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# Assessing Indonesia's Peatland Management Strategies Under the ASEAN Transboundary Haze Pollution Second Road Map

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**Abstract**
Peatland ecosystems in Southeast Asia are vital carbon sinks and biodiversity reserves, yet they face persistent threats from unsustainable land-use practices, particularly fire-based land clearing. Indonesia, which holds a significant share of the region's tropical peatlands, remains a key actor in addressing the environmental and transboundary haze crises stemming from peatland degradation. As a member of ASEAN, Indonesia is bound by regional commitments, including the ASEAN Agreement on Transboundary Haze Pollution and the ASEAN Second Haze-Free Roadmap (2023–2030), which promotes sustainable peatland management through strategies such as the ASEAN Peatland Management Strategy (APMS). This paper aims to critically assess Indonesia's peatland management strategies in light of these regional obligations. It evaluates the implementation and enforcement of the Zero Burn Policy, the current state of peatland rehabilitation and preservation efforts, the institutional and legal roles of the Indonesian government, and comparative insights drawn from other ASEAN member states. This research uses a combination normative and empirical juridical research methodology, integrating doctrinal legal analysis with contextual evaluation of implementation practices. Despite regulatory advancements and institutional initiatives, Indonesia continues to face significant challenges, including weak enforcement, persistent land burning, and fragmented governance. The paper concludes that achieving sustainable peatland management and fulfilling ASEAN commitments requires stronger inter-agency coordination, enhanced legal clarity, and deeper regional collaboration rooted in shared environmental governance principles.

**Keywords:** Peatland Management; Transboundary Haze Pollution; Environmental Governance

## A. Introduction

Peatland ecosystems in Southeast Asia play a critical role in global carbon retention, storing over 90% of their carbon in waterlogged soils and constituting nearly 40% of the

world's tropical peatlands, despite covering only 6% of the global peatland area.[1] Beyond their function as carbon sinks, these ecosystems serve as biodiversity hotspots, supporting endemic species and sustaining local livelihoods. However, unsustainable land use practices, particularly fire-based land clearance, have led to widespread degradation of these peatlands, resulting in significant carbon emissions and contributing to regional environmental issues such as transboundary haze pollution.[2]

As a member state of ASEAN, Indonesia is obligated to actively participate in and adhere to regional agreements, including those addressing transboundary environmental issues. Over the years, ASEAN has progressively strengthened its framework for mitigating transboundary haze pollution, beginning with the 2002 ASEAN Agreement on Transboundary Haze Pollution and, more recently, advancing through the ASEAN Second Haze-Free Roadmap (2023–2030). This roadmap outlines nine mutually reinforcing strategies aimed at achieving a haze-free ASEAN by 2030. It emphasizes the importance of eliminating transboundary haze through coordinated and collective actions at the regional, sub-regional, national, and local levels.

One of the nine key strategies outlined in the ASEAN Second Haze-Free Roadmap (2023–2030) is the ASEAN Peatland Management Strategy (APMS). The APMS encompasses several core measures, including the rehabilitation and restoration of at least 30% of degraded peatlands, the conservation and protection of remaining peatland ecosystems, and the adoption of integrated peatland fire management and prevention approaches—most notably, the Zero Burning Policy.[3] In addition to these technical and policy-oriented measures, the strategy underscores the importance of regional collaboration through the exchange of knowledge, expertise, and best practices among ASEAN member states. To ensure coherence between regional and national efforts, member states are also required to formulate, implement, and regularly update their respective National Action Plans in accordance with the APMS objectives.

Prior to the adoption of the ASEAN Peatland Management Strategy (APMS), Indonesia had already undertaken significant initiatives to prevent peatland fires and promote sustainable peatland management. These efforts included the establishment of the Peatland

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[1] ASEAN Secretariat, *ASEAN Peatland Management Strategy (2023-2030)*, 5, https://asean.org/wp-content/uploads/2024/04/APMS-2-Apr-Web.pdf

[2] Vong Sok and Swetha Peteru, "As Southeast Asia's Haze Dissipates, Managing Peatlands Is More Urgent than Ever - CIFOR-ICRAF Forests News," CIFOR, last modified November 11, 2024, accessed April 20, 2025, https://forestsnews.cifor.org/90047/as-southeast-asias-haze-dissipates-managing-peatlands-is-more-urgent-than-ever?fnl=

[3] ASEAN Secretariat, *ASEAN Peatland Management Strategy (2023–2030)*, 19.

Restoration Agency (*Badan Restorasi Gambut*) and the issuance of key regulatory instruments, such as Law Number 32 of 2009 and Government Regulation Number 57 of 2016, which provide the legal framework for the sustainable use and conservation of peatlands. Despite these measures, the effectiveness of Indonesia's legal and institutional responses remains limited. Peatland fires continue to occur, even in designated priority restoration areas, and the practice of land burning persists due to its low cost and ease of implementation. Moreover, overlapping land ownership claims and inconsistencies in permit allocation have created significant challenges in coordinating efforts among stakeholders, thereby undermining the overall success of sustainable peatland restoration and fire prevention initiatives.[4]

In light of these considerations, this paper aims to critically assess the effectiveness of Indonesia's past and present peatland management strategies within the framework of the ASEAN Transboundary Haze Pollution Second Roadmap (2023–2030) by exploring the following key issues: The extent to which the Zero Burning Policy been implemented as a preventive measure in peatland management, and how effective is its enforcement; The current state of peatland rehabilitation and preservation in Indonesia, and how its effectiveness is monitored and evaluated; The roles and responsibilities of the Indonesian government—at both the central and regional levels—in ensuring sustainable peatland governance aligned with ASEAN commitments; The lessons can be drawn from other ASEAN member states' policies and best practices to improve Indonesia's approach to peatland management and haze mitigation.

This paper adopts a combined normative and empirical juridical research methodology, integrating doctrinal legal analysis with contextual evaluation of implementation practices. The normative aspect involves a critical examination of the legal frameworks governing peatland management and transboundary haze pollution, focusing on both national and regional instruments. Primary legal sources include Indonesian environmental legislation, as well as international agreements such as the ASEAN Agreement on Transboundary Haze Pollution.

The empirical dimension complements this analysis by drawing on case studies, official reports, and statistical data to evaluate the real-world implementation and effectiveness of these legal instruments. Key secondary sources include ASEAN publications such as the Second ASEAN Haze-Free Roadmap (2023–2030) and the ASEAN Peatland Management Strategy,

[4] Almasdi Syahza, Sri Astuti, Suarman , Brilliant Asmit, "Efforts to prevent peatland fires through implementing local community education" Asian Education and Development Studies, Volume 13, Issue 5 (2024): 550, https://doi.org/10.1108/AEDS-06-2024-0132

alongside academic journals, policy briefs, and expert commentaries that offer critical insights into legal, institutional, and socio-economic dimensions of peatland governance.

## B. Discussion

### B. 1. Zero Burning Policy

Indonesia experienced one of its most catastrophic fire seasons in 2015, a year that marked a peak in the frequency and intensity of forest and land fires across the archipelago. Data from the Global Fire Emissions Database, compiled by Guido van der Werf, recorded nearly 100,000 individual fire events that year. By September, emissions from these fires had consistently surpassed the average daily emissions of the entire United States economy. This crisis was not an isolated occurrence; earlier severe fire episodes in June 2013, March 2014, and November 2014 illustrate a clear upward trajectory in fire activity.[5] The vast majority of these fires are intentionally set by agro-industrial entities employing fire as a primary tool for land clearing. The slash-and-burn method, favored for its speed and minimal costs, remains the dominant approach, as it significantly reduces labor and machinery expenses compared to mechanical land-clearing alternatives.

Large-scale forest conversion for agriculture in Indonesia predominantly occurs in lowland areas with peat soils—among the most agriculturally productive but ecologically vulnerable lands. According to Global Forest Watch Fires, over half of the fires in 2015 were concentrated on peatlands, particularly in high-risk provinces such as South Sumatra, South Kalimantan, Central Kalimantan, and Papua. Peatlands are highly susceptible to burning and, when ignited, represent a major source of greenhouse gas emissions due to their substantial carbon stocks, accumulated over thousands of years from decomposed organic matter. The draining and burning of peatlands—often for the establishment of oil palm or acacia plantations—releases vast quantities of carbon dioxide ($CO_2$) and methane ($CH_4$), the latter of which has a global warming potential 21 times greater than $CO_2$. Notably, these peatland fires

[5] Nancy Harris, Susan Minnemeyer, Fred Stolle, and Octavia Aris Payne, "Indonesia's Fire Outbreaks Producing More Daily Emissions than Entire US Economy," *WRI Indonesia*, October 16, 2015, https://wri-indonesia.org/en/insights/indonesias-fire-outbreaks-producing-more-daily-emissions-entire-us-economy?__cf_chl_rt_tk=p9wGCVzzFU2_pN7YWRuaDiJb0hxHrNMinwvxmUV31CM-1758794822-1.0.1.1-LZRIjbMQOl5X8VIDM1MARqkrERR0vz8ztPeKOSZNpJI.

are very problematic as it is stated that Indonesia and Malaysia's peatland fires contribute to the majority of transboundary haze within the ASEAN region.[6]

To reduce carbon emissions and mitigate transboundary haze from peatland fires, the ASEAN community has adopted the Zero Burning Policy—an approach that prohibits land clearing through open burning as a response to the widespread environmental, health, and economic consequences of forest and land fires. Historically, this policy was introduced in the ASEAN Agreement on Transboundary Haze Pollution, which defines the Zero Burning Policy as "a policy that prohibits open burning but may allow some forms of controlled burning."[7] Under this agreement, "open burning" refers to any form of fire, burning, or smoldering that takes place in open areas,[8] while "controlled burning" is defined as a regulated activity permitted under national law that does not result in wildfires or contribute to transboundary haze pollution.[9]

The ASEAN committee recognizes the Zero Burning Policy as a critical measure in addressing peatland fires, as reaffirmed in "Strategy 4: Sustainable Management of Peatlands for Peatland Fire Prevention" within the ASEAN Second Haze-Free Roadmap. This strategy mandates that member states strengthen and rigorously enforce the Zero Burning Policy in accordance with the ASEAN framework on Peatland Fire Management. Additionally, Strategy 4 specifies that the progress of the policy's enforcement may be evaluated through the submission of "evidence of efforts to achieve zero burning," while acknowledging the possible continuation of some controlled burning practices.

The implementation of the Zero Burning Policy within Indonesia's regulatory framework can be understood through two distinct approaches: (1) the prohibition of land clearing through burning, and (2) the allowance of "controlled" burning under specific circumstances. The prohibition aspect is firmly established in several legislative instruments. Article 69 paragraph (1) letter h of Law Number 32 of 2009 on Environmental Protection and Management explicitly forbids land clearing by burning. [10] This is reinforced by Article 50 paragraph (3) Law Number 41 of 1999 on Forestry which prohibits forest burning[11] and Article 56 paragraph (1) Law Number 39 of 2014 on Plantations which forbids plantation business

[6] World Resources Institute, "Indonesia's Fire Outbreaks Producing More Daily Emissions than Entire US Economy," last modified October 16, 2015, https://wri-indonesia.org/en/insights/indonesias-fire-outbreaks-producing-more-daily-emissions-entire-us-economy.
[7] Association of Southeast Asian Nations, *ASEAN Agreement on Transboundary Haze Pollution*, art. 1(14).
[8] Ibid., art. 1(9).
[9] Ibid., art. 1(3).
[10] Law Number 32 of 2009 on Environmental Protection and Management, art. 69(1)(h).
[11] Law Number 41 of 1999 on Forestry, art. 50(3).

actors from clearing or cultivating land using fire.[12] Further strengthening this framework, Government Regulation Number 57 of 2016, through Article 26 paragraph (1) letter c, specifically prohibits the burning of peatlands and/or the authorization of such activities. Together, these provisions form a comprehensive legal basis for the national Zero Burning mandate.

Conversely, the policy also accommodates limited exceptions through the concept of "controlled" burning. Article 69 paragraph (2) of Law Number 32 of 2009 permits the use of fire for land clearing under three strict conditions: (1) the area burned must not exceed two hectares per household; (2) the land must be used to cultivate local crop varieties; and (3) firebreaks must be established during the burning process. This regulatory exception reflects the state's recognition of local wisdom—traditional ecological knowledge and land management practices that are community-based, seasonal, small in scale, and conducted under collective supervision. These practices, often passed down through generations, are grounded in cultural heritage and a sustainable balance with the local environment.

As of 2025, several major agribusiness actors in Indonesia—such as PT Sinar Mas Agro Resources and Technology Tbk (SMART), PT Tunas Sawa Erma Group, Asian Agri, and the Indonesian Palm Oil Association (*Gabungan Pengusaha Kelapa Sawit Indonesia* or GAPKI)—have formally integrated the Zero Burning Policy into their operational frameworks. Among these, SMART stands out as a leading example of corporate compliance and proactive engagement in sustainable land management. Operating over 536,877 hectares of land, much of which overlaps with peatland areas, SMART faces significant environmental risks related to land clearing practices. Nevertheless, the company has demonstrated notable success in operationalizing the Zero Burning Policy through a comprehensive, four-pronged strategy.

First, SMART strictly prohibits the use of fire in all stages of land preparation, development, and throughout its supply chain, in alignment with prevailing Indonesian legal frameworks. Second, the company has instituted robust fire prevention measures, including an early warning system that continuously monitors hotspot maps and employs a risk-rating mechanism to assess fire potential. Third, SMART emphasizes community-based approaches through the *Desa Makmur Peduli Api* (DMPA) program, which empowers local communities by providing training in fire prevention, basic firefighting techniques, and early warning

[12] Law Number 34 of 2014 on Plantation, art. 56(1)..

protocols. Lastly, the company maintains rapid response capabilities by deploying dedicated firefighting teams who remain on standby to contain and suppress fires promptly.

However, a major unresolved challenge in implementing the Zero Burning Policy to protect Indonesia's peatlands lies in its impact on smallholder farmers. A study by Rohadi in 2017 conducted in Pelalawan, Indragiri Hulu, and Indragiri Hilir in Riau Province reveals the significant difficulties smallholders face in complying with the policy. While the Zero Burning Policy promotes a safer and more sustainable method of peatland management, its implementation is financially burdensome for small-scale farmers.[13]

A rough cost comparison highlights this disparity: clearing land using fire costs approximately IDR 1,000,000 per hectare, whereas adopting zero-burning methods requires around IDR 6,300,000 per hectare when done manually, and up to IDR 7,000,000 per hectare with heavy machinery. For many smallholders, the high cost of non-burning land preparation far exceeds the potential earnings from crop yields. Consequently, many opt for the more affordable practice of burning, often with limited regard for its ecological impact or broader environmental consequences beyond immediate local concerns. In some cases, landowners have chosen to abandon their farmland altogether. These neglected plots tend to accumulate biomass over time, substantially increasing the risk of wildfires during the dry season.

Due to the high cost of non-burning land preparation methods, we propose that the government address this issue by providing incentives to smallholders to encourage the adoption of sustainable and fire-free agricultural practices. These incentives could include access to affordable land-clearing equipment, financial support or subsidies, training on zero-burning techniques, and market access for sustainably produced crops. By easing the economic burden on smallholders, the government can help shift traditional practices toward environmentally friendly methods, reducing the risk of peatland and forest fires while supporting rural livelihoods.

### B. 2. The Need for Rehabilitation and Restoration

Peatland degradation is a direct consequence of fire-based land clearing practices. Accordingly, comprehensive efforts to rehabilitate and restore degraded peatlands are crucial—not only to mitigate long-term environmental harm but also to fulfil the commitments

[13] B. Winarno, D. Rohadi, T. Herawati, M. Rahmat, and E. Suwarno, "Out of Fire Disaster: Dynamics of Livelihood Strategies of Rural Community on Peatland Use and Management," *IOP Conference Series: Earth and Environmental Science* 487 (2020): 012008, https://www.cifor-icraf.org/publications/pdf_files/articles/ARohadi2001.pdf

outlined in Strategy 4 of the ASEAN Second Haze-Free Roadmap, which emphasizes sustainable peatland management and restoration across the region. The specific policies, targets, and implementation frameworks supporting this strategy are further detailed in the ASEAN Peatland Management Strategy (APMS).

The APMS distinguishes between peatland rehabilitation and restoration, recognizing them as two interrelated but distinct processes. Rehabilitation refers to the re-establishment of natural hydrology and vegetation cover with the aim of maintaining and protecting ecosystem functions, enhancing biodiversity, and potentially generating socioeconomic benefits—such as through agroforestry or wetland-based agriculture. This process may involve replanting or cultivation efforts, but can also include facilitating natural regrowth. In contrast, restoration is understood as the subsequent phase following rehabilitation, whereby—given adequate time and proper management—peatland functions are gradually restored to conditions comparable to those of undisturbed, intact peatland ecosystems.

To achieve the objectives of rehabilitating, restoring, and conserving degraded peatlands, ASEAN member states are encouraged to undertake several key actions. These include: (1) halting all activities that contribute to the conversion or degradation of natural peatlands in order to safeguard their ecological integrity, hydrological balance, and climate-regulating functions; (2) implementing no-drain agricultural practices on peatlands already under cultivation to minimize further subsidence and degradation; and (3) establishing robust legal frameworks that ensure the strict conservation of remaining pristine peatland areas.[14]

Notable progress has been made in advancing these goals, particularly among southern ASEAN countries, which have actively developed and applied techniques for rewetting and re-vegetating degraded peatlands. Rewetting—often achieved through canal blocking or closure—helps to restore the water table and enables the land to support wetland agriculture. This process is frequently complemented by re-vegetation efforts involving the planting of native species or economically viable crops that are ecologically compatible with peatland conditions.

This regional progress has been mirrored by Indonesia's national initiatives, most notably through the creation of institutional bodies tasked with restoring and protecting peatland ecosystems. The Indonesian government established the Peatland Restoration Agency (*Badan Restorasi Gambut* or BRG) through Presidential Regulation Number 1 of 2016. The

[14] ASEAN Secretariat, *ASEAN Peatland Management Strategy* (n. 1), 47.

agency was tasked with accelerating peatland restoration efforts in seven priority provinces: Jambi, South Sumatra, Riau, South Kalimantan, Central Kalimantan, West Kalimantan, and Papua. By the end of 2020, BRG was restructured and expanded into the Peat and Mangrove Restoration Agency (*Badan Restorasi Gambut dan Mangrove* or BRGM), broadening its mandate to include mangrove ecosystems alongside peatlands. Under BRGM, a range of strategic approaches has been introduced, most notably the "3R" restoration model: Rewetting, Revegetation, and Revitalization.[15] This integrated approach aims to restore the ecological function of peatlands by raising water tables (rewetting), replanting native vegetation (revegetation), and revitalizing local livelihoods through sustainable economic alternatives.

The first stage, rewetting, focuses on restoring moisture to dried peatlands by maintaining a minimum water level of 0.4 meters. This is achieved through techniques such as canal blocking, backfilling, the construction of boreholes, and the installation of water barriers to effectively manage the water regime. Rewetting is essential to reduce fire risk and to reestablish the natural hydrological functions of the peatland. Once the land is sufficiently saturated, the second stage, revegetation, begins. This involves replanting native vegetation that is ecologically suited to peat ecosystems. Species such as *gelam*, *jelutong*, and peat pandan are selected specifically because they do not disrupt the water balance. In addition to restoring biodiversity, revegetation helps stabilize canal banks and prevent soil erosion. The third stage, revitalization, aims to improve community livelihoods through sustainable economic activities. These include sago and coffee cultivation, rubber tapping, swamp-based fisheries, and the development of nature-based tourism.[16]

Furthermore, BRGM also took a community engagement approach by developing the *Desa Mandiri Peduli Gambut* (DMPG) program as an evolution of *Desa Peduli Gambut* (DPG). The program is implemented in peat hydrological areas and focuses on the main three interventions: Rewetting, Revegetation, and Village Economic Revitalization. DMPG makes villages the main actors in peat conservation with a community and landscape-based approach. The program involves training, capacity building, and technical assistance in managing and restoring peatlands sustainably.[17]

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[15] Ministry of Environment and Forestry, Republic of Indonesia, "Restorasi dan Perlindungan Gambut," last modified April 4, 2018, http://pojokiklim.menlhk.go.id/read/restorasi-dan-perlindungan-gambut

[16] Pantau Gambut, "Peatland Restoration Steps,". accessed April 21, 2025, https://en.pantaugambut.id/peat-101/peatland-restoration-steps

[17] Nano Sudarno and Akhmad Widjaya. "Studi Konsep Pengembangan Desa Mandiri Peduli Gambut (DMPG) Provinsi Kalimantan Timur." *PROPEAT, in cooperation with GIZ and the Ministry of Environment and Forestry of the Republic of Indonesia*, May 2022, 8-9, https://pkgppkl.menlhk.go.id/v0/wp-content/uploads/2023/08/02-Studi-Pengembangan-Desa-Mandiri-Peduli-Gambut-Kalimantan-Timur.pdf.

To assess the effectiveness of BRGM's approach in rehabilitating and restoring degraded peatlands, the implementation of the 3R strategy by PT Sinar Mas Agro Resources and Technology Tbk (SMART)—previously discussed in Section B.1—offers a relevant insight on the state and impact of the 3R strategy. As a major agribusiness actor, SMART has successfully revegetated over 1,600 hectares of degraded peatland across West Kalimantan and Jambi by utilizing the 3R approach. The company aims to complete the current phase of peatland rehabilitation in West Kalimantan by 2025 and finalize the initial phase of a 750-hectare rehabilitation project in Jambi by 2027. This example illustrates the potential for synergy between state-driven policy frameworks and private-sector initiatives in achieving long-term peatland restoration goals.[18]

Equally important alongside technical restoration efforts is the existence of a strong legal and regulatory framework for peatland protection. The Indonesian government has enacted a series of key policies, including a moratorium on issuing new licenses for activities in primary natural forests and peatlands—established through Presidential Instruction Number 10 of 2011 and extended through Presidential Instruction Number 6 of 2013 and Presidential Instruction Number 8 of 2015. In addition, Government Regulation Number 71 of 2014 on the Protection and Management of Peat Ecosystems provides a comprehensive legal foundation for safeguarding peatlands.

### B. 3. Government Initiatives for Strategic Success

Regarding the Second Haze Free Road Map. The sixth strategy revolves around strengthening relevant national policies, laws, regulations, and their implementation, this includes follow-up and review/enforcement. This strategy involves actions that would strengthen the laws of the country to efficiently progress the second haze free roadmap. To enhance national efforts in addressing environmental challenges, particularly haze pollution, it is essential to build capacity for developing, implementing, and enforcing robust policies, laws, and regulations. This includes fostering shared learning and the exchange of best practices in monitoring, evaluation, compliance, and enforcement. Strengthening coordination among enforcement agencies, leveraging innovative technologies, and aligning national monitoring with Roadmap indicators are crucial steps. Encouraging collaboration between the public and private sectors can also incentivize compliance through partnerships and support mechanisms.

[18] Smart. "Peat Restoration: Rebuilding Nature, One Step at a Time." *PT Sinar Mas Agro Resources and Technology Tbk (PT SMART Tbk)*. Accessed April 20, 2025. https://www.smart-tbk.com/en/cara-kerja-restorasi-gambut-rehabilitasi-gambut/

Additionally, adopting and implementing national policies that integrate the polluter-pays principle and economic tools such as tax concessions can promote behavioral change and haze prevention. The development of economic instruments and ESG frameworks will further support enforcement efforts and reduce pollution. Enhanced communication strategies, including accessible fire reporting tools and reward schemes, can boost public engagement. Lastly, reviewing and updating relevant laws and policies, with stakeholder input, will help close implementation gaps and improve regulatory compliance and enforcement.

The Polluter Pays Principle is an environmental policy idea that asserts that the party responsible for causing pollution should incur the expenses of managing it in order to avoid harm to human health or the environment. This includes funding for actions like pollution management, cleanup, and environmental restoration. Implementing the Polluter pays principle in Indonesia's peatland management and haze pollution prevention can be a powerful method to enforce environmental accountability and improve long-term sustainability. Indonesia can approach the Polluter Pays Principle by strengthening existing environmental laws, such as Law Number 32 of 2009, improving the law in ways such as explicitly amending peatland-specific regulations. There needs to be a sort of legal mechanism to identify and assign liability to those involved for peatland degradation.

Indonesia can minimise haze pollution by merging economic policies with Environmental, Social, and Governance (ESG) frameworks. Pollution taxes, fines, subsidies for sustainable practices, and tradable licenses are all ways for the government to make polluting more expensive and incentivise cleaner alternatives. ESG frameworks encourage transparency, sustainable land use, and corporate accountability. Indonesia can improve enforcement, ensure compliance, and encourage long-term environmental responsibility by tying access to finance and government support to ESG performance, as well as using instruments such as satellite surveillance and regional cooperation.

Peatland management encompasses a wide array of legal, policy, and regulatory frameworks operating at both national and regional levels. Within most ASEAN member states, the governance of peatlands involves multiple institutions, with various ministries and agencies holding distinct roles and responsibilities. This institutional complexity reflects the cross-sectoral nature of peatland issues, which intersect with environmental protection, land use planning, agriculture, and climate change mitigation.

ASEAN has introduced various policy instruments and regional initiatives that pertain to peatland governance, either as a primary focus or within broader environmental and developmental agendas. These frameworks are designed to support the conservation,

sustainable management, and rehabilitation of peatland areas. Among the principal instruments are the ASEAN Agreement on Transboundary Haze Pollution (AATHP), the Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control with Means of Implementation (commonly known as the Haze-Free Roadmap), the ASEAN Peatland Management Initiative (APMI), the ASEAN Peatland Management Strategy (APMS), and the ASEAN Programme on Sustainable Management of Peatland Ecosystems (APSMPE). Moreover, peatland issues are addressed within broader regional strategies associated with economic cooperation and food security, including the ASEAN Integrated Food Security (AIFS) Framework, the Strategic Plan of Action on Food Security in the ASEAN Region (SPA-FS), and the ASEAN Agricultural Research and Development Information System (ASEAN-ARDIS).

The Indonesian government, at both the national and local levels, is essential for putting ASEAN's peatland management plans into action. This involves making sure their own rules match the ASEAN framework, working together across different agencies, and actually implementing the plans on the ground. Such as Indonesia's 2020–2049 National Peatland Ecosystem Protection and Management Plan aligns closely with regional frameworks, directly incorporating the goals of ASEAN's Haze-Free Roadmap and the ASEAN Peatland Management Strategy (APMS). This reflects the country's commitment to both environmental protection and regional cooperation in addressing peatland degradation and haze issues.

Since 2019, the Ministry of Environment and Forestry (MoEF) has revised more than 14 sub-regulations to meet the requirements of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), address the APMS 2006–2020 targets for peat fire prevention, and support sustainable livelihood strategies under the ASEAN Programme on Sustainable Management of Peatland Ecosystems (APSMPE). At the local level, efforts to institutionalize these frameworks are evident. For example, Kubu Raya Regency has established provincial peatland management units that coordinate closely with ASEAN's technical guidelines, including practices like canal blocking and groundwater monitoring, to ensure effective peatland restoration and fire prevention. In terms of practical, on-the-ground peatland management, countries across the ASEAN region continue to face similar challenges, including drainage issues, frequent fires, unsustainable livelihood practices, and poor enforcement of existing laws and regulations. Moreover, there remains a pressing need to raise public awareness about the critical role that healthy, undisturbed peatlands play in addressing climate change, preserving biodiversity, and promoting sustainable development.

Regional cooperation is required, as one of the primary drivers of peatland deforestation and degradation in Southeast Asia is the absence of clear regulatory and policy frameworks for peatland conservation, protection, and restoration, along with the inconsistent enforcement of existing regulations related to peatland management. In order to improve on these policies, closer regional collaboration is required, especially on law enforcement, regulations on biodiversity, and peatland protection. Therefore, peatland management efforts should be enhanced through inclusive policy-making involving multiple stakeholders and cross-border cooperation. Monitoring and evaluation systems should be integrated into policies at both national and regional levels.

According to ASEAN's second APMS, elements to address in regional cooperation include: (1) Synthesis of all relevant legislation, policy, or regulations specifically related to peatlands, their biodiversity, hydrology, agriculture, and preservation, and inherent weaknesses identified; (2) Integrated Pest Management (IPM) is incorporated into Regional Collaboration Plans and Agreements, which include climate mitigation targets and adaptation plans; (3) The law enforcement of regulations on biodiversity conservation and peatland protection has improved; (4) Monitoring and evaluation of the implementation of existing policy frameworks at the regional level has improved; (5) Enhance Multistakeholder partnerships to support peatland management, improve and enforce regulations on biodiversity conservation and peatland protection

Indonesia's current efforts on peatland management have been quite effective, but at the same time has its side of challenges. Further enforcement and compliance are required as illegal drainage and burning still occur, although it has reduced; they could be improved. Two of the strategies we could use to improve Indonesia's current efforts are enhancing multi-stakeholder partnerships to support peatland management and improving and enforcing regulations on biodiversity conservation and peatland protection. Enhancing multi-stakeholder partnerships to support peatland management requires Indonesia to take action, such as mobilising adequate financial, human, and technological resources at all levels, and engaging the banking and investment sectors to generate additional resources for peatland management. To enhance peatland protection and restoration, it is essential to strengthen coordination by establishing permanent national and regional platforms that unite key stakeholders, including ministries, local governments, civil society, indigenous groups, and private sector actors, and by creating a multi-stakeholder advisory council under the Peat and Mangrove Restoration Agency (BRGM). Equally important is building trust through inclusive participation by ensuring Indigenous Peoples and Local Communities (IPLCs) are involved from the outset

using Free, Prior, and Informed Consent (FPIC) frameworks, and by supporting community-led mapping of customary territories. These steps help reduce policy conflicts, encourage shared decision-making, and ensure projects are sustainable and equitable.

Another strategy is to improve and enforce regulations on biodiversity conservation and peatland protection. To improve and enforce regulations on biodiversity conservation and peatland protection, Indonesia needs to streamline its legal framework and boost the capabilities of its institutions, alongside increasing financial support for local enforcement. Expanding the use of real-time monitoring tools, such as satellite imagery and community reporting, is crucial, while empowering local and indigenous communities as active partners through legal recognition and collaborative management is equally important. Implementing strict penalties and progressively increasing fines for violations, coupled with incentives for sustainable practices, can significantly enhance compliance, particularly within the private sector. Furthermore, closer alignment with international climate and biodiversity initiatives can provide essential funding and ensure accountability, thereby bolstering long-term, cross-sectoral enforcement endeavors.

### B. 4. Improvements Based on ASEAN's Efforts

Indonesia has a vast amount of tropical peatlands, holding around 70% of Southeast Asia's peatlands. Indonesia requires much more responsibility and caution in the management of its peatlands. Indonesia has made efforts on efficient peatland management and prevention of haze pollution, however, improvements may be made to ensure efficient progress in the management of peatlands and prevention of Haze Pollution. By improving the use of ASEAN's Second Roadmap on Transboundary Haze control with means of implementation. Indonesia could significantly enhance its haze pollution management on peatlands by strengthening its national policy and regulatory framework in line with the Second Haze-Free Roadmap's sixth strategy. This involves not only tightening existing laws related to peatland protection but also ensuring their consistent enforcement. Building institutional capacity is key for government agencies, particularly at the local level, that need adequate training, resources, and coordination mechanisms to effectively implement and monitor peatland regulations. Incorporating shared learning and best practices from regional partners could improve Indonesia's approaches to compliance and enforcement. Additionally, aligning national monitoring systems with the Roadmap's indicators will help track progress and ensure accountability.

To drive behavioral change and incentivize better practices, Indonesia can also adopt economic instruments such as the polluter-pays principle, tax incentives for sustainable land use, and stronger ESG (Environmental, Social, and Governance) frameworks. Engaging the private sector through partnerships and compliance support can also play a key role in reducing haze-triggering activities. Moreover, improving public awareness and participation, for instance, through accessible fire-reporting tools and community-based reward programs, can empower local communities to take part in prevention efforts. Periodic review and refinement of existing policies, informed by stakeholder consultation, will help close regulatory gaps and ensure long-term compliance and environmental protection

By improving the use of ASEAN's Peatland Management Strategy. Indonesia can enhance its peatland management strategies by aligning more closely with ASEAN's regional frameworks, particularly the ASEAN Peatland Management Strategy (APMS). A critical first step involves consolidating and reviewing all national policies, laws, and regulations related to peatlands, such as those concerning biodiversity, hydrology, agriculture, and land use, to identify overlaps, gaps, and areas of weakness. Given that peatland management in Indonesia involves multiple ministries and agencies, improved inter-agency coordination is essential to ensure consistent policy implementation. Furthermore, integrating Indonesia's peatland conservation policies into broader regional collaboration plans, especially those linked to climate change mitigation and adaptation, can strengthen cross-border cooperation and reinforce national commitments under the ASEAN Agreement on Transboundary Haze Pollution and the Haze-Free Roadmap.

To address on-the-ground challenges such as fires, drainage, and unsustainable land-use practices, Indonesia should invest in capacity building for law enforcement and enhance monitoring and evaluation systems, aligning them with ASEAN indicators. Public awareness campaigns about the importance of intact peatlands for climate regulation, biodiversity, and sustainable development should also be scaled up. Emphasizing inclusive, multi-stakeholder policy-making involving local communities, the private sector, and civil society can improve compliance and foster shared responsibility. Additionally, stronger regional coordination, particularly in enforcing laws on biodiversity and peatland protection, will help Indonesia not only tackle peatland degradation more effectively but also contribute meaningfully to ASEAN's collective environmental goals.

We could further improve our Peatland strategies with the support and knowledge of other countries associated with ASEAN, to further improve our current strategies on Peatland management and Haze Pollution prevention, we could create an understanding for

improvement by using another country's strategy associated with ASEAN as a basis to improve our current strategies, an country associated with ASEAN is Malaysia which had its own National action plans for peatlands. Malaysia's sustainable management of peatlands includes the use of the ASEAN Peatland Management Initiative and the 2006–2020 APMS (ASEAN Peatland Management Strategy). Malaysia has put in place laws and regulations for the sustainable management of peatland that cover the prevention of peat fire and loss of biodiversity. Malaysia's strategies for sustainable peatland management are grounded in six key pillars: (1) improving knowledge and awareness through research and education; (2) strengthening institutional capacity and stakeholder coordination; (3) enhancing fire and haze prevention through better prediction, enforcement, and sustainable land-use guidelines; (4) and implementing integrated management plans for major peatland basins, including buffer zones for water bodies. Additionally, (5) national and state-level cooperation will be enhanced through inter-sectoral mechanisms, and (6) more financial, technical, and human resources will be allocated to bolster peatland protection and management efforts.

The overarching goal of Malaysia's National Action Plan for Peatlands is to manage peatlands sustainably to conserve resources, prevent degradation and fires, and ensure long-term benefits. The plan emphasizes enhancing awareness and capacity, conserving peatland ecosystems, promoting integrated and sustainable management, and ensuring effective multi-stakeholder collaboration. A dedicated institutional framework underpins the plan, led by the National Steering Committee on Peatlands (NSCP), which coordinates implementation and reports to the National Wetlands Committee. Supporting task forces and state-level peatland working groups will focus on specific issues such as biodiversity, fire prevention, and community involvement.

Indonesia has recently created a national action plan as well, Indonesia's 2020–2049 National Peatland Ecosystem Protection and Management plan. Both Indonesia's 2020–2049 National Peatland Ecosystem Protection and Management Plan and Malaysia's National Action Plan for Peatlands aim to promote sustainable peatland management. However, they differ in terms of their scope, approaches to implementation, and the extent of their integration with regional frameworks. Indonesia's peatland management plan could integrate several effective strategies from Malaysia's approach to their national plan:

1. **Strengthening Community-Based Fire Management**

   Indonesia can enhance its fire prevention efforts by adopting Malaysia's successful model of community fire brigades. In Pahang, local villagers are trained as first responders who patrol peatlands and relay fire alerts directly to authorities. This

grassroots system provides a rapid response mechanism that Indonesia currently lacks, as it relies heavily on satellite monitoring. Additionally, Indonesia could adopt Malaysia's innovative underground firefighting methods, which have proven effective in suppressing smoldering peat fires, especially those that burn below the surface, more efficiently than traditional canal-blocking techniques.

2. **Promoting Localized, Basin-Specific Planning**

   To improve peatland protection, Indonesia should consider adopting a more localized planning approach similar to Malaysia's basin-focused strategies. For example, Malaysia's management of the Raja Musa Forest Reserve incorporates tailored interventions for each peat basin, including the creation of buffer zones and biodiversity corridors. Indonesia could enhance its current peat hydrological unit (PHU) mapping by integrating basin-specific livelihood programs. This would help reduce land-use conflicts, particularly in areas dominated by palm oil production.

3. **Embracing Iterative Implementation and Short-Term Targets**

   Rather than adhering strictly to long-term restoration goals, Indonesia could benefit from a more flexible and adaptive implementation model. Malaysia's project-based approach allows for regular reassessment and adjustment, ensuring goals remain realistic and responsive to on-the-ground conditions. Introducing five-year targets aligned with ASEAN's Haze-Free Roadmap would allow Indonesia to address persistent challenges such as overlapping land-use permits and improve the effectiveness of its broader peatland management strategy.

## C. Conclusion

Indonesia, which possesses the largest peatland area in the ASEAN region, holds a crucial role in maintaining regional ecological stability and reducing global carbon emissions. It is essential for Indonesia to preserve its peatlands to prevent fires that significantly contribute to transboundary haze pollution—a recurring problem in Southeast Asia. To address this issue, ASEAN has established a comprehensive strategy through the ASEAN Second Haze-Free Roadmap (2023–2030), which includes the ASEAN Peatland Management Strategy (APMS) as a key component under Strategy 4: Sustainable Management of Peatlands. This strategy not only emphasizes technical approaches such as rewetting, revegetation, and revitalization but also highlights the importance of regional collaboration and the strengthening of legal and institutional frameworks at the national level. Therefore, Indonesia needs to reinforce the implementation of the Zero Burning Policy, ensure the continuity of rehabilitation and

restoration programs like the 3R strategy led by BRGM, and strengthen coordination among the central and regional governments, the private sector, and local communities.

Indonesia's efforts in peatland management and haze pollution control have been a significant success, but there is still much opportunity for improvement through better enforcement, increased inter-agency cooperation, and deeper regional engagement. Indonesia should ensure long-term environmental sustainability by better harmonising with ASEAN frameworks, particularly the Second Haze-Free Roadmap and the ASEAN Peatland Management Strategy. Integrating effective ASEAN practices, such as Malaysia's localised planning and community-based fire management, can give practical answers tailored to Indonesia's specific ecological and socioeconomic setting. Through these steps, Indonesia can consolidate its leadership in regional environmental governance while also making significant progress towards sustainable peatland conservation and haze mitigation.

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