from regulators, investors, environmental organisations and international stakeholders. The emergence of sustainability-related frameworks and regulations, such as the EU Deforestation Regulation (EUDR), the Task Force on Climate-related Financial Disclosures (TCFD), and the International Sustainability Standards Board (ISSB) reporting standards, has added pressure on plantation companies to improve environmental accountability and climate governance. SD Guthrie Berhad has undertaken various sustainability initiatives such as renewable energy projects, methane capture systems, biodiversity conservation programmes, and net-zero emissions commitments. However, climate resilience, environmental sustainability and long-term ESG performance remain a concern. Therefore, this study aims to examine SD Guthrie Berhad's climate-related risks, sustainability challenges and ESG transformation strategies and their impact on sustainable finance and long-term business resilience.

Background of The Study

The Malaysian palm oil industry is among the major contributors to the national economy and continues to be a major producer of export revenues and jobs. As global demand for palm oil is increasing, plantation companies are under mounting pressure to prove economic performance together with environmental sustainability. Climate related risk, degradation of the environment and shifting expectations around sustainability have increased the demand for more ESG governance and responsible corporate practices throughout industry. SD Guthrie Berhad is a key operator in palm oil in Malaysia and one of the largest plantation companies in the world. The firm has significant oil palm estates and downstream operations in numerous countries. Its core business activities are in oil palm agriculture, palm oil processing, downstream manufacturing, renewable energy development and sustainability-related projects.

SD Guthrie Berhad has in recent years increased its sustainability agenda with a range of environmental and climate related operations. These include a target to reach net-zero greenhouse gas emissions by 2050, methane collection systems, investments in renewable energy, biodiversity conservation initiatives and the implementation of its NDPE (No Deforestation, No Peat, No Exploitation) policy. The company has also strengthened its sustainability reporting requirements by linking disclosures to globally recognised frameworks such TCFD and ISSB. These measures are a testament to SD Guthrie Berhad's commitment to embed environmental issues in its company and improve climate resilience on the longer term. However, the firm still must contend with challenges concerning environmental threats, regulatory requirements, operational disruptions and greater stakeholder scrutiny. SD Guthrie Berhad is thus an interesting case study of how plantation companies are addressing climate-related risks and sustainable finance issues in a changing ESG context.

LITERATURE REVIEW

This study applies underpinning theories such as Stakeholder Theory, Legitimacy Theory, and Risk Management Theory to explain how organisations respond to climate-related risks and sustainability expectations within the plantation sector. These theories provide a useful framework for understanding the relationship between environmental accountability, ESG governance, and sustainable finance.

Stakeholder Theory

Freeman (1984) suggested the Stakeholder Theory, which states that organisations should create value for a wide range of stakeholders and not just for the interests of shareholders. The main stakeholders are investors, regulators, employees, customers, local communities and environmental organisations. The increasing demand for environmental sustainability and climate governance from stakeholders on the plantation sector has driven companies to improve ESG practices, sustainability reporting and to minimise the environmental footprint. Successful stakeholder management is therefore a pre-requisite to sustaining organisational legitimacy, investor confidence and long-term business sustainability.

Legitimacy Theory

Legitimacy Theory explains that organisations seek to align their activities with societal values and expectations to maintain public acceptance and long-term survival (Suchman, 1995). Plantation companies frequently face scrutiny regarding environmental issues such as deforestation, biodiversity loss, and greenhouse gas emissions. Consequently, organisations increasingly adopt sustainability initiatives and ESG reporting practices to demonstrate environmental responsibility and maintain legitimacy among stakeholders. Failure to meet societal expectations may result in reputational damage, reduced investor confidence, and restricted market access.

Risk Management Theory

Risk Management Theory focuses on the identification, assessment, and mitigation of risks that may affect organisational performance and sustainability. Climate-related risks have become increasingly important because environmental disruptions such as floods, droughts, rising temperatures, and changing rainfall patterns can negatively affect plantation productivity and operational continuity. As a result, plantation companies increasingly integrate climate adaptation strategies, environmental monitoring systems, and ESG governance mechanisms into their risk management frameworks to strengthen resilience and long-term sustainability.

Climate-Related Risks and Sustainable Finance

Climate-related risk is being increasingly recognised as important financial concerns impacting corporate performance, investment decisions and long-term sustainability. Climate change is leading to warming, loss of biodiversity, environmental degradation and extreme weather events that threaten economic stability and environmental sustainability (IPCC, 2023). The Task Force on Climate-related Financial Disclosures (TCFD, 2023) distinguishes between two types of climate-related hazards: physical and transition risks. The physical risks include flooding, drought, storms and rising temperatures, while transition risks stem from changing legislation, initiatives to cut carbon and stakeholder expectations. Excellent ESG performance is closely connected with organisational resilience and financial performance, studies suggest. Several studies have demonstrated that firms with strong ESG performance tend to have lower cost of capital, better risk management capabilities and higher long-term business value (Eccles et al., 2014; Khan et al., 2016; Fatemi et al., 2018). Friede et al., (2021) found that businesses with higher levels of ESG governance are likely to be better performers in the long run. Similarly, Gillan et al., (2021) observed that ESG integration leads to greater governance of the organization and long-term value development. Climate-related risk directly affects the plantation sector's agricultural productivity, operational efficiency and supply chain stability. Hence, sustainable finance and good ESG governance have become more important to promote climate resilience, environmental stewardship and long-term firm competitiveness.

Sustainable Finance

Sustainable finance is the practice of incorporating environmental, social and governance (ESG) considerations into financial decisions, with the aim of supporting economic growth over the long term while resolving sustainability issues. Sustainable finance is not just concerned with financial returns but also with the reconciliation of economic success with environmental conservation and social responsibility. With climate disruptions becoming more frequent, sustainable finance solutions such as green bonds, sustainability-linked loans, climate funds and ESG-focused investment portfolios have gained appeal.

Recent study provides evidence that sustainable finance is important in raising resources for ecologically friendly initiatives and improving organisational climate resilience. Zhang (2025) claims that sustainable finance improves financial stability by promoting investments that deal with climate-related physical and transition issues. Likewise, Yunus and Nanda (2024) noticed that investors are increasingly factoring in ESG variables in investment decisions since ESG performance affects financial returns, risk management, and long-term sustainability outcomes. Sustainable finance is therefore a key tool to reward good firm activity and increase organisational resilience to environmental and climate related challenges. Growing regulatory regulations and stakeholder expectations are also driving the increasing importance of sustainable financing. The financial institutions and investors are under increasing pressure to factor in climate-related risks in the allocation of capital and investment decisions. Sustainable finance frameworks assist organisations to improve their sustainability performance, strengthen ESG governance and boost transparency through sustainability reporting. Therefore, firms with high sustainability performance are often better able to attract investment, retain stakeholder confidence and boost their long-term competitiveness. The plantation sector has gained significant importance in the field of sustainable finance given the increasing concerns on climate change, environmental degradation and sustainability-related risks. Those plantation companies who manage to include sustainability concepts into their business strategy will be able to benefit from increased access to funding, investor confidence and enhanced long-term company resilience.

ESG Transformation

ESG transformation is the strategic integration of sustainability considerations into organisational governance structures, operational processes, business strategies and risk management systems. The journey to ESG is not just about compliance and sustainability reporting. It is also about embedding ESG concepts into the heart of business decision-making and long-term corporate planning. As sustainability standards have evolved, so has ESG transformation as a core element of firm competitiveness and organisational resilience. ESG transformation is becoming more important, due to climate-related challenges, legal changes, stakeholder expectations and investors' desire for sustainable company practices. ESG transformation is a new paradigm of sustainable finance, as investors increasingly evaluate businesses by environmental performance, social responsibility and governance quality (Dovbiy et al., 2022). Companies that successfully integrate ESG concepts into their operations are frequently better equipped to manage sustainability risks and create long-term value.

Higher levels of ESG integration inside firms contribute to better risk management, improved governance systems, and stronger financial performance, according to Yang and Shi (2024). Kashyap, Rastogi and Agarwal (2025) further argue that ESG integration has been an intrinsic part of corporate risk management since environmental and climate-related risks are increasingly affecting organisational resilience and financial stability. An effective ESG transformation helps organisations identify sustainability-related risks, develop stakeholder connections and foster openness through improved sustainability disclosures. For plantation companies such as SD Guthrie Berhad, the ESG transformation includes strengthening climate governance, minimising environmental impacts, increasing sustainability reporting and enhancing engagement with stakeholders. A successful ESG transformation therefore enables the sustainable finance goals and aids environmental accountability, organisational resilience and long-term value growth.

Relationship between Climate-Related Risks, Sustainable Finance and ESG Transformation

Literature suggests that climate-related risks, sustainable finance and ESG transformation are strongly related. Climate-related risks present material operational, financial and regulatory challenges which motivate

organisations to improve sustainability governance and risk management practices. Shirai (2023) notes that climate-related risks are increasingly recognised as material financial risks as they impact business performance, investment decisions and long-term organisational sustainability. In response to these risks, sustainable finance mechanisms provide financial incentives that encourage organisations to adopt environmentally responsible practices and improve sustainability performance. Sustainable finance enables investments in renewable energy, climate adaptation, emission reduction projects and other sustainability related projects to increase organisational resilience. Thus, sustainable finance is an important driver for the sustainability transformation and for mitigating climate risks. ESG transformation is a strategic organisational response to climate-related risks, integrating sustainability considerations into governance structures, strategic planning, and operational activities. Organisations that effectively address climate-related risks through ESG transformation are more likely to gain investor confidence, improve sustainability performance and achieve long-term business resilience. Therefore, climate-related risks, sustainable finance and ESG transformation should be seen as interconnected building blocks that together drive organisational sustainability and long-term value creation.

Literature Gap

There is a lot of research on climate-related risk, sustainable finance, and ESG across industries and location. It contains a significant amount of research on the effects of climate-related risks on financial performance, organisational resilience and investment decision making. Furthermore, plenty of literature has highlighted the role of sustainable finance and ESG integration in enhancing long-term value creation and sustainability results. However, much of current research sees climate-related risks, sustainable finance and ESG reform as individual issues, not interconnected ones. Moreover, most of the studies have focused on financial institutions, manufacturing sectors or developed countries with fewer studies on these concerns in Malaysian plantation business. The significance of climate governance and sustainability transformation in the palm oil industry is growing. Nonetheless, there are no studies in the literature that specifically examine how plantation companies use ESG transformation approaches to mitigate climate-related risks and achieve sustainable financing goals. This study therefore attempts to fill the gap by taking SD Guthrie Berhad as a case to understand better the role of climate-related risk management, sustainable finance practices and ESG transformation in contributing towards organisational resilience, environmental accountability and long-term sustainability in the Malaysian plantation industry.

Current Issues Faced by Sd Guthrie Berhad

Environmental Risks

Environmental sustainability continues to be one of the greatest challenges facing the global palm oil industry. SD Guthrie Berhad, one of the world's largest plantation companies, is under increasing pressure over the environmental impacts of its plantation operations and supply chain activities. The company's environmental challenges are deforestation, loss of biodiversity and water pollution. Deforestation related to the plantation expansion activities in Sarawak is one of the most discussed environmental issues. Environmental groups (NGO), such as The Borneo Project and SAVE Rivers, raised alarm over land clearance activities in Belaga, Sarawak, allegedly associated with suppliers in the SD Guthrie Berhad supply chain. Urun Plantation, a palm oil plantation company based in Belaga, Sarawak, was involved in environmental controversies over forest clearing and native land issues. Although these issues were not directly undertaken by the company, the issue highlighted the importance of effective supply chain governance and sustainability monitoring. Deforestation destroys habitats, reduces biodiversity and increases greenhouse gas emissions, as well as reducing the potential of the forests to retain carbon dioxide. Another major problem in the plantation sector is loss of biodiversity. The deforestation associated with oil palm expansion is widely recognised as a major driver of biodiversity loss, carbon emissions and ecosystem degradation in Southeast Asia (Vijay et al., 2016; Meijaard et al., 2020). The conversion of tropical rainforest areas into oil palm plantations can threaten wildlife habitats and reduce the resilience of ecosystems. As Carlson et al. (2018) reported, unsustainable plantation development causes habitat fragmentation and environmental degradation. Therefore, plantation companies are being called upon to improve biodiversity conservation programmes and sustainable land management practices. Water pollution continues to be one of the major environmental challenges. Palm Oil Mill Effluent (POME) is a by-product of the palm oil

processing activities and if not properly managed it can adversely affect the water quality. To combat this challenge, SD Guthrie Berhad has introduced wastewater treatment systems and methane capture technologies to mitigate environmental impacts and improve sustainability performance.

Climate-Related Risks

The plantation business is becoming more vulnerable to climate-related risks, given the industry's reliance on weather patterns and environmental conditions. SD Guthrie Berhad is exposed to physical and transition concerns connected to climate change. Physical climate threats include flooding and droughts, higher temperatures and changes in rainfall patterns, which can influence the productivity of plantations and impair continuity of operations. Changing climate patterns have a profound effect on oil palm output through heat stress, water scarcity and increasing pest outbreaks (Paterson et al., 2015; Woittiez et al., 2017). The flooding can damage infrastructures, transportation networks, plantation facilities and the lengthy periods of drought can diminish the crop output and affects the plantation performance. Warmer temperatures can also decrease the productivity of labour and boost the cost of operations. A further big climate problem is the generation of greenhouse gases. Emissions from plantation operations include land management, transportation systems, industrial processing and methane emissions from Palm Oil Mill Effluent (POME). Methane generated in the treatment of mill effluent is one of the company's biggest sources of operational emissions (SD Guthrie Sustainability Report, 2024). In response the company has established methane collection systems, renewable energy projects and low-carbon efforts to support its objective to net-zero emissions by 2050. SD Guthrie Berhad is also susceptible to transition risk arising from changes in environmental rules and stakeholder expectations. International sustainability frameworks and legislation such as the European Union Deforestation Regulation (EUDR), TCFD and ISSB reporting standards mean that plantation enterprises must increase climate governance, environmental accountability and sustainability transparency.

Social and Governance Risks

In addition to environmental and climate-related challenges, SD Guthrie Berhad is also confronted with social and governance risks that could impact on the organisation's legitimacy and stakeholder confidence. Native Customary Rights (NCR) land disputes with the indigenous communities such as the Iban, Penan, Kenyah and Kayan are a major issue concerning plantation activities in Sarawak. Some local communities claimed that plantation expansion activities affected traditional land ownership, forest resources and local lives. Indigenous communities depend on forest ecosystems for farming, hunting, fishing and cultural practices. The plantation development without proper consultation can therefore result in social conflict and governance problems. This issue also raises serious Environmental, Social and Governance (ESG) concerns as investors are increasingly evaluating plantation companies based on indigenous rights protection and stakeholder engagement practices. Research on sustainable plantation governance shows that unresolved land rights disputes can undermine social legitimacy and create major operational and reputational risks for plantation companies (Colchester et al., 2011; Cramb & Curry, 2012). From a governance perspective, environmental controversies and sustainability-related allegations can increase the ESG scrutiny of plantation companies by investors, regulators, environmental organisations and international stakeholders. Organisations associated with environmental degradation or poor sustainability governance suffer reputational damage, declining investor confidence and reduced market access. Consequently, the importance of effective ESG governance, stakeholder engagement and sustainability transparency has increased to sustain corporate legitimacy and to enable business resilience in the long term. As expectations of sustainability continue to evolve, plantation companies will need to improve governance frameworks and environmental accountability to compete in global markets.

Challenges Faced by Sd Guthrie Berhad

Sustainability and Regulatory Challenges

The main challenge for SD Guthrie Berhad is to align its sustainable transformation with its financial and operational goals. Sustainability initiatives such as renewable energy projects, methane capture systems, biodiversity protection programs and enhanced ESG reporting require a lot of money to implement. Previous studies show that ESG shifts often entail large implementation costs in the short run but can generate long-term

financial and reputational benefits (Porter & Kramer, 2011; Friede et al., 2015). These actions support long-term sustainability and climate resilience but can also increase operational costs and create additional constraints on organisational resources. Similarly, SD Guthrie Berhad's exposure to a more complex regulatory environment. International sustainability regulations such as the European Union Deforestation Regulation (EUDR), Task Force on Climate-related Financial Disclosures (TCFD) and International Sustainability Standards Board (ISSB) reporting standards necessitate plantation companies to enhance environmental accountability and sustainability disclosures. Failure to meet these requirements may adversely affect market access, investor confidence and the reputation of the firm.

Climate and Operational Challenges

Climate change continues to pose serious operational challenges for plantation companies. Extreme weather events such as floods, droughts and changing rainfall patterns may disrupt plantation productivity, damage infrastructure and affect supply chain efficiency. Rising temperatures may also diminish labour productivity and escalate operational risks in plantation operations. Another challenge is the availability and management of climate-related information. Reliable environmental data, risk assessments and monitoring systems are required to support decision-making processes for effective climate governance. Nevertheless, predicting environmental disruptions and handling climate-related risks over large areas of plantation are still complex and resource-intensive tasks.

ESG and Reputational Challenges

The sustainability performance of the plantation business is under intense examination from investors and authorities and environmental organisations and consumers globally. Environmental disputes like as deforestation, biodiversity depletion and supply chain management may cause reputational risks and increased scrutiny on ESG. ESG conflicts negatively influence investors' perception, market valuation and trust in stakeholders, notably in the environmentally sensitive industries (Krüger, 2015; Capelle-Blancard & Petit, 2019). Sustainable credibility and maintaining stakeholder confidence are vital to the long-term competitiveness of SD Guthrie Berhad. With ESG aspects becoming a more significant consideration in investment decisions and corporate valuations, the company must constantly increase sustainability governance, stakeholder engagement, and environmental accountability to sustain legitimacy and develop long-term business resilience.

Strategies Adopted by Sd Guthrie Berhad

Climate Mitigation and Low-Carbon Strategies

To address climate-related risks and reduce greenhouse gas emissions, SD Guthrie Berhad has implemented several climate mitigation initiatives as part of its sustainability transformation agenda. One of the company's key commitments is its target to achieve net-zero greenhouse gas emissions by 2050 through its "Beyond Zero" sustainability strategy. A major component of this strategy involves the implementation of methane capture systems and biogas facilities at palm oil mills. Methane emissions generated from Palm Oil Mill Effluent (POME) represent a significant source of operational greenhouse gas emissions within the palm oil industry. By capturing methane and converting it into renewable energy, the company reduces carbon emissions while improving energy efficiency and environmental performance. In addition, SD Guthrie Berhad continues to invest in renewable energy technologies, including solar, biomass, and biogas systems, to reduce dependence on fossil fuels and support low-carbon operations. These initiatives demonstrate the company's commitment to climate resilience and sustainable business practices.

Environmental Protection and Conservation Strategies

Environmental conservation remains a key component of SD Guthrie Berhad's sustainability agenda. The company has adopted a No Deforestation, No Peat, No Exploitation (NDPE) policy to minimise environmental impacts associated with plantation development and supply chain operations. The company also implements biodiversity conservation and reforestation programmes aimed at protecting wildlife habitats, restoring degraded ecosystems, and enhancing carbon sequestration. These initiatives contribute to biodiversity protection while

supporting broader climate adaptation and environmental sustainability objectives. Furthermore, SD Guthrie Berhad invests in climate-resilient agricultural practices through research and development activities. These efforts include the development of more resilient oil palm varieties, improved water management systems, and enhanced soil conservation practices designed to strengthen long-term plantation productivity under changing climate conditions.

ESG Governance and Sustainability Reporting

SD Guthrie Berhad has strengthened ESG governance by integrating sustainability considerations into corporate strategy and operational decision-making processes. The company has enhanced its sustainability reporting practices through alignment with internationally recognised frameworks such as the Task Force on Climate-related Financial Disclosures (TCFD) and the International Sustainability Standards Board (ISSB). Improved sustainability reporting enhances transparency, supports stakeholder engagement, and enables investors to evaluate the company's environmental performance and climate-related risks more effectively. Through stronger ESG governance, sustainability disclosures, and stakeholder engagement initiatives, SD Guthrie Berhad seeks to improve environmental accountability, strengthen investor confidence, and support long-term business resilience within an increasingly sustainability-focused business environment.

DISCUSSION

This study highlights the rapid increase in climate-related risks within the plantation business with clear implications for environmental sustainability, operational continuity and long-term financial resilience. The results suggest that plantation companies are under increasing pressure to balance profitability and environmental responsibility, while meeting increasing stakeholder expectations for sustainability performance. The case of SD Guthrie Berhad is a reminder of the huge ESG risks those environmental issues such as deforestation; loss of biodiversity, greenhouse gas emissions and water contamination represent to plantation companies. Meanwhile, climate-related disruptions including floods, droughts and changing weather patterns continue to threaten operational performance and the long-term future of the company. Studies indicate the increasing role of sustainable finance in enabling climate adaption and sustainability transformation. Investment decisions are increasingly looking at environmental performance, climate governance and ESG disclosures. This means that companies with good ESG governance and sustainability practices are often better placed to earn investors' trust and boost long-term competitiveness. The outcomes support Stakeholder Theory with emphasis on the need to address stakeholder expectations on environmental accountability and sustainability. The outcomes agree with the Legitimacy Theory that suggests that organisations progressively enhance sustainability actions to obtain public trust and business legitimacy. Moreover, Risk Management Theory continues to be important as climate adaption techniques and ESG governance frameworks significantly reduce environmental and operational risks.

The SD Guthrie case shows that strong climate governance and sustainable finance regulation is being built into what organisations need to be resilient over the long term and to sustainable economic performance. The results are consistent with previous research showing that climate-related threats have become financially relevant and are progressively affecting corporate performance and investment decisions (Bolton et al., 2020; NGFS, 2023). Organisations with strong ESG governance frameworks are generally more capable of addressing sustainability challenges and maintaining long-term competitiveness (Eccles et al., 2014; Gillan et al., 2021). The results highlight the growing need of sustainable finance to strengthen the climate resilience of the plantation sector. The sustainable finance methods such as sustainability-linked financing, green investment projects and the ESG-based capital allocation can help organisations to finance the climate adaption and environmental protection activities. With investors integrating climate-related risks into their investment decisions, companies that have strong ESG governance and climate risk management are more likely to be considered for long-term investments and remain financially competitive in global markets.

RECOMMENDATIONS

Based on the findings of this study, several recommendations are proposed to strengthen climate governance, sustainability performance, and long-term resilience within SD Guthrie Berhad and the wider plantation industry.

Strengthening Supply Chain Governance and Sustainability Enforcement

Environmental controversies associated with supplier-related plantation activities demonstrate that weaknesses in supply chain governance may expose organisations to significant ESG and reputational risks. SD Guthrie Berhad should continue strengthening sustainability enforcement mechanisms through stricter supplier assessments, independent ESG verification, and enhanced monitoring of environmentally sensitive areas. Stronger supply chain governance can improve environmental accountability, reduce sustainability-related risks, and strengthen stakeholder confidence. Strong supply chain monitoring and sustainability enforcement have been identified as critical mechanisms for reducing deforestation-related risks and improving ESG performance (Lambin et al., 2018).

Enhancing Transparency of ESG Reporting and Sustainability Disclosures

As investors and regulators increasingly rely on ESG information when making decisions, SD Guthrie Berhad should further enhance the transparency and quality of its sustainability disclosures. More comprehensive reporting on climate-related risks, environmental incidents, corrective actions, and sustainability performance can improve investor confidence and reduce concerns regarding greenwashing. Greater transparency also strengthens organisational legitimacy and stakeholder trust. Enhanced sustainability disclosure improves transparency, reduces information asymmetry, and strengthens investor confidence (Dhaliwal et al., 2011).

Improving Corrective Action Mechanisms for Non-Compliant Suppliers

Sustainability governance is effective not just in the policies but also in the execution of such policies. SD Guthrie Berhad must enhance corrective action processes for suppliers failing to meet environmental and sustainability criteria. This could include better remediation programmes, more robust supplier monitoring, ongoing environmental audits and suspension of suppliers when necessary. Such initiatives can help ensure consistency between sustainability commitments and operational standards across the supply chain.

Expanding Stakeholder Engagement in Environmentally Sensitive Areas

Stakeholder engagement remains essential for effective sustainability governance. SD Guthrie Berhad should continue strengthening engagement with local communities, indigenous groups, environmental organisations, regulators, and other relevant stakeholders. More inclusive stakeholder participation can improve environmental decision-making, reduce potential conflicts, and support sustainable plantation development in environmentally sensitive regions. Effective stakeholder engagement contributes significantly to environmental legitimacy and long-term sustainability outcomes (Freeman et al., 2020).

Strengthening the Operational Effectiveness of Climate Governance Strategies

Although SD Guthrie Berhad has implemented various sustainability initiatives, climate-related risks continue to create operational and environmental challenges. Therefore, the company should strengthen the integration of climate governance into operational decision-making processes through improved environmental monitoring systems, climate risk assessments, scenario planning, and sustainability performance evaluations. Stronger implementation can improve organisational resilience and long-term sustainability outcomes.

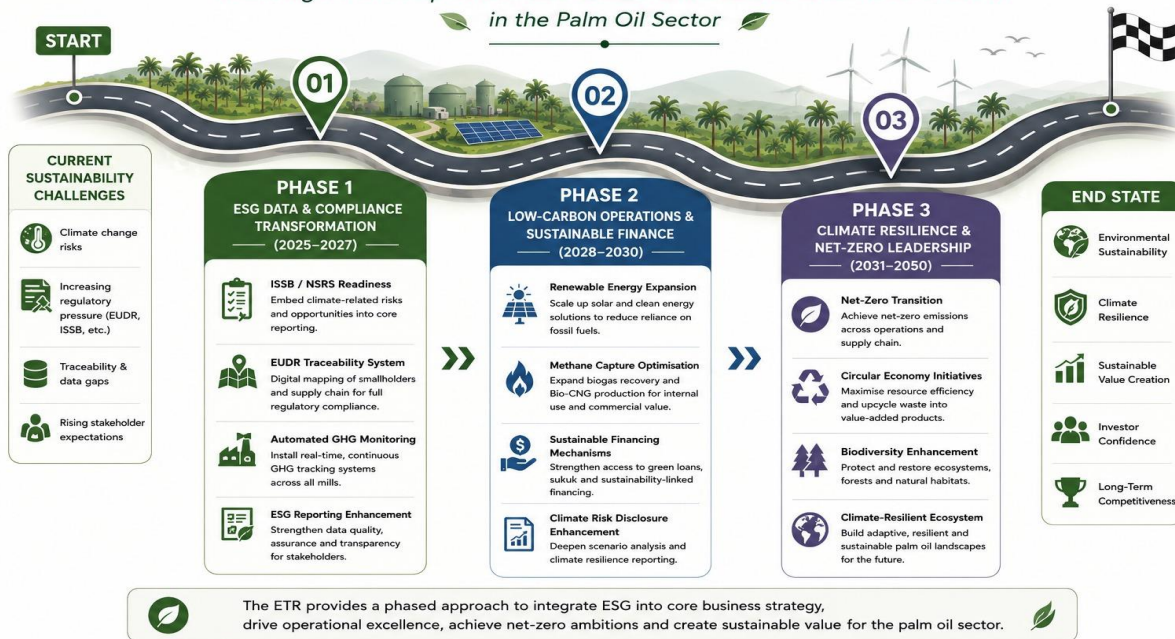
Proposed ESG Transformation Roadmap (ETR)

Based on the results of the present study, an ESG Transformation Roadmap (ETR) is provided as a conceptual framework to facilitate sustainability transformation in plantation enterprises. The framework has four interlinked dimensions: climate risk management, ESG governance, sustainable finance, and stakeholder

engagement. ETR provides a systematic approach for organisations to detect climate-related risks, improve sustainability governance, link environmental actions to financial objectives and enhance stakeholder confidence. The integration of these elements into a single framework allows the roadmap to enable long-term organisational resilience, environmental accountability and sustainable value development. The proposed framework can offer a realistic reference for plantation companies, investors, regulators, and policymakers who aim to increase climate resilience and speed up sustainability transformation in the plantation sector.

PROPOSED ESG TRANSFORMATION ROADMAP (ETR)

*A Strategic Roadmap for Climate-Resilient and Sustainable Value Creation
in the Palm Oil Sector*



CONCLUSION

Climate change is now one of the most urgent threats to environmental sustainability, company operations and long-term economic development around the world. In the plantation sector, climate-related hazards such as deforestation, biodiversity loss, greenhouse gas emissions, water pollution, floods, droughts and changing weather patterns are progressively influencing operational continuity, financial performance and sustainability results. This is leading to increased pressure on plantation firms to improve climate governance, increase environmental accountability and embed sustainability considerations into corporate decision-making processes. This study investigates how SD Guthrie Berhad manages climate-related risks through sustainable financing and ESG governance strategies. The results reveal that environmental sustainability and climate resilience are now major strategic concerns in the plantation industry. The report also reveals that climate-related risks are not only environmental issues but have now really become important economic and financial risks that can impair organisational resilience, investor trust, market access and long-term competitiveness. The analysis found that SD Guthrie Berhad has taken several sustainability initiatives in response to climate-related challenges, including its net-zero emissions commitment, methane capture systems, renewable energy investments, biodiversity conservation programmes, NDPE policy implementation and enhanced ESG reporting practices. These efforts represent the company's commitment to enhancing sustainability performance and lowering environmental impacts while ensuring business resilience.

However, sustainability transformation is a continuous process that must be constantly enhanced and changed. Plantation enterprises are under continual pressure from problems connected to regulatory compliance, climate-related operational disruptions, costs of sustainability transition and rising stakeholder demand. Thus, companies must continuously enhance their risk management practices, sustainability governance mechanism and stakeholder engagement strategies to remain competitive in an increasingly sustainability-oriented global business environment. The research highlights the importance of sustainable financing to promote climate adaptation, environmental conservation and long-term organisational resilience. Effective climate risk

management, ESG governance, sustainable finance and interaction with stakeholders can be combined effectively to improve business sustainability and allow responsible corporate growth. In addition, the suggested ESG Transformation Roadmap (ETR) presents a practical framework that could assist plantation firms in speeding up their sustainability transformation and improving their climate resilience. Finally, more coordination between firms, regulators, investors, communities and environmental stakeholders are still crucial in pushing forward sustainable growth in Malaysia's plantation industry.

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