Sustainable Forest Management and Effective Land Use Policies for Mitigating Forest Loss: The Case of Malaysia

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Based on World Resource Institute (WRI)'s 2023 report, the loss of tropical primary forests in 2022 has increased, resulting in a total of 41 thousand km^2 being lost. Despite facing ongoing challenges in conserving existing forest areas, Malaysia has managed to keep rates of primary forest loss at nearly record-low levels. The Malaysian Government is committed to maintaining at least 50 percent of Malaysia's land mass under forest and tree cover. As of 2020, the country's forest cover is 54.58 %, exceeding the targeted goal. This paper aims to identify the effectiveness of implementing sustainable forest management practices and multiple land use policies to mitigate forest loss using Malaysia as a case study. A case study approach was used to describe the implementation of sustainable forest management practices and multiple land use policies to mitigate forest loss in Malaysia. The study reviewed government websites, land-use policies, legislative documents, journal articles, guidelines on sustainable forest management, and official press releases to gather information. Malaysia has stabilised its deforestation rates by implementing Sustainable Forest Management (SFM) including Selective Management System (SMS), Reduced Impact Logging (RIL), forest management certification, enhancement of forest law, enforcement and governance, and research and development. The country also effectively implemented various land-use policies to mitigate forest loss and promote sustainable land management practices. The analysis shows that the ongoing demand for food, transportation, and infrastructure development will continuously put the pressure on forest and resulting in controlled annual forest loss. It is essential for Malaysia implementing additional efforts to enhance its conservation efforts while striking a balance between development needs and the conservation of existing forest areas.

1. Introduction

Malaysia is one of the world's 17 megadiverse countries (Von Rintelen et al., 2017; Tong, 2020), with a land area of approximately 330.3 thousand km^2 comprised of Peninsular Malaysia, Sabah, and Sarawak. Malaysia is dedicated to conserving and protecting its forest, with a goal of maintaining at least 50 % of its land area under forest and tree cover across its land area, in accordance with its pledge made at the Earth Summit 1992 (Yap et al., 2021; Varkkey et al., 2018). After nearly three decades, Malaysia remains steadfast in upholding this pledge. As of 2020, the country's forest cover is 54.58 % or 180.5 thousand km^2 of its total land area (Figure 1). Notably, approximately 106.8 thousand km^2 have been designated as Permanent Reserve Forest (PRF) or Permanent Forest Estate, while 33.2 thousand km^2 are categorised as Totally Protected Area (TPA), and 40.5 thousand km^2 are classified as Stateland Forest (NRECC, 2023).

Based on the Malaysian Constitution, state governments are largely responsible for managing forestry, with the federal Government's role being advisory and limited to providing support for the forestry sector through technical assistance, training, research, and development (Moktshim, 2020). Both state and federal administrations consistently struggle to maintain existing forest areas. This is primarily because that land is

considered as a valuable commodity, and there are often more profitable opportunities for alternative land uses such as agriculture, infrastructure development, and urbanisation. Prioritising forest conservation efforts becomes challenging since these other land uses may provide larger returns on investment. Moreover, the costs associated with forest management are continuously increasing, adding to the financial burden faced by the authorities responsible for their maintenance.

According to the World Resource Institute (WRI)'s 2023 report (WRI, 2023), tropical primary forest loss in 2022 has worsened even though countries have promised to end deforestation. The report reveals that 41 thousand km^2 of tropical primary forest were lost in 2022, resulting in the emission of 2.7 gigatonnes (Gt) of carbon dioxide. Despite this worrying trend, Indonesia and Malaysia have made impressive strides by significantly reducing their deforestation rates. The report highlighted that Malaysia has managed to keep rates of primary forest loss at nearly record-low levels although encountering ongoing challenges in maintaining existing forest areas. The country has successfully reduced its primary forest loss by 57 % as of 2022, positioning it as the fourth-ranked country among the top 10 nations for reducing primary forest loss as of 2022.

The academic literature assessing Malaysia's forestry sector is largely focused on assessing individual policies or regions, such as the analysis of the impacts of the Malaysian Timber Certification Scheme (Lewis and Davis, 2015) and the overview forestry sector in Peninsular Malaysia (Talib, 2015). There has been no study to assess the success of Malaysia in reducing deforestation, explicitly focusing on the effectiveness of land use policies, legislation, and forest management practices. This research contributes to filling this gap by describing the implementation of sustainable forest management practices and multiple land use policies to mitigate forest loss using Malaysia as a case study.
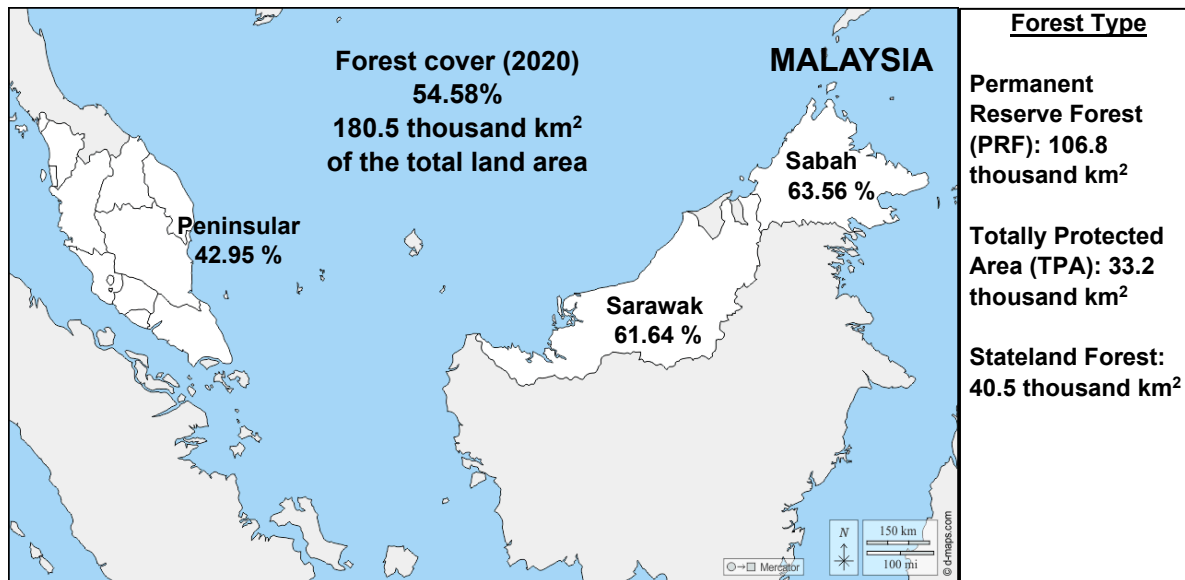

Figure 1: Total Forested Areas in Malaysia. The map shows the forest coverage of the Peninsular, Sabah, and Sarawak. Map modified from d-maps.com. (The original map was adopted from D-maps (2023)).

2. Research Method

A case study approach was used to describe the implementation of sustainable forest management practices and multiple land use policies to mitigate forest loss in Malaysia. The study was conducted by reviewing information posted on government websites and other relevant documents, such as land-use policies, legislative documents, journal articles, guidelines on sustainable forest management (SFM) in Malaysia, and official press releases. Keywords such as forest, sustainable forest management, and deforestation were used for the search. The extracted data encompassed the targets and action plans outlined in the documents, which were expected to influence forestry management and the conservation of existing forested areas.

3. Sustainable Forest Management in Malaysia

Malaysia has successfully implemented sustainable forest management (SFM) practices. The nation gives equal importance to conserving its natural resources, addressing social and environmental concerns while focusing on economic growth and development. Since 1978, Malaysia has adopted the Selective Management

System (SMS) as part of SFM. This system involves the selection of a management regime to optimise economic harvesting, utilisation, reforestation, and sustained yield (Chiew, 2009).

In Malaysia, a well-regulated system is in place to ensure a consistent timber supply. Forest resources are controlled and regulated through forest management plans at the targeted areas to be harvested and volumes to be extracted. Since 1996, the allocation of annual felling coupes has been closely monitored through the Seventh Malaysian Development Plan. This monitoring helps maintain a balance between timber production and extraction, considering the net area of production forest within the Permanent Forest Reserve. The compliance with each state's allocated annual felling coupes is reported to the National Land Council every five years. Malaysia also adopted Reduced Impact Logging (RIL) in forest management (Chiew, 2009). RIL is characterised by intensively planned and stringent control in timber-harvesting operations to minimise environmental impact on forest stands and soils. This approach focuses on reducing the adverse effects of logging activities on the ecosystem.

In addition to sustainable forest management (SFM), Malaysia has implemented various national strategies and programs to support these efforts. These include the forest certification initiative, the enhancement of forest law, enforcement and governance, and research and development projects. One notable initiative is the Malaysian Timber Certification Scheme (MTCS), which has been implemented since 2001 as a voluntary national timber certification scheme.

The MTCS has emerged as a leading timber certification scheme for tropical forests in Southeast Asia. It has gained international recognition as the region's first tropical timber certification scheme to be endorsed by the Programme for the Endorsement of Forest Certification (PEFC), the world's largest forest certification system. As of May 2023, a total of 31 forest management units (FMUs) covering an area of 61.5 thousand km^2 have been certified and sustainably managed under the MTCS (MTCC, 2023).

4. Forest Administration

According to Article 74(2) of the Federal Constitution of Malaysia, each state is responsible for managing its forests. Consequently, each state holds the authority and independence to enact laws, regulations and administer forestry policies within its territories. The federal Government's executive authority is primarily limited to providing the states with guidance, technical help, training and, support for forestry-related research, and development.

In the present governmental system, the three regions of Malaysia – Peninsular Malaysia, Sabah, and Sarawak, have individually formulated policies and legal frameworks to govern their respective forests. The legislative framework governing forestry in Peninsular Malaysia involves the Forestry Policy of Peninsular Malaysia and National Forestry Act 1984 (Amended 2022). Sabah implements the Sabah Forest Policy, Forest (Timber) Enactment 2015, Forest Rules 1969 and Sabah Forest Enactment 1968. Sarawak enacts the Sarawak Forest Policy, Forests Regulations, and Sarawak's Forests Ordinance 2015 (Cap.71). These region-specific policies and legislations outline each area's forest management guidelines and regulations (KeTSA, 2021).

The National Land Council (NLC) was founded on 22 January 1958, which aimed to promote a cohesive strategy towards forestry policy, governance, and management. It also sought to harmonise policies across different sectors that interact with the forestry industry. This establishment was mandated by Article 91(1) of the Federal Constitution. The primary role of this Council is to coordinate the implementation of sustainable practices and the optimal utilisation of forest resources, ensuring their conservation as valuable natural assets in a planned, rational, and efficient manner. The Council facilitates dialogues between the Federal and State governments to encourage collaboration within the land, mining, and forestry sectors..

The National Land Council (NLC) is chaired by the Prime Minister and consists of representatives selected by the Sultan or the Governor from each State Government . Additionally, the NLC includes the minister responsible for forestry affairs and other Federal Ministers whose portfolios impact the forestry sector, such as finance, trade, agriculture, and agro-based industry, as well as plantation industries and commodities. Besides enhancing collaboration, the NLC also serves as a forum for federal and state governments to discuss and resolve forest policy, administration, and management issues (Chiew, 2009).

Considering the numerous advancements in the forestry sector on both domestic and global levels, along with Malaysia's obligations to worldwide agreements and conventions, there is a necessity to formulate a comprehensive forestry policy. This policy required effectively addressing emerging issues such as climate change impacts, ensuring food security and sustaining livelihoods, and covering all three regions' needs and priorities.

In this scenario, the Malaysia Policy on Forestry (MPF) was created by merging essential elements from the forest policies of three regions. The policy statement and rationale of the MPF serve as a reference and guidance for the forest policies and regulations of the three regions (KeTSA, 2021). The state government will separately outline the specific targets, goals, and strategies in the respective forestry policies.

5. Changes in Forest Cover

Between 1990 and 2010, Malaysia experienced a deforestation rate of 0.3 % per year. Notably, this rate decreased to 0.1 % per year during two distinct periods: 1990-2000 and 2001-2010. From 2009 onward, the change in forest areas has stabilised (MESTECC, 2018; NRE, 2017). This stabilisation is primarily due to improved forest management practices and enhancement in agricultural crop production as part of the 3rd National Agriculture Policy (NAP3) (NRE, 2017).

Despite these positive developments, the forests still face pressures from a growing population, estimated to reach nearly 40 M by 2040, and increased demands for food, transportation, infrastructure, and energy. Additionally, maintaining forested areas poses a challenge as land is considered a premium commodity, and alternative land use types often promise higher returns on investment. Furthermore, the costs associated with forest management continue on the rise.

Continuous deforestation constantly threatens forests as they are cleared continuously for alternative land-use purposes. Despite being labeled as Environmentally Sensitive Areas, certain regions are still targeted for development, indicating that lower priority is a significant factor contributing to land-used competition. The natural forests in Malaysia have suffered from fragmentation due to habitat conversion and infrastructure construction. The disruption of wildlife corridors has affected animal migration and resource availability, resulting in genetic isolation within these ecological islands (Torre et al., 2019).

6. Effective Land Use Policies for Mitigating Forest Loss

Malaysia has prioritised sustainable development and is continuously committed to protecting and conserving its natural resources. In conjunction with this, the country has taken comprehensive measures and implemented robust land use policies to provide a framework for safeguarding its invaluable resources and conserving the ecosystem services provided by its forests. Through these actions, the country ensures that economic progress does not achieve at the cost of environmental conservation.

Malaysia continued to commit to maintaining a minimum of 50 % of the country's land area under forest and tree cover. In order to address the multifaceted challenges associated with forest loss, the country has implemented various land-use policies to mitigate forest loss and promote sustainable land management.

The Malaysia Policy on Forestry (KeTSA, 2021) is dedicated to ensuring sufficient forested areas that provide ecosystem services, conserve biodiversity, protect the environment, and support the sustainable use of resources for socioeconomic advancement.

The Sabah Forest Policy (SFD, 2018) is likewise dedicated to the objective of designating and safeguarding a minimum of 50 % of Sabah's land area for sustainable use of forest and maintaining tree cover to support biodiversity conservation, environmental safeguards and socioeconomic development. Sabah targets to gazette at least 30 % of its land area or 22 thousand km^2 as Totally Protected Areas(TPAs) by the year 2025. The National Policy on Biological Diversity 2016-2025 (NPBD) (KATS, 2019) aims to conserve a minimum of 20% of terrestrial areas and inland waters, along with 10% of coastal and marine regions by utilising a representative system of protected areas (PA) and other impactful area-based conservation strategies

The National Policy on Biological Diversity 2016-2025 (NPBD) (KATS, 2019) aims to conserve a minimum of 20% of terrestrial areas and inland waters, along with 10% of coastal and marine regions, utilising a comprehensive network of protected areas (PA) and other impactful area-based conservation strategies.

The target is materialised by several actions, including expanding the extent and representativeness of terrestrial and PA networks, developing community-conserved areas as an integral part of the PA network, and improving the effectiveness of PA management.

Under The National Agricommodity Policy (2021-2030)(MPIC, 2022), the country has worked with industry to improve sustainability practices in the Agricommodity sector to resolve issues that come under the environmental, sustainability, and governance. The Government committed to limiting the expansion of oil palm plantations to protect biodiversity and support efforts to retain 50 % of forest cover. In order to achieve these targets, the Malaysian Government has implemented several measures. These include capping the total area allocated for oil palm plantation at 65 thousand km^2 across the country, banning new planting of oil palm in peatlands, and stricter regulations on existing oil palm plantations on peatlands. The conversion of Permanent Forest Reserve (PFR) for oil palm planting activities or other agricultural crops is also restricted. Furthermore, all oil palm plantations are required to be certified under the Malaysian Sustainable Palm Oil (MSPO) certification scheme.

In addition to the abovementioned policies, Malaysia amended the National Forestry Act 1984 (Amendment 2022) in 2022. This amendment introduces stricter procedures for the degazettement of Permanent Reserved Forests (PRFs). The amended act now mandates holding a public inquiry before any PRF area can be degazetted, ensuring transparency and public involvement in the decision-making process. The amendment

also requires simultaneous replacement of any PRF that is degazetted with an equivalent forest area. These provisions aim to safeguard existing PRF areas and prevent further reduction in forest areas.

7. Funding Sources for Sustainable Forest Management

Malaysia has a long history of forest management. However, certain forested areas have experienced degradation due to past management effects. Restoring and rehabilitating these forests required high-cost and nurturing efforts. Sustainable Forest Management is a long-term investment that requires significant resources for planning, implementation, monitoring, and evaluation.

Table 1: Forest development allocation, Malaysia, 2017-2021

Country		(million MYR)				
	Year	2017	2018	2019	2020	2021
Malaysia	State	69.31	65.23	116.11	108.27	135.25
	Federal	78.41	49.12	60.07	79.14	89.36
	Total	147.75	114.36	176.08	187.41	224.61

Source: The Compendium of Environment Statistics, Malaysia 2022

Based on Chiew (2009), Malaysia would require total funding of 2,884.71 million MYR to ensure the sustainable management of forest resources in Malaysia. This allocation will cover various aspects such as research, infrastructure development, and human resources training in Malaysia. Despite a gradual increase in state and federal funding for forest development over the past five years (Table 1) (DOSM, 2022), the budget remains insufficient to effectively conserve the country's forests and meet international obligations.

In this scenario, the Federal Government of Malaysia took a proactive approach by introducing a new financial mechanism called Ecological Fiscal Transfer (EFT) for biodiversity conservation in 2019. This mechanism aims to incentivise State Governments to protect critical ecosystems such as water catchment areas and wildlife habitats by maintaining and increasing protected areas.

The Federal Government has demonstrated its commitment to protecting and conserving Malaysia's forests and biodiversity. In 2019, an allocation of 60 million MYR was designated for this purpose and further increased to 70 million MYR in both 2021 and 2022. In addition, the Government significantly raised the funding to 150 million MYR in 2023 (NRECC, 2023). This funding increase reflects the need to allocate adequate resources for research, infrastructure development, and human resources enhancement to achieve sustainable forest management in Malaysia.

8. Discussion

Malaysia did not publicly reveal annual data regarding deforestation areas and rates. The author conducted a limited study using the available information derived from government websites and international reports. This review highlights Malaysia's commitment to reducing forest loss and showcases the progress in maintaining at least 50 % of its land area to remain under forests. Since 2009, Malaysia has stabilised its deforestation rates by implementing sustainable forest management strategies and forest certification programs. Besides that, Malaysia has also effectively implemented land use caps through various land-use policies (Table 2) to mitigate forest loss and promote sustainable land management practices. The areas of other land use, including cropland and settlement, are closely monitored to reduce further forest loss. The success of Malaysia in reducing deforestation has been acknowledged by the World Resource Institute in 2023, reporting a significant 57 % reduction in Malaysia's primary forest loss.

Table 2: Mitigation Actions and Related Policies

Related Policy	Action	Land Use Caps
• Malaysia Policy on Forestry • National Policy on Biological Diversity	Sustainable Forest Management	a minimum of 50 % of the country's land area under forest
National Agricommodity Policy (2021-2030)	Sustainable Agricommodity Cultivation	• capping the total area allocated for oil palm plantation at 65 thousand km^2 nationwide • banning new planting of oil palm in peatlands • No conversion of Permanent Reserved forests for oil palm plantations, or other agricultural crops

9. Conclusion

Although Malaysia is showing significant progress in reducing forest loss, halting deforestation remains challenging, particularly for developing countries like Malaysia. The demand for food, transportation, and infrastructure development will continuously pressure the forest, making it difficult to maintain existing forest areas. Based on these scenarios, it is projected that forest areas in Malaysia will continue to experience an annual loss. Additional action is required to enhance its conservation efforts, promote sustainable practices and ensure the long-term conservation of its valuable forest resources.

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