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# Financing and incentive options to promote the sustainable use and management of peatland forests in Southeast Asia

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## Key messages

- **Peatlands have multifaceted values but are threatened.** Peatlands provide ecological, economic, cultural, spiritual, historical, aesthetic and wilderness benefits. In Southeast Asia, the 24–30 million ha of peatlands vary significantly between healthy and degraded states and are threatened significantly by large-scale agricultural expansion. Collaboration of all relevant stakeholders is critical to develop an integrated approach to peatland management and restoration.
- **Climate- and nature-based solutions (NbS) can help meet carbon sequestration and ecosystem resilience goals.** Annual investments in NbS must ideally reach USD 542 billion by 2030 and USD 737 billion by 2050 from the current USD 200 billion.
- **Diverse sources, including public, private and philanthropic investments, must be harnessed to finance sustainable peatland management.** These funds can be channelled using a variety of mechanisms that can provide necessary financial support and promote specific behaviours or outcomes to drive large-scale projects and achieve ambitious climate action.
- **An initial investment of USD 1.5 billion by 2030 is needed to mitigate haze in Southeast Asia.** The ASEAN Investment Framework for Haze-Free Sustainable Land Management in Southeast Asia (AIF-HFSLM) was developed to leverage this funding and mobilize resources to support the actions identified under the ASEAN Peatland Management Strategy and Second Haze-Free Roadmap.
- **An appropriate enabling environment is crucial.** An enabling environment is needed to capitalize on available funding and investment opportunities at local, national and regional levels. Targeted research can enhance selection and implementation of financing strategies in sustainable peatland management.

## Introduction

Financing and incentive options for tropical peatlands to address the complex challenges of ecosystem degradation must be better understood. These options need to promote carbon sequestration, ensure economic viability, engage communities, invest in infrastructure and develop effective governance structures. Initial guidance was developed more than a decade ago under the Association of Southeast Asian Nations (ASEAN) Peatland Forests Project (APFP) and Sustainable Management of Peatland Forests in Southeast Asia (SEApeat) (Macmillan 2013). This Infobrief updates these options to align with current environmental, technological and socioeconomic changes in the region.

Peatlands are the world's largest terrestrial carbon store (Joosten et al. 2009; Page et al. 2011) and the most dominant type of wetland forest. This unique ecosystem provides a range of environmental services, including hydrological management, flood mitigation and the provision of habitats for diverse flora and fauna. In addition to these ecological benefits, compared with temperate peatlands, tropical peatlands provide valuable goods such as timber and non-timber forest products and have a higher carbon storage capacity. They also hold significant cultural, spiritual, historical, aesthetic and wilderness values (Bonn et al. 2016). Intact and healthy tropical peatlands are characterized by layers of organic matter that accumulate under waterlogged conditions and an anaerobic environment, which act as effective carbon sinks by slowly decomposing organic material and sequestering carbon over long periods (UNEP 2022).

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Peatlands in Southeast Asia, estimated to be 24–30 million ha in size, vary significantly between healthy and degraded states (Hoyt et al. 2020; Poulter et al. 2021; UNEP 2022). These peatlands face significant threats primarily from large-scale agricultural expansion, particularly from palm oil and timber plantations. This, in turn, leads to extensive drainage, deforestation and subsequent degradation of these ecosystems. These activities disrupt the natural hydrology and ecology of peatlands, releasing significant amounts of carbon dioxide ($CO_2$) and methane as the peat oxidizes, contributing to greenhouse gas (GHG) emissions (Omar et al. 2022). Degradation is further intensified by increased fire risk in drained, dry peatlands (Dohong et al. 2017; Miettinen et al. 2012).

Apart from causing substantial GHG emissions, health impacts and reduced agricultural productivity, degradation of peatlands also results in severe economic losses (see Box 1). This highlights the urgent need for effective management and restoration strategies to mitigate these challenges (Kiely et al. 2021; UNEP 2022). In reviewing current understanding of intact and degraded peatlands in Southeast Asia, Mishra et al. (2021) emphasize the need for active participation of all relevant stakeholders – including local communities, governmental bodies, private sector and various organizations – in a collaborative effort towards integrated peatland management and restoration.

Mobilizing financial flows to climate- and nature-based solutions (NbS) is essential to meet carbon sequestration and ecosystem resilience goals. NbS seek to address societal challenges such as climate change, biodiversity loss and land degradation through actions to protect, sustainably manage or restore natural ecosystems. There are increasing concerns about identifying sources of financing for sustainable peatland management and restoration in Southeast Asia, especially as costs of restoration are significant. For example, restoration of 2.5 million ha of peatland in Indonesia would cost around USD 1.7–4.5 billion (Sari et al. 2020).

These figures present difficulties if funding relies solely on public financing (Harrison et al. 2020). The literature indicates a lack of global funding for the restoration of peatlands, identifying the need for more funding from both public and private sectors (Goib et al. 2018; UNEP 2021b; Sari et al. 2020). To achieve this, the role of non-state actors in supporting financing for peatland restoration is crucial (Astuti 2016; Sari et al. 2020).

While there are many options for financing and incentives, a clearer framework is needed to coordinate fundraising efforts across ASEAN. The regional programme, Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia (MAHFSA), is a joint effort between the

### Box 1. Forest and land fires and their economic costs in three ASEAN countries

**Indonesia** experienced severe forest and land fires during the dry El-Nino season in 2015. The fire burned 2.65 million ha of forests and land (MoEF 2021a), mainly on degraded peatlands, and caused USD 16 billion in economic losses (Glauber et al. 2016). In 2019, another major fire burned 1.65 million ha of forest and land (MoEF 2021b), resulting in losses of USD 5.2 billion (World Bank 2019). The major fire events between 2004 and 2015 caused a total economic loss of USD 93.8 billion (Kiely et al. 2022).

**Malaysia** has been affected by transboundary haze from forest and peat fires. In Kuala Lumpur and nearby Selangor, significant haze events in 2005, 2006, 2008 and 2009 led to increased hospital admissions. During those years, Malaysia experienced an estimated 19 haze days annually, with a marked increase of 2.4 inpatient cases per 10,000 individuals due to haze-related respiratory and cardiovascular conditions. The annual economic impact of these haze episodes was approximately USD 91,000 (MYR 273,000), reflecting increased medical costs and productivity loss due to haze-related health issues (Othman et al. 2014).

**Thailand**, particularly in the northern regions, also suffers from annual haze due to agricultural burning and forest fires, often during the dry season between January and April. In Chiang Mai and surrounding provinces, haze-related pollution consistently surpasses safe levels, driving up respiratory issues and emergency hospital visits by 35.6% for conditions such as asthma and chronic obstructive pulmonary disease (Pothirat et al. 2016). The economic impact includes healthcare expenses, tourism losses and decreased productivity due to haze-related illnesses. Although specific data on direct economic losses are limited, these impacts underscore the financial strain and recurring health risks faced by Thailand (Hanafi et al. 2019). Cross-border pollution from neighbouring Myanmar and Laos further compounds these challenges, underscoring the need for regional cooperation to mitigate haze and its economic toll in Thailand effectively (Xinhua 2024).

ASEAN Secretariat and the International Fund for Agriculture Development (IFAD). Through strengthened regional coordination, it aims to tackle transboundary haze pollution and promote sustainable forest management and peatland conservation. Since 2021, MAHFSA has been helping develop an investment framework for haze and sustainable peatland management, identifying funding needs, potential sources and financing modalities.

## Public and private financial flows to NbS

Financial flows and incentives are needed to encourage individuals, organizations and businesses to be more cooperative and supportive of more positive environmental outcomes. Financial flows in 2023 highlight the large difference between investments in NbS and nature-negative investments. Annually, nearly USD 7 trillion is allocated to activities detrimental to the environment, with about USD 5 trillion originating from private sector sources (UNEP 2023a). This figure surpasses the amount invested in NbS despite the notable increase in total financing for these initiatives, which rose from USD 133 billion in 2020 to USD 200 billion in 2023 (Tobin-de la Puente and Mitchell 2021; UNEP 2021a, 2023a).

While both public and private finance for NbS have increased, they remain insufficient.. In 2023, public finance contributed approximately USD 165 billion, up from USD 113 billion in 2020. For its part, private investments increased from USD 18 billion to about USD 35 billion during the same period (UNEP 2021a, 2023a). Despite these increases, private sector financing remains limited, accounting for only 18% of overall financing for NbS (UNEP 2023a). Additionally, public funding derived from official development assistance (ODA) accounted for only about 2% of total public funding in both 2020 and 2023 (UNEP 2021a, 2023a). See Figure 1 for a breakdown of 2023 financing flows to various NbS categories.

To meet the ambitious targets set by the Rio Conventions – such as limiting global warming to 1.5°C and achieving land degradation neutrality – annual investments in NbS must increase substantially, ideally reaching USD 542 billion by 2030 and USD 737 billion by 2050 (UNEP 2023a). This necessitates an increase in public and private funding. Moreover, it

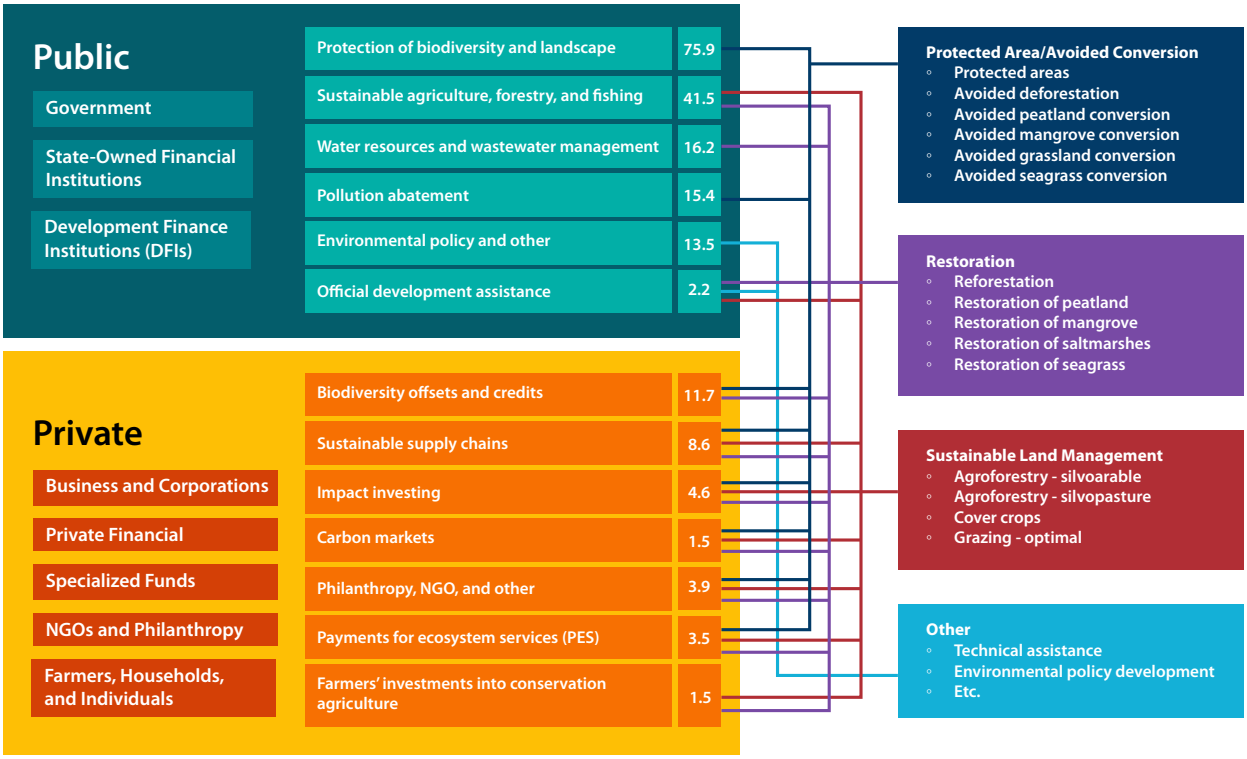


**Figure 1. Sources and categories of NbS funding with indicated amounts in USD billions within public and private funding streams (adapted from UNEP 2023a)**

also requires a concerted effort to realign financial flows away from nature-harming activities towards those that support sustainable practices and foster environmental restoration and resilience.

With this in mind, the transformation of the finance system must consider enablers and barriers to attracting private capital and scaling up investment. Further, divesting from fossil fuels and other environmentally detrimental sectors presents a significant opportunity to align investment strategies with sustainability goals. Reallocating capital from industries that contribute to climate change and ecological degradation can foster growth of sustainable alternatives. This strategic shift encourages innovation in green technologies and renewable energy, thereby stimulating market demand for sustainable products and services.

Southeast Asia continues to face annual peatland fires and the associated economic and ecological losses. In this context, targeted financing for peatland restoration offers a powerful mechanism to mitigate these costs, protect carbon stocks and strengthen resilience against climate impacts.

## Financing and incentive options

Financing mechanisms provide necessary funds (i.e., direct financial support) to facilitate peatland management and restoration. Incentive mechanisms encourage specific behaviours or outcomes by offering rewards and benefits, or disincentives and penalties. However, the focus here is on incentives that deliver a direct impact on resource users. Both mechanisms are critical for driving large-scale projects and achieving ambitious climate action. Tables 1 and 2 outline various options for potential financing and incentives, respectively, to support implementation of sustainable peatland management. These options have been implemented across multiple geographical scales within Southeast Asia with varying degrees of success.

**Table 1. Various financing options**

| Financing options | Brief description | Examples and studies |
|---|---|---|
| Blended finance | Combines public and private funding sources to maximize investment, leveraging public funds to attract private capital. | ASEAN Catalytic Green Finance Facility (ACGF) managed by Asian Development Bank's (ADB) Southeast Asia Green Finance Hub assists ASEAN governments in preparation and financing of infrastructure projects aimed at promoting environmental sustainability and achieving climate change objectives by blending ADB's funds with private investment contributions (ADB 2023). By 2022, partners had committed USD 504 million in co-financing for ACGF projects.<br>Blended finance approaches have been shown to attract private investment by reducing initial risk, enabling larger-scale environmental projects and restoration initiatives (GGGI 2021). |
| Carbon finance and other ecosystem service finance | Commodification of ecosystem services that are generated.<br>Carbon finance involves creation and sale of carbon credits based on GHG emission reductions or removals (an ecosystem service). This enables landowners and project developers to secure private financing while often integrating public funding sources. The development of carbon finance mechanisms for peatlands has progressed significantly in recent years, and the reducing emissions from deforestation and forest degradation (REDD+) mechanism is one possible source of funding.<br>Other ecosystem services, such as biodiversity conservation, watershed protection, and the provision of water and biological resources, can similarly be commodified to generate financing through development of new markets and fee structures. | The Katingan Mentaya Project in Central Kalimantan, Indonesia, managed by PT. Rimba Makmur Utama (PT. RMU), covers 203,570 ha and obtained its Environmental Restoration Concession licence in 2013. The project primarily generates revenue from the sale of carbon credits in voluntary markets to corporations to support emission reductions, biodiversity conservation and local community welfare.<br>Sills et al. (2014) highlight the potential of REDD+ projects like Katingan to drive conservation through carbon finance but also emphasize the need for sustained funding, continuous monitoring and adaptive management strategies to meet ecological and financial objectives for long-term success. However, Wunder et al. (2024) state that gains from REDD+ investments have been shown to be modest. |

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**Table 1.** Continued

| Financing options | Brief description | Examples and studies |
|---|---|---|
| Compensation from past deforestation and degradation | Compensation through conservation or restoration projects is based on liabilities from past deforestation or degradation activities. These mechanisms are similar to remediation and compensation procedures and sustainability certification processes (such as Forest Stewardship Council or Roundtable on Sustainable Palm Oil). | Indonesia's Environmental Fund Management Agency (BPDLH) allocated approximately USD 74.8 million in 2022 for environmental initiatives. Of this, 55% (USD 40.98 million) was allocated to the REDD+ Result-Based Payment programme, and 1% (USD 7.22 million) supported the TERRA programme to enhance community welfare in forested areas (Muhammad 2023).<br>Sills et al. (2015) found that compensation-based funding combined with local initiatives and robust monitoring could significantly reduce deforestation rates and maintain conservation outcomes in degraded ecosystems. West et al. (2023) highlighted the need to revise deforestation baseline methodologies to ensure accurate attribution of deforestation reduction through conservation interventions, thus supporting conservation incentives and global carbon accounting integrity. |
| Donor funding | Financial support from philanthropic organizations or international agencies (including multilateral organizations) to cover initial costs. | The Sustainable Use of Peatland and Haze Mitigation in ASEAN (SUPA) project, funded by the European Union and Government of Germany, aims to promote sustainable peatland management and reduce haze in ASEAN countries. Launched in 2019, SUPA focused on technical and policy support, capacity building and implementation of the ASEAN Peatland Management Strategy (ASEAN 2019; ASEAN Secretariat 2021).<br>Donor funds are essential in early conservation stages but face sustainability challenges in the long term (Sills et al. 2014; UNEP 2022). |
| Government budgets | Direct funding allocated by government bodies nationally or from bilateral agreements. | Through the Peat and Mangrove Restoration Agency (BRGM), the Indonesian government allocated approximately IDR 865 billion (USD 64 million) in 2017 for peatland restoration across seven priority provinces. The agency's mandate includes coordinating national peatland restoration efforts, with a goal to restore 2.5 million ha (Safitri 2016; Tempo 2017).<br>ICCTF (2022) found that government-led projects with comprehensive support from international funds were effective in peatland restoration and fire management, leading to significant GHG emissions reductions and improved local livelihoods (ICCTF-UKCCU Project Completion Report 2022). |
| Multi-donor trust fund | A type of pooled financing involving multiple organizations aimed at obtaining contributions from donors to support specific national, regional or global development outcomes. | The ASEAN Transboundary Haze Pollution Control Fund was established to implement the ASEAN Agreement on Transboundary Haze Pollution (AATHP) and invited participating nations to contribute to the fund with an initial goal of USD 500,000.<br>Indonesia Sustainable Landscape Management Multi-Donor Trust Fund (SLM-MDTF) is led by the Indonesian Coordinating Ministry for Economic Affairs in partnership with the World Bank. It has received contributions from Norwegian and Australian governments of USD 36.05 million as of June 2023 to support integrated and sustainable landscape management (Coordinating Ministry for Economic Affairs 2023). |

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**Table 1.** Continued

| Financing options | Brief description | Examples and studies |
|---|---|---|
| Peat bonds and debt instruments | Peat bonds are green bonds designated for peatland restoration, paludiculture, and other peatland-related economic activities. These bonds also support verification of performance of funded activities. More generally, these loans or bonds (including forest bonds, green bonds, sustainability bonds, social bonds, green loans and sustainability-linked loans) are issued to raise funds for projects with specific environmental benefits or performance targets, including peatland restoration. | The Malaysian Green Technology Financing Scheme, managed by the Malaysian Green Technology and Climate Change Corporation (MGTC), has allocated MYR 3 billion (USD 750 million) in green bonds to support renewable energy, energy efficiency and sustainable agriculture projects, including peatland rehabilitation as part of Malaysia's climate commitments (UCLG ASPAC 2024a).<br>Indonesia's issuance of green sukuk (Islamic bonds) has funded climate-resilient infrastructure and sustainable land-use projects. In 2022, IDR 13.02 trillion (USD 900 million) was raised to support initiatives such as peatland restoration in areas like Central Kalimantan, aligning with the country's environmental goals (UCLG ASPAC 2024b). |
| Public–private partnerships (PPPs) | Collaborative arrangements between government and private sector to share risks and resources for peatland restoration projects. These partnerships enable the private sector to contribute capital and expertise, while the government provides regulatory support, facilitating long-term management and restoration of peatlands and other critical ecosystems (UCLG ASPAC 2024b). | In Indonesia, PPPs have been leveraged in infrastructure and climate-action related projects, governed by two regulations (Presidential Regulation No. 38/2015 and Ministry of Finance PMK No. 180/2020) and a total investment of over USD 63 billion (UCLG ASPAC 2024b). |

Financing options can be applied alone or in combination to fund incentives (Table 2). Tedesco et al. (2022) found that a variety of financing mechanisms operationalized incentives for forest restoration. However, they noted about 33% of reviewed studies cited government budgets as the main source of funding. Carbon offset schemes (e.g., Clean Development Mechanism, REDD+ and voluntary carbon markets) accounted for 26% of funding, while funds and grants accounted for another 16%. Along the same line, the final review of the ASEAN Peatland Management Strategy (APMS) 2006–2020 highlighted four broad funding sources for peatland management and transboundary haze prevention: direct contributions from ASEAN member states (AMS), ASEAN pooled resources, external funding and private sector, including corporate social responsibility (CSR) programmes (ASEAN Secretariat 2021).

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Several companies in Indonesia have embraced CSR programmes to support peatland management. PT Kilang Pertamina International Unit Sungai Pakning in Riau, Indonesia, for example, uses CSR programmes to support peatland management and align with APMS. CSR programmes, such as *Kampung Gambut Berdikari* (Independent Peat Village), *Permata Hijau Pesisir Gambut* (Green Coastal Peat Gem) and *Sekolah Cinta Gambut* (Love Peat School), focus on climate change adaptation and sustainable peatland management. The programmes also involve engagement of communities in reforestation, mangrove planting to prevent coastal erosion, construction of canal blockings to maintain peatland water levels, and educational programmes on peatland conservation and fire prevention (Purwanto et al. 2022). Another example is the APRIL Group's *Restorasi Ekosistem Riau* programme which aims to conserve, restore and protect 365,733 ha of forest, including 150,693 ha of peat swamp forest on the Kampar Peninsula and Padang Island in Indonesia (APRIL n.d.).

**Table 2. Various incentive options**

| Incentive | Brief description | Type | Examples and studies |
|---|---|---|---|
| Incentives at the site level | Financial payments, seedlings, micro-credits, etc, at the local level to communities, villages, farmers or landowners are increasingly recognized to support active collaboration among local stakeholders in achieving conservation management objectives. | Economic, Information | Indonesia: local tree planting and micro-credits to farmers to stop peat burning and support peatland restoration (Schaafsma et al. 2017; UNEP 2021b); local community engagement in peatland restoration efforts coordinated by BRG (Sari et al. 2020); Philippines: provision of seedlings to local communities, including support for smallholders to enhance reforestation (Wardell 2020); Thailand: community-based wildlife tourism between Khao Yai and Thap Lan National Parks (Rode et al. 2016).<br>Wardell (2020) also identified offering training opportunities for community-based forest enterprises, scholarships to build local capacity and use of mobile payment services that can facilitate fund transfers directly to smallholders as incentives at the local level. |
| Peatland polluter-pays principle | Penalties for pollution or degradation of peatlands related to haze pollution in ASEAN encompassing both health and aesthetic considerations, as well as the cost of compensating individuals whose livelihoods depend on peatlands or who value these ecosystems for their environmental services and biodiversity. | Economic, Managing risk | Indonesia: 2009 national regulation on environmental protection and management allows the state and communities to sue when harmed by pollution (Panjaitan et al. 2021). |
| Peatland user-pays principle | A pricing approach in which consumers cover costs associated with the goods and services they use, including the cost to the natural environment (uses the tax system to address environmental externalities). | Economic, Managing risk | Malaysia: Social forestry project in Sabah funded through Community Forestry Cess Fund, which derives its resources from fees imposed on timber companies that are calculated according to the volume of timber exported or processed (now a consideration for sustainable forest management licence) (Wong et al. 2020). |
| Haze insurance | Pay-outs during heavy haze incidents by using part of the premium as a contribution for fire/haze reduction or from those that benefit. | Managing risk | Singapore: HazeShield by Swiss Re Corporate Solutions provides haze insurance to businesses (Swiss Re Corporate Services 2024). |
| Payment for ecosystem services (PES) | PES schemes offer farmers or community groups payments in return for managing their land to provide ecological services. | Economic | Vietnam: PES programmes for farmers to adopt land-use practices that support ecosystem services and conservation outcomes (Duong and de Groot 2018).<br>Thailand: PES in buffer zones between Khao Yai and Thap Lan National Parks (Rode et al. 2016). |
| Tax incentives and subsidies | Tax incentives and subsidies have been deployed effectively to achieve environmental outcomes. | Economic | Indonesia: up to 200% tax deductions for reforesting degraded lands in Nusantara (Jong 2024). |
| Labelling/ certification | A market-based approach for peatland conservation aiming to engage consumers in recognizing sustainably sourced peatland products. Certification can also facilitate producers in obtaining premium pricing and accessing niche markets. | Information, Economic | RSPO (Roundtable on Sustainable Palm Oil)certification in Indonesia, ex. Siak regency, Riau Province (Info Sawit 2022) and Malaysia. |
| Non-monetary initiatives | Awards, prizes and other methods of promoting recognition and pride in peatland conservation are successful approaches to protection. | Information | Asia Environmental Enforcement Awards recognize the accomplishments of individuals and governmental organizations that exhibit exceptional leadership in the fight against transboundary environmental crimes, to motivate continued excellence in environmental enforcement. (UNEP 2023b). |

## Voluntary carbon credits

One financing option for restoring peatlands is voluntary carbon credits. The voluntary carbon market and REDD+ offer opportunities to secure tropical peatland for conservation in the medium to long term across ASEAN countries (World Bank 2022). For example, the East Kalimantan Jurisdictional Emissions Reduction Program (see Box 2), which is part of the Forest Carbon Partnership Facility (FCPF), allows key actors at all levels and sectors to develop an equitable benefit-sharing plan (World Bank 2022). This programme provides payments to governments or private entities for achieving verified reductions in GHG emissions, often linked to forest conservation and sustainable land management.

In addition to public financing mechanisms, private companies have also shown growing interest in purchasing carbon credits from East Kalimantan. Large European companies, such as the Geneva-based Mercure, have expressed interest in buying East Kalimantan carbon credits at prices between USD 30–45 per tonne, significantly higher than the initial price of USD 5 per tonne. According to Governor Isran Noor, ongoing negotiations are expected to lead to the sale of 1 million tonnes of $CO_2e$ from the excess emission reductions achieved during 2019–2020 (MMR Portal 2023). Higher prices and additional sales have yet to be finalized. However, this interest from private buyers reflects the rising value of carbon credits and the potential for increased revenue through international carbon markets.

## An investment framework for haze-free sustainable land management in Southeast Asia

MAHFSA estimates that USD 1.5 billion in initial investments will be required to mitigate transboundary haze in Southeast Asia by 2030. To address this significant financial need, the ASEAN Investment Framework for Haze-Free Sustainable Land Management in Southeast Asia (AIF-HFSLM) was developed to leverage funding and mobilize resources. AIF-HFSLM builds upon and aims to

### Box 2. East Kalimantan Jurisdictional Emissions Reduction Program (ER Program)

The ER Program aims to reduce deforestation and forest degradation across East Kalimantan Province, Indonesia, covering 12.7 million ha, 54% of which is forested (World Bank 2022). It is designed to help relevant stakeholders and remunerate them in exchange for reducing deforestation and forest degradation and protecting high carbon stock areas, including peatlands (World Bank 2022). In addition, it enables stakeholders to improve land governance, enhance the livelihood of local communities, and develop and implement policies that support habitat and species protection (MMR Portal 2023).

The ER Program is expected to reduce around 86.3 million tCO2e of (gross) emissions from 2020 to 2024 (FCPF 2019). Following the first monitoring period covering 2020–2021, Indonesia received an advance payment of USD 20.9 million in 2022 under the Emission Reduction Payment Agreement (ERPA) with FCPF for reducing deforestation and forest degradation (REDD+) in East Kalimantan. This has the potential to receive up to USD 110 million for verified emission reductions. This advance represents 13.5% of the reported emissions reductions for 2019–2020, with the full payment pending third-party verification. The payment will support the 2021 Benefit-Sharing Plan, ensuring equitable distribution to national and local governments (25% as responsibility allocation), beneficiaries to reduce emissions (65% as performance allocation) and local communities that protect forests (10% as reward allocation).

In March 2023, the East Kalimantan government signed an Incentive Payment Agreement with district and city governments for the distribution of REDD+ funds (MMR Portal 2023). The payment mechanism is seen as a model for other regions in Indonesia (World Bank 2022). Led by the Ministry of Environment and Forestry, the Environmental Fund Management Agency (BPDLH) signed the agreement with the Governor of East Kalimantan, Isran Noor, and local leaders. Discussions in early 2024 indicated that funds will be distributed to 441 villages and community groups through 2025 (Sucipto 2024).

East Kalimantan's leadership in tackling deforestation and degradation aligns with Indonesia's broader climate targets, including commitments in the Paris Agreement, setting the region on a green development pathway (World Bank 2022). The first payment under the ER Program was a significant achievement. Subsequent payments are expected in 2023 and 2025, pending verification of further emission reductions (World Bank 2022). In addition, East Kalimantan has exceeded its target, reducing 32 million tonnes of CO2e by December 2020 to surpass the target of 22 million tonnes. The excess 10 million tonnes of CO2e are being marketed through partnerships with international organizations. These include the International Finance Corporation, which is helping to connect East Kalimantan with multinational buyers such as Google, Delta Airlines and Microsoft.

support implementation of ASEAN initiatives, such as the AATHP, ASEAN Haze-Free Roadmap 2023–2030, APMS 2023–2030, ASEAN Socio-Cultural Community Blueprint 2025 and priority actions as identified in the upgraded National Action Plan on Peatlands of AMS.

Additionally, the AIF-HFSLM identifies potential funding sources aligned with those discussed in earlier sections. To further diversify funding, the framework also identifies modalities such as a government-endorsed investment network facilitating investments at regional and national levels; matching facilities linking investment needs with potential financiers; and a technical unit guiding sustainable land management investments. The framework also results-based climate finance mechanisms, such as ERPAs. For example, ERPAs can help ASEAN countries build track records in carbon credit generation, leveraging additional private sector funding and ensuring long-term financial sustainability for haze mitigation projects. Since the World Bank initiated ERPAs, more than USD 2 billion has been committed, showcasing their potential to attract private sector investment and scale climate-smart activities in the region.

The AIF-HFSLM is structured to enhance financing specifically for peatland restoration, sustainable management and carbon credit initiatives. By connecting with global funds, such as the Green Climate Fund and REDD+, the AIF-HFSLM aims to attract substantial international resources for ASEAN-led peatland needs and initiatives. Through ERPAs and similar mechanisms, the framework could expand opportunities for carbon financing and private sector involvement in sustainable practices that reduce transboundary haze. Additionally, the matching facilities will need to operate and address needs at various levels, including national and subnational governments, and small and medium enterprises. There are opportunities for AIF-HFSLM to build on existing facilities such as the Land Finance Hub developed by CIFOR-ICRAF under the Green Finance for Sustainable Landscapes (GF4SL) project. This is supported by the Global Environment Facility to connect small and medium enterprises with investors (Puspitaloka et al. 2023). The multi-stakeholder approach to AIF-HFSLM implementation also facilitates partnerships with ASEAN development partners and private sector entities. This enables AMS to secure long-term funding streams and implement resilient, climate-smart practices necessary for sustainable peatland management and transboundary haze mitigation.

## Conclusions

The region and AMS continue to explore and develop financing and incentive mechanisms to achieve the goals of sustainable peatland management. These efforts need to build on and learn from current policies, budgets and incentive schemes, as well as be compatible with other government policy objectives to facilitate effective implementation. Harnessing diverse funding sources, including public, private and philanthropic investments, is necessary to address the substantial financial requirements of sustainable peatland management. This is a complex task that requires innovative financing mechanisms, such as blended finance and pooled funding approaches, which can mitigate risks and attract investments.

To capitalize on available funding and investment opportunities, an enabling environment is crucial to help implement a range of coordinated and complementary mechanisms at various levels (e.g., local, national, regional). Central to an enabling environment is the need for clear identification and assessments of peatlands and well-defined governance structures and legal framework, such as land tenure, at the local and national levels.

Other critical elements also need to be developed or enhanced at the local, national and regional levels. These include policy frameworks; institutional capacities and structures; partnerships among relevant stakeholders; markets based on ecosystems services (e.g., carbon, biodiversity); bankable projects; and knowledge about peatlands (e.g., carbon stocks, sustainable value chains, ecosystems services) and the local/Indigenous communities that depend on them.

Targeted research is crucial for enhancing the selection, design and implementation of financing strategies in sustainable peatland management. Research should explore areas such as green value chains and new markets (e.g., carbon market) that create economic opportunities while promoting sustainable practices. It should also investigate the effectiveness of community-based financing models that engage local stakeholders in peatland conservation, analyse policy frameworks necessary to create a conducive environment for private investment in sustainable peatland management, and track changes in ecosystems services due to the impacts of climate change.

The upcoming Western Pacific Sustainable Peatland Management (SAGU) project, funded by the International Climate Initiative (IKI), seeks to address some of these questions in Indonesia, Malaysia and Papua New Guinea. However, more funding and similar projects are needed to support better understanding, mobilize additional finance and contribute to the long-term sustainability of peatland ecosystems in the region.

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## References

ADB (Asian Development Bank). 2023. *ASEAN catalytic green finance facility: Supporting climate action in Southeast Asia.* Mandaluyong, Philippines: Asian Development Bank. https://www.adb.org/sites/default/files/institutional-document/950121/asean-catalytic-green-finance-facility-2023.pdf

ASEAN Secretariat. 2021. *Report of the final review of the ASEAN Peatland Management Strategy (APMS) 2006-2020.* Jakarta, Indonesia: ASEAN Secretariat.

ASEAN (Association of Southeast Asian Nations). 2019. EU to support sustainable use of peatland and haze mitigation in ASEAN. Jakarta, Indonesia: ASEAN Secretariat. https://asean.org/eu-to-support-sustainable-use-of-peatland-and-haze-mitigation-in-asean/

APRIL (Asia Pacific Resources International Limited) (n.d.). Conservation. Accessed 11 November 2024. https://www.aprilasia.com/en/sustainability/conservation

Astuti R. 2016. Toward a haze-free ASEAN: Private financing for peatland restoration. *RSIS Commentary* 252. Singapore: Rajaratnam School of International Studies. https://www.rsis.edu.sg/wp-content/uploads/2016/10/CO16252.pdf

Bonn A, Allott T, Evans M, Joosten H and Stoneman R. 2016. Peatland restoration and ecosystem services: An introduction. *In* Bonn A, Allott T, Evans M, Joosten H, Stoneman R. eds. *Peatland restoration and ecosystem services: Science, policy and practice* 1-16. Cambridge University Press. https://doi.org/10.1017/CBO9781139177788

Coordinating Ministry for Economic Affairs. 2023. The Coordinating Ministry for Economic Affairs, the World Bank, and Related Ministries/Agencies collaborate to manage the sustainable landscape management multi-donor trust fund program (in Bahasa). https://ekon.go.id/publikasi/detail/5247/kemenko-perekonomian-bank-dunia-dan-kementerianlembaga-terkait-bekerja-sama-mengelola-program-sustainable-landscape-management-multi-donor-trust-fund

Dohong A, Aziz AA, Dargusch P. 2017. A review of the drivers of tropical peatland degradation in South-East Asia. *Land Use Policy* 69 349–360. https://doi.org/10.1016/j.landusepol.2017.09.035

Duong NTB and de Groot WT. 2018. Distributional risk in PES: Exploring the concept in the payment for environmental forest services program, Vietnam**.** *Forest Policy and Economics* 92:22–32. https://doi.org/10.1016/j.forpol.2018.03.008

FCPF (Forest Carbon Partnership Facility). 2019. *Carbon Fund Emission Reductions Program Document (ER-PD) ER Program Name and Country: East Kalimantan Jurisdictional Emission Reductions Program, Indonesia*. Date of Submission or Revision: May 2019.

Glauber AJ, Moyer S, Adriani M and Gunawan I. 2016. *The cost of fire*. Jakarta, Indonesia: World Bank. https://thedocs.worldbank.org/en/doc/643781465442350600-0070022016/render/Indonesiaforestfirenotes.pdf

GGGI (Global Green Growth Institute). 2021. *Closing the climate financing gap: Insights from the Green Growth Performance Measurement (GGPM) framework*. https://gggi.org/wp-content/uploads/2021/09/GGGI-Technical-Report-20_Closing-the-Climate-Financing-Gap_Final_20210914.pdf

Goib BK, Fitriani N, Wicaksono SA, Goldstein J. 2018. *Financing peatland restoration in Indonesia: Insights from the private sector*. Jakarta, Indonesia: World Resources Institute. https://wri-indonesia.org/en/resources/data-visualizations/financing-peatland-restoration-indonesia-insights-private-sector

Hanafi NH, Hassim MH, Noor ZZ, Ten JY, Aris NM, Jalil AA. 2019. Economic losses due to health hazards caused by haze event in Johor Bahru, Malaysia. *E3S Web of Conferences, 90*, 01009. https://doi.org/10.1051/e3sconf/20199001009

Harrison ME, Ottay JB, D'Arcy LJ, Cheyne SM, Anggodo Belcher C, Cole L, Dohong A, Ermias Y, Feldpausch T, Gallego-Sala A, et al. 2020. Tropical forest and peatland conservation in Indonesia: Challenges and directions. *People and Nature* 2(1):4–28.

Hoyt AM, Chaussard E, Seppalainen SS, Harvey CF. 2020. Widespread subsidence and carbon emissions across Southeast Asian peatlands. *Natural Geoscience* 13:435–440. https://doi.org/10.1038/s41561-020-0575-4

ICCTF (Indonesian Climate Change Trust Fund). 2022. Project Completion Report: *Sustainable Forest and Peatland Management to Reduce Emissions in Indonesia through Local Actions (TEGAK)*. https://www.icctf.or.id/wp-content/uploads/2022/03/Project-Completion-Report-PCR-UKCCU.pdf

Info Sawit. 3 March 2022. Smallholders competent in cultivating peatlands sustainably. Info Sawit. https://gapki.id/en/news/2022/03/03/smallholders-competent-in-cultivating-peatlands-sustainably/

Jong HN. 21 February 2024. Indonesia to offer tax perks to companies investing in reforestation of its new capital city. Mongabay. https://news.mongabay.com/2024/02/indonesia-to-offer-tax-perks-to-companies-investing-in-reforestation-of-its-new-capital-city/

Joosten H. 2009. *The global peatland $CO_2$ picture: Peatland status and emissions in all countries of the world*. Wageningen, the Netherlands: Wetlands International. https://unfccc.int/files/kyoto_protocol/application/pdf/draftpeatlandco2report.pdf

Kiely L, Spracklen DV, Arnold SR, Papargyropoulou E, Conibear L. 2021. Assessing costs of Indonesian fires and the benefits of restoring peatland. *Nature*

*Communications* 12(1). https://doi.org/10.1038/s41467-021-27353-x

Macmillan DC. 2013. *Development of financing and incentive options for sustainable management of peatland forests in Southeast Asia*. ASEAN Peatland Forest Project and Sustainable Management of Peatland Forests Project. Jakarta, Indonesia: ASEAN Secretariat and Global Environment Centre.

Miettinen J, Shi C, Liew SC. 2012. Two decades of destruction in Southeast Asia's peat swamp forests. *Frontiers in Ecology and the Environment* 10(3):124–128.

MoEF (Ministry of Environment and Forestry) 2021a. *Rakorsus pengendalian karhutla 2021*. http://sipongi.menlhk.go.id/publikasi/read/157/rakorsus-pengendalian-karhutla-2021

MoEF (Ministry of Environment and Forestry) 2021b. *Rekapitulasi luas kebakaran hutan dan lahan (Ha) per provinsi di Indonesia tahun 2016-2021*. http://sipongi.menlhk.go.id/hotspot/luas_kebakaran

Mishra S, Page SE, Cobb AR, Lee JSH, Jovani-Sancho AJ, Sjögersten S, Jaya A, Aswandi, Wardle DA. 2021. Degradation of Southeast Asian tropical peatlands and integrated strategies for their better management and restoration. *Journal of Applied Ecology* 58(7) 1370–1387. https://doi.org/10.1111/1365-2664.13905

MMR Portal. 1 March 2023. The Government of East Kalimantan signs acceptance of FCPF REDD+ funds from the World Bank. News, MMR Portal. https://mrv.kaltimprov.go.id/en/post-page-detail/pemerintah-kaltim-teken-penerimaan-dana-redd-program-fcpf-dari-world-bank

Muhamad N. 2023. *Dorong Perbaikan Lingkungan, BPDLH Salurkan Dana Rp74,8 Miliar pada* 2022. 10 November. https://databoks.katadata.co.id/ekonomi-makro/statistik/3e7945842001922/dorong-perbaikan-lingkungan-bpdlh-salurkan-dana-rp748-miliar-pada-2022

Omar MS, Ifandi E, Sukri RS, Kalaitzidis S, Christanis K, Lai DTC, Bashir S, Tsikouras B. 2022. Peatlands in Southeast Asia: A comprehensive geological review. *Earth-Science Reviews* 232:104149.

Othman J, Sahani M, Mahmud M, Ahmad MKS. 2014. Transboundary smoke haze pollution in Malaysia: Inpatient health impacts and economic valuation. *Environmental Pollution* 189:194–201.

Page SE, Rieley JO, Banks CJ. 2011. Global and regional importance of the tropical peatland carbon pool. *Global Change Biology* 17(2):798–818. https://doi.org/10.1111/j.1365-2486.2010.02279.x

Panjaitan ADU, Novianti N, Farisi M. 2021. Polluter Pays Principle *Terkait Pertanggungjawaban Corporate PTTEP Australasia Terhadap Pencemaran Minyak Di Laut Timur Indonesia. Uti Possidetis: Journal of International Law* 2(2):189–209.

Pothirat C, Tosukhowong A, Chaiwong W, Liwsrisakun C, Inchai J. 2016. Effects of seasonal smog on asthma and COPD exacerbations requiring emergency visits in Chiang Mai, Thailand. *Asian Pacific Journal of Allergy and Immunology* 34(4):284–289.

Poulter B, Fluet-Chouinard E, Hugelius G, Koven C, Fatoyinbo L, Page SE, Rosentreter JA, Smart LS, Taillie PJ, Thomas N, et al. 2021. A review of global wetland carbon stocks and management challenges. *In* Krauss KW, Zhu Z, Stagg CL. eds. *Wetland carbon and environmental management*. Wiley Geophysical Monograph Series. https://doi.org/10.1002/9781119639305.ch1

Purwanto W, Widhagdha MF, Ajar SB, Hidayat R. 2022. Sustainable corporate social responsibility program as an effort for community adaptation to climate change: Case study in Bukit Batu District, Bengkalis Regency. *Proceedings of the 2nd International Conference on Communication Science* (ICCS 2022).

Puspitaloka D, Brady MA, Wardell DA, Elba M, Tomasoa R, Fremy L, Sampurna Y, Gallagher E, Norisda E, Gunawan YD, Darmokusumo S, Peteru S. 2023. *Building micro, small and medium enterprises' capacity and access to green finance through the Land Finance Hub: A case study of Indonesian MSMEs.* CIFOR. https://doi.org/10.17528/cifor-icraf/009032

Rode J, Wittmer H, Emerton L, Schröter-Schlaack C. 2016. Ecosystem service opportunities: A practice-oriented framework for identifying economic instruments to enhance biodiversity and human livelihoods. *Journal for Nature Conservation* 33:35–47. https://doi.org/10.1016/j.jnc.2016.07.001

Safitri MA. 2016. Peatland restoration in Indonesia. Paper presented at Japan Pavilion of COP 22, Marrakech, Morocco, 7–18 November 2016.

Sari AP, Dohong A, Wardhana, B. 2021. Innovative financing for peatland restoration in Indonesia. *In* R. Djalante, J. Jupesta, and E. Aldrian (Eds.). *Climate change research, policy and actions in Indonesia*. Springer Climate 247–264. Springer. doi.org/10.1007/978-3-030-55536-8_12

Schaafsma M, Van Beukering PJH, Oskolokaite I. 2017. Combining focus group discussions and choice experiments for economic valuation of peatland restoration: A case study in Central Kalimantan, Indonesia. *Ecosystem Services* 27**:**150–160.

Sills EO, Atmadja SS, de Sassi C, Duchelle AE, Kweka DL, Resosudarmo IAP, Sunderlin WD. eds. 2014. REDD+ on the ground*: A case book of subnational initiatives across the globe*. Bogor, Indonesia: CIFOR.

Sills EO, Herrera D, Kirkpatrick A, Brandão A, Dickson R, Hall S, Pattanayak S. 2015. Estimating the impacts of local policy innovation: The synthetic control method applied to tropical deforestation. *PLOS ONE* 9(7):e101673. https://doi.org/10.1371/journal.pone.0101673

Sucipto. 1 February 2024. Carbon incentive funds in East Kalimantan will be distributed to villages. Kompas. https://www.kompas.id/baca/english/2024/01/31/en-dana-insentif-karbon-di-kaltim-bakal-disalurkan-ke-desa.

Swiss Re Corporate Services. 2024. HazeShield: The first ever standalone haze insurance solution for businesses operating in Singapore. Brochure. https://corporatesolutions.swissre.com/dam/jcr:e3073142-5032-4b1f-9058-40c344e21102/HazeShield-brochure.pdf

Tedesco AM, Brancalion PHS, Hepburn MLH, Walji K, Wilson KA, Possingham HP, Dean AJ. 2022. The role of incentive mechanisms in promoting forest restoration. *Philosophical*

*Transactions of the Royal Society B: Biological Sciences* 378(1867) 20210088. https://doi.org/10.1098/rstb.2021.0088

Tempo. 17 May 2017. Govt allocates Rp865 billion for peatland restoration. Tempo. https://en.tempo.co/read/875988/govt-allocates-rp865-billion-for-peatland-restoration

Tobin-de la Puente J, Mitchell AW. eds. 2021. *The little book of investing in nature,* Oxford: Global Canopy.

UCLG ASPAC (United Cities and Local Governments Asia Pacific). 2024a. *Climate finance landscape Malaysia*. Barcelona: UCLG ASPAC. https://uclg-aspac.org/wp-content/uploads/2024/09/2024_Climate-Finance-Landscape-Malaysia.pdf

UCLG ASPAC (United Cities and Local Governments Asia Pacific). 2024b. *Climate finance landscape Indonesia*. Barcelona: UCLG ASPAC. https://uclg-aspac.org/wp-content/uploads/2024/09/2024_Climate-Finance-Landscape-Indonesia.pdf

UNEP (United Nations Environment Programme). 2023a. State of finance for nature: The big nature turnaround – repurposing $7 trillion to combat nature loss. Nairobi: UNEP. https://doi.org/10.59117/20.500.11822/44278

UNEP (United Nations Environment Programme). 2023b. Asia enforcement awards winners tackling scourge of transboundary environmental crime. 28 November. Press Release. Nairobi: UNEP. https://www.unep.org/news-and-stories/press-release/asia-enforcement-awards-winners-tackling-scourge-transboundary.

UNEP (United Nations Environment Programme). 2022. Global peatlands assessment – The state of the world's peatlands: Evidence for action toward the conservation, restoration, and sustainable management of peatlands. Nairobi: Global Peatlands Initiative, UNEP.

UNEP (United Nations Environment Programme). 2021a. State of finance for nature *2021*. Nairobi: UNEP.

UNEP (United Nations Environment Programme). 2021b. Economics of peatlands conservation, restoration, and sustainable management – A policy report for the Global Peatlands Initiative. Barbier EB, Burges JC. eds. Nairobi: UNEP.

Wardell DA. 2020. Incentive structures for policy and institutional mainstreaming of commercial forestry investment sub-projects. Report. Los Baños, Philippines: World Agroforestry (ICRAF); Quezon City, Philippines: Department of Environment and Natural Resources; Manila, Philippines: Asian Development Bank; Washington, DC: Global Environment Facility.

West TAP, Wunder S, Sills EO, Börner J, Rifai SW, Neidermeier AN, Frey GA, Kontoleon A. 2023. Action needed to make carbon offsets from tropical forest conservation work for climate change mitigation. *Environmental Research Letters* 18(1). https://arxiv.org/abs/2301.03354

Wong GY, Moeliono M, Bong IW, Pham TT, Sahide MA, Naito D, Brockhaus M. 2020. Social forestry in Southeast Asia: Evolving interests, discourses and the many notions of equity. *Geoforum* 117:246–258.

World Bank 2022. Indonesia receives first payment for emission reduction in East Kalimantan. Press Release. 8 November 2022. https://www.worldbank.org/en/news/press-release/2022/11/08/indonesia-receives-first-payment-for-reducing-emissions-in-east-kalimantan

World Bank. 2019. Indonesia economic quarterly: Investing in people. Jakarta, Indonesia: World Bank. https://www.worldbank.org/en/country/indonesia/publication/indonesia-economic-quarterly-reports

Wunder S, Schulz D, Montoya-Zumaeta JG, Börner J, Ponzoni Frey G, Betancur-Corredor B. 2024. Modest forest and welfare gains from initiatives for reduced emissions from deforestation and forest degradation. *Communications Earth & Environment* 5(1):394.

Xinhua. 29 October 2024. Thailand, Myanmar, Laos launch joint action plan to tackle cross-border haze. *China Daily Asia*. https://www.chinadailyasia.com/hk/article/596475



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