



ASEAN PEATLAND MANAGEMENT STRATEGY 2023-2030



one vision
one identity
one community

STRATEGY AND ACTION PLAN FOR SUSTAINABLE MANAGEMENT OF PEATLANDS IN ASEAN MEMBER STATES 2023-2030

Endorsed by

ASEAN Task Force on Peatlands on 17 August 2023
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Foreword



Peatlands have long been a vital part of the ASEAN landscape playing a crucial role in sustaining biodiversity, carbon sequestration, climate mitigation, and water resource management. There are approximately 27 million hectares of peatlands in Southeast Asia, which is nearly 40% of the world's known tropical peatlands and around 6% of the entire global peatland resources. However, peatlands are increasingly under threat from the anthropogenic activities as well as natural phenomenon caused by the climate change, of which the impacts are not only to the region's environment but also our health and economic well-being.

The unsustainable practice of using fire for land clearance has led to extensive and persistent fires during dry weather, becoming the source of about 90 per cent of transboundary smoke haze in the southern ASEAN region. Peatlands management is therefore key in the implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), as well as the Second Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control with Means of Implementation adopted in August 2023 which set strategies to achieve a haze-free ASEAN by 2030.

I am privileged to present the new publication, the "Second ASEAN Peatland Management Strategy 2023-2030". This comprehensive document represents a significant milestone in the regional commitment to addressing one of the most pressing environmental challenges in our region. I commend the ASEAN Task Force on Peatlands for their extensive review and guidance. I would like to express my gratitude to all the ASEAN Member States, organisations, and experts who have contributed to the development of this new document.

I hope that this Strategy could facilitate the ASEAN Member States to achieve the vision that ASEAN will have healthy and resilient peatlands by 2030 which would contribute to promoting biodiversity conservation, climate change mitigation, and ecosystem services. As ASEAN looks forward to the Post-2025 ASEAN Socio-Cultural Community Blueprint and its contribution to the Kunming-Montreal Global Biodiversity Framework, I believe that sustainable peatland management would play an important role in building a resilient community in terms of improving their livelihoods through nature-based solutions and ecosystem-based approach. We are determined to break the cycle of peatland degradation, reducing the risks of transboundary haze pollution and its adverse effects on our environment, health, and economies.

I call upon all the ASEAN Member States, international partners, and stakeholders to join hands in the implementation of the ASEAN Peatland Management Strategy 2023-2030. Together, we can collectively safeguard our peatlands to create a brighter and more sustainable future for the region.

A stylized, handwritten signature in dark blue ink, consisting of a large, sweeping 'A' followed by a horizontal line and a small flourish.

H.E. Ekkaphab Phanthavong
Deputy Secretary-General of ASEAN
for ASEAN Socio-Cultural Community

Preface

The ASEAN Peatland Management Strategy (APMS) 2023-2030 (APMS 2023-2030) is developed by the ASEAN Member States (AMS) to guide actions in support of sustainable management of peatlands in the region. The first APMS (2006-2020) was prepared due to the pressing needs identified for the wise use and sustainable management of peatlands. The issues to be tackled involve the ongoing fires and related haze problems with the associated effects on the economy and health of the region, as well as the ongoing threats to peat ecosystem(s) and its likelihood of negatively contributing to global climate change. Against this background, the APMS 2006 -2020 was developed within the framework of the ASEAN Peatland Management Initiative (APMI) and the ASEAN Agreement on Transboundary Haze Pollution (AATHP).

This updated APMS, is developed based on recommendations from the Final Review of Implementation of the APMS 2006-2020 (Final Review) and is in line with the APMS 2006-2020, taking into consideration the present state of peatlands in ASEAN, knowledge gained during the last 17 years, peatland development status and sustainable livelihood opportunities for communities and business as well as the growing threat of climate change and loss of biodiversity.

Each AMS has now, or is in the process of developing, a National Action Plan for Peatlands (NAPPs). The APMS 2023-2030 is meant to assist in the sustainable management of ASEAN peatlands as well as support towards updating or developing the NAPPs. Under the auspices of the ASEAN Secretariat and with the assistance of Asian Management Consulting (AMC) under the provision of the strategic programme, the Sustainable Use of Peatlands and Haze Mitigation in ASEAN (SUPA), the present APMS underwent several revisions based on feedback from AMS, peatland management partners, such as International Union for Conservation of Nature (IUCN), Center for International Forestry Research (CIFOR) and Global Environment Centre (GEC) – please see Methodology and Approach in the Introduction for details.

Between February 2020 and August 2021, the implementation of the APMS 2006-2020 was reviewed by the AMS and ASEAN Secretariat, and the “Final Report of the Final Review of Implementation of the APMS 2006-2020” was endorsed by the Committee under the Conference of Parties to the ASEAN Agreement on Transboundary Haze Pollution (COM AATHP) via ad-referendum on 4 August 2021. As a result of the review, the current APMS has been updated, based on recent research and data (See Reference list). Adjustments have also been made to the Focal Areas and the associated Action Plan is updated accordingly. The final version of the APMS 2023-2030 was adopted by the COP AATHP on 23 August 2023 in Vientiane, Lao PDR.

In line with the APMS 2006-2020, the 2023-2030 Strategy primarily focuses on the following:

- Enhancing Awareness and Knowledge on Peatlands
- Addressing Transboundary Haze Pollution and Environmental Degradation
- Promoting Sustainable Management of Peatlands
- Enhancing and Promoting Collective Regional Cooperation on Peatland Issues

In addition to adding focus on:

- Climate change
- Biodiversity conservation
- Community livelihoods

As in the previous strategy, it sets out operational objectives that contribute to the delivery of one or more of the areas above, serving as guidance to AMS and other implementing bodies and collaborating partners through specific action plans and timeframes for these actions.

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List of Abbreviations

AATHP	ASEAN Agreement on Transboundary Haze Pollution
ACB	ASEAN Centre for Biodiversity
AIFS	ASEAN Integrated Food Security Framework
AMS	ASEAN Member States
APMI	ASEAN Peatland Management Initiative
APMS	ASEAN Peatland Management Strategy
APSMPE	ASEAN Programme on Sustainable Management of Peatland Ecosystems
ASCC	ASEAN Socio-Cultural Community
ASEAN ARDIS	ASEAN Agricultural Research and Development Information System
ASMC	ASEAN Specialised Meteorological Centre
ASOEN	ASEAN Senior Officials on Environment
ASEAN	Association of Southeast Asian Nations
ASEAN-WEN	ASEAN Wildlife Enforcement Network
ATFP	ASEAN Task Force on Peatlands
AWGCC	ASEAN Working Group on Climate Change
AWGFCC	ASEAN Working Group on Forest and Climate Change
AWGFM	ASEAN Working Group on Forest Management
AWGNCB	ASEAN Working Group on Nature Conservation and Biodiversity
AWGWRM	ASEAN Working Group on Water Resource Management
CBD	Convention on Biological Diversity
CIFOR	Center for International Forestry Research
CBFiM	Community Based Fire Management
COM AATHP	Committee under the Conference of Parties to the AATHP
COP AATHP	Conference of Parties to the AATHP
COP26	Conference of Parties 26 (Climate Convention 2021, Glasgow)
ENSO	El Niño Southern Oscillation
FAs	Focal Areas
FAFD	Food, Agriculture and Forestry Division
FLEG	Forest Law Enforcement and Governance
GCF	Global Climate Fund
GEC	Global Environment Centre
GEF	Global Environment Facility
GHG	Greenhouse gas emissions
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation GmbH)
IUCN	International Union for Conservation of Nature
IFM	Integrated Fire Management
IPM	Integrated Peatland Management
LogFrame	Logical Framework Analysis
MAHFSA	Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia
NAPPs	National Action Plan on Peatlands
NTFP	Non-timber forest product
OECM	‘other effective area-based conservation measure’ – as defined by AICHI and CBD in 2018.
OM	Organic material

PHU	Peat Hydrological Unit
PMU	Peatland Management Unit
SDG	Sustainable Development Goals
SPM	Sustainable Peatland Management
SPA-FS	Strategic Plan of Action on Food Security in the ASEAN Region
UNFCCC	United Nations Framework Convention on Climate Change

Glossary

Community Livelihoods (or Livelihoods) is defined here as community matters related to mainly income and health, whether as a worker on a plantation, in the forestry sector or a farmer on his or her own land. Only Integrated management and the application of knowledge driven best management practices that is environmentally sound can guarantee improved livelihoods for local communities.

Data driven is the practice of using data to inform decisions. This may include collecting data from multiple sources, analysing it, and then using the insights to inform decision making. Data driven decisions are based on quantitative evidence, which can make them more reliable and accurate than decisions based on qualitative evidence.

Intact peatlands are peatlands where some disturbances have occurred in the past, such as selective logging of a few trees, limited hunting or fishing. There has been no drainage and all the ecological functions of the area are intact.

Inventory of peatlands provides information on the location, area, type, thickness, ecological and hydrological condition, land use, carbon storage and values of the peatlands. This forms the basis for establishing priorities for any activity relating to the use, protection and restoration of peatlands. The inventory data also provide the basis for monitoring the status of peatlands, for CO₂ emission and for evaluating the effectiveness of restoration measures taken (Wetland International).

Mapping peatland either with remote sensing techniques or ground truthing data or the combination of both provides inventory data that is used for further monitoring and assessment of peatlands conditions and progress of restoration efforts.

Key versus Supporting Focal Areas – Key is used here as “main” or “core” areas of importance while “supporting” is used to indicate “supplementary” or “complimenting” areas. This division is somewhat subjective.

To avoid confusion, a brief glossary regarding the differences between rewetting, rehabilitating, and restoration of peatlands is included to how the presented APMS uses the terms.

Rewetting is defined as raising of ground water levels in drained peatland to its original levels. In order to preserve peat this rewetting should result in a peat hydrology that is as “near natural” as possible. However, in many cases, although canals are blocked, ground water levels are kept artificially low (to -50 cm or even -65-80 cm). This is mainly due to peatland agriculture focusing on dry-land crops which require dry peat. The rewetting carried out under these forms reduces the risk of fire but does not stop greenhouse gases caused by peat oxidation in the upper (still dry) peat. Many projects and programmes involving peat ‘restoration and replanting’ comprise of such partial rewetting only, while still planting dry-land species (Giesen & Sari 2018).

Rehabilitating degraded peatland is defined here as re-establishing natural hydrology and vegetation cover to maintain and protect the ecosystem function, increase biodiversity, and perhaps bring socioeconomic benefits (e.g., via agroforestry or wet-land agriculture). Such interventions may involve providing a tree cover that will lower fire risks – i.e., not sedges and ferns. Peatland rehabilitation programmes usually include some form of replanting or cultivation but may also include natural regrowth. Planting trees alone however, even on fully re-wetted peat, is not automatically peatland

rehabilitation or paludiculture, even though it may be promoted as such – it is imperative that they are wet-land species, preferably native, and not dry-land species.

Restoration is defined here as the process following rehabilitation which, given sufficient time and management, lead to peatland functions returning similar to an undisturbed peatland. This process is poorly studied and could take a long time. This can be explained by once drained, peat will subsidize and oxidize (released as CO₂) and is lost. Restoration would imply that peat sequestration by vegetation is greater than or equal to that lost due to oxidation (Giesen & Sari 2018, Zu et al., 2021).

Peat Hydrological Unit (PHU) is a contiguous peatland ecosystem which may have one or more domes and is located between two rivers, between rivers and the sea, and/or in swamps.

Peatland Management Unit (PMU) is a concept for managing peatlands horizontally/across administrative boundaries and vertically/in partnership with organisations and institutions.

Pristine peatlands are peatlands where no human disturbances to ecosystem function have occurred – i.e. no removal of trees, nor drainage in the PHU have occurred. There are very few, if any, pristine peatlands left in ASEAN.

Paludiculture is generally defined as wet agriculture and forestry on wet or rewetted peatland (latin *palus* meaning swamp) and refers to cultivating crops (native or non-native) on intact or re-wetted peatlands. However, the application of the term “paludiculture” is debated as it is contingent on whether the different peatland agricultural practices are considered sustainable. In terms of greenhouse gas emissions, how sustainable a paludiculture practice is deemed to be, depends on the overall carbon balance of a peatland which depends on the greenhouse gas measured, the species of plant and the water table level of the peatland (Zu et al., 2021).

Paludiculture has been under development in northern temperate areas as a means of rehabilitating degraded peatlands, while simultaneously making these areas economically beneficial (Wichtmann & Joosten 2007). In recent years paludiculture has been promoted as a solution for sustainable management of tropical peatlands. Paludiculture does have some controversy however, as some researchers are of the opinion that paludiculture in its strictest sense will allow only for native swamp or wetland species.

Several rehabilitation projects are based on only partially re-wetting the peatland (limited drainage) for dry-land crop species such as cocoa, coffee, pineapple, banana, maize, most citrus, dragon-fruit, and is often mislabelled as “paludiculture”. Such cultivation is unsustainable as the dry peat will continue to oxidize.

In the tropics, paludiculture is believed by many to be a sustainable solution to reduce and reverse the degradation of peatland. It includes traditional local agricultural practices which predate the use of the term. Commercial paludiculture has not been trialled in the tropics to the extent that it has in temperate peatlands (Zu et al., 2021).

Research Facility A research facility as defined for the purpose of this document is a network whose purpose is to *facilitate* the collection and dissemination of knowledge relating to peatlands. The network should assist in directing research and promote collaboration between existing national and regional research centres and institutions. The network will require some resources to operate, and it is suggested it reside within a well-established existing centre or institution, such as the ITPC

(International Tropical Peatlands Centre) established by Indonesia in close collaboration with ASEAN Task Force on Peatlands (ATFP).

In its simplest form, one can think of a project WhatsApp group, keeping all members of the group updated, a Facebook group for the likeminded or a web portal providing information to the general public but targeting professionals.

Sustainable Peatland Management (As used in this document):

Sustainable peatland management is the management of peatlands in such a way as to maintain or enhance their ecological character and services for current and future generations.

Thus, specifically for peatlands – Maintaining uses of the peatland while simultaneously ensuring the conservation of the ecosystem(s) and avoiding depletion of the biological resources therein.

Targets versus Results (As defined for the Action Plan):

A **result** is the intermediate goal or expected outcome of activities if targets have been met. For example, if a certain number of training courses have been held, then the result is staff are now qualified to perform their tasks or, if all the canals have been blocked (a target), then the expected result would be the water-levels rise to the original levels (i.e., the peatland is rewetted).

A **target** is the aim of an activity and is typically a number (although not always). Example: the target is the number of training courses in a year or number of canals blocked during a project.

Introduction

The ASEAN Peatland Management Strategy (APMS) is developed by ASEAN Member States (AMS) to support the sustainable management of peatlands in the region. The first APMS covered the period of 2006-2020 (the APMS 2006-2020) and was prepared due to the pressing needs recognised by both local and international communities in particular, of the emerging threat of forest fire caused by land preparation and peatland fires and its associated haze to the economy and health of the region. It was developed within the framework of the ASEAN Peatland Management Initiative (APMI) and the ASEAN Agreement on Transboundary Haze Pollution (AATHP).

In 2020-2021, a Review of the APMS 2006-2020 was conducted (Final Review of Implementation of the APMS 2006-2020, 4 August 2021) with recommendations for a new APMS (APMS 2023-2030) - this document.

What is new in the APMS 2023-2030?

Time Period, Awareness / Capacity Building and Management

The present APMS will span seven years compared to the previous APMS that covered fourteen years of peatland developments.

Considering the awareness, capacity building and associated changes in peatland management across ASEAN that have occurred during the previous APMS 2006-2020, the APMS targets are building on previous developments and have been adjusted to the implementation timeframe of the APMS 2023-2030. This includes an increased urgency to protect and sustainably manage the remaining peatlands in the era of climate change, biodiversity loss, shortage of fresh and clean water and food insecurity. This situation challenges AMS for more concerted efforts in regional coordination and cooperation on the main Focal Areas (FAs) that are peatland degradation, peatland protection, biodiversity conservation, fire management, sustainable livelihoods and peatland use, underpinned by data driven management supported by applied research, information and awareness raising as well as capacity development at the various stakeholder levels. Such an Integrated Peatland Management (IPM) approach has received increased attention in the new APMS, supported by extensive references and scientific findings (see Chapter 5).

Northern and Southern ASEAN

Stakeholder engagements highlighted a clear difference between northern and southern ASEAN countries with respect to peatlands. Further support for this is through the indication that some AMS are well advanced in the implementation of some actions, such as mapping, research, rehabilitation

and fire control of peatlands. While other AMS indicated the need for more research and inventory as well as capacity building as the peatlands in their regions are still poorly understood and mapped. The difference is most evident between northern and southern ASEAN countries. Southern ASEAN countries include Indonesia, Malaysia, Thailand, Brunei Darussalam (and Singapore, that does not have peatland but is affected by the smoke-haze caused by peatland fires).

The APMS 2023-2030 has differentiated these requirements by separating targets based on countries advanced in a particular activity against those in a preliminary or on-going state. This can be seen in the action plan matrix (Chapter 7) which lists different actions and timelines based on these differences. This structure allows AMS to determine and set their own priorities based on progress in achieving actions in the previous APMS. For example, if a Member State has completed a certain task, such as mapping and inventory, then it is concluded and the Member State in question would simply focus on other aspects. This is in line with the APMS 2006-2020 and the Final Review (2021) which suggested a set of jointly achievable goals with clear time bound targets, and indicators which can be clearly evaluated and monitored, but with flexibility that takes into account the differences in how much AMS have progressed on specific issues.

Focal Areas Updated

Based on the APMS 2006-2020, the Final Review (2021), discussions with experts, ASEAN Secretariat and AMS, literature review and taking stock of on-going relevant agreements within ASEAN and beyond¹, particular attention was made to the recommendations in the Review and to the FAs forming the basis of the development of the Action Plan for APMS 2023-2030.

Seventeen years have passed since the official launch of the APMS 2006-2020. The Final Review (2021) recommends the FAs identified for the APMS 2006-2020 receive a revision and an update. According to the Final Review, the implementation of several FAs is, very much well underway with several receiving a score of >70%. The APMS 2023-2030 needs to reflect this evolution. See Table A (from the Final Review) below.

Table A. Summary of scoring for APMS (2006-2020) implementation against Focal Areas

Focal Areas	Started	Ongoing/ continuous	Geographic Scope	Progress Score
1. Inventory and Assessment	100 %	100 %	7 (5-8)	70 %
2. Research	100 %	100 %	6 (5-7)	63 %
3. Awareness and Capacity Building	100 %	100 %	8 (5-10)	76 %
4. Information Sharing	100 %	100 %	7 (6-8)	77 %
5. Policies and Legislation	100 %	100 %	7 (7-8)	70 %
6. Fire Prevention, Control and Monitoring	100 %	100 %	5 (4-6)	60 %

¹ This includes the COP26 in Glasgow, Aichi Targets, the Ramsar Convention and the UN Sustainable Development Goals (SDGs).

Focal Areas	Started	Ongoing/ continuous	Geographic Scope	Progress Score
7. Conservation of Peatland Biodiversity	100 %	100 %	8 (7-9)	69 %
8. Integrated Management of Peatlands	100 %	100 %	6 (3-8)	61 %
9. Promotion of Best Management Practices of Peatlands	100 %	100 %	7 (5-9)	70 %
10. Restoration and Rehabilitation	100 %	100 %	5 (4-7)	65 %
11. Peatland and Climate Change	100 %	87 %	3 (1-6)	42 %
12. Regional Cooperation	100 %	100 %	8 (5-10)	73 %
13. Financing of the Implementation of Strategy	100 %	100 %	4 (2-7)	45 %
Grand Total	100 %	99 %	7	69 %

Notes: Score 1-10 (Geographic scope) based on average number of AMS undertaking activity (Range is given in brackets for number of countries implementing each of the separate actions within each FA). Figures are average for all actions related to that FA. Note that participation in some actions included all 10 AMS, but average for all actions is lower.

Revision of the Focal Areas and Operational Objectives

With the intent to provide added emphasis to the *purpose* or *goal* of each FA, the operational objectives of each were also reviewed. While in the APMS 2006-2020 the objectives were formulated as activities, the underlying intent remains valid and have been reformulated. The focus throughout has been on peatland management, with all objectives supporting the implementation of integrated, sustainable peatland management.

For those Member States who have not completed specific tasks from the APMS 2006-2020, the Operational Objectives are therefore still valid and have been moved/merged into the new Action Plan (Chapter 7).

The Final Review (2021) also recommended a review of the **Action Plan**. The new Action Plan (Chapter 7) is now using Logical Framework Analysis as the guiding principle and has clear Objectives, Actions, Goals, Targets, and Verifiable Indicators which is also in line with the recommendations of the Final Review.

Based on the priorities for the next APMS identified in the Final Review (2021) (From Table 13 in the Final Review), an assessment was made as this relates to the APMS 2023-2030 (Annex 1). All actions from the previous APMS (Chapter 8 in Final Review) have been incorporated into the new FAs and Operational Objectives. This includes intersecting of cross cutting elements such as research or integrated management and their timelines updated with time bound targets where possible, compared to non-time bound short-, medium- and long-term targets set out in the previous APMS.

Thus, no Action, Objective or FAs have been removed or dropped, but have been edited and revised to better reflect the evolution of peatland management in ASEAN since 2006.

Acknowledging that updating FAs may present an issue, as NAPPs of some AMS are based on the APMS 2006-2020 FAs, it is also acknowledged that FAs need to evolve over time as targets are met and new foci reveal themselves. The FAs went through a series of revisions, starting with merging overlapping FAs, converting select FAs to Operational Objectives under related FAs and identifying FAs that were not in the APMS 2006-2020. The APMS 2023-2030 has twelve (12) FAs that link to the APMS 2006-2020 FAs allowing continuity of action for AMS NAPPs. Please see Table 1 below (new FAs) and Chapter 6.

Table 1. Focal Areas and their respective Goals for APMS 2023-2030

(**Key** Focal Areas; **Supportive** Focal Areas)

No.	Focal Area	Goal
1	Inventory, Mapping and Assessment	All peatlands are mapped according to their characteristics and hydrological regimen.
2	Restoration and Rehabilitation	30% of degraded peatlands in ASEAN have been or are under rehabilitation by 2030 as agreed under the Global Biodiversity Framework.
3	Community Livelihoods	Sustainable management of peatlands has significantly progressed across sectors, improving livelihoods for and empowerment of local communities.
4	Peatland Biodiversity and Ecosystem Conservation	Peatland biodiversity is preserved in-situ and ex-situ with 30% of peatlands in ASEAN included in protected areas and OECMs by 2030 in agreement with the Global Biodiversity Framework.
5	Fire Prevention, Control and Monitoring	Transboundary Haze from peatland fires is eliminated.
6	Peatland and Climate Change	Peatlands protected and rehabilitated to enhance resilience to climate change and reduce emissions towards a target of net-zero emissions by 2050.
7	Integrated Peatland Management	To ensure integrated multi-stakeholder management of peatlands at a PHU level with the involvement of private sector, agriculture, plantation, forestry and environment sectors.
8	National Policies and Legislation	AMS have adequate regulations, policies and plans to ensure peatlands are managed sustainably at the national level.
9	Research	Research in ASEAN is enhanced to support peatland biodiversity conservation, rehabilitation, and sustainable management.
10	Information Sharing, Awareness & Capacity building	Awareness/Capacity on par with management needs and requirements
11	Regional Cooperation	AMS working together to share best practices and collaborate to enhance sustainable peatland management throughout ASEAN.

No.	Focal Area	Goal
12	Sustainable Financing	Sustainable financing of peatland protection and management is ensured.

The new and old FAs align in the Action Plan (Chapter 7). The assessment and reallocation are designed/intended to strengthen and improve attention to the integrated manner of sustainable peatland ecosystem management, which is in line with the intent of the APMS 2006-2020 and the Final Review (2021).

The APMS 2023-2030 recognises and is very much in support of the UN Sustainable Development Goals (SDGs). For example, managing peatland fires alone contributes to SDG Goals 3, 6, 8, 10, 13, 15, 16 and 17. (See also Annex 2 - How Wetlands Support the Achievement of the SDGs).

The Conclusions outlined in the Final Review (2021) remain valid and have received added attention in the new Action Plan.

Methodology and Approach of the APMS 2023-2030

The structure and content of the APMS 2023-2030 was drawn based on the previous APMS 2006-2020 and progress towards reaching the action plans as reported in the Final Review (2021).

Assessment of the APMS 2006-2020

While the basic structure in the APMS 2006-2020 was maintained, the new APMS 2023-2030 has updated background based on progress over the previous APMS implementation – on environmental, social, economic, climatic and science information with the related scientific references.

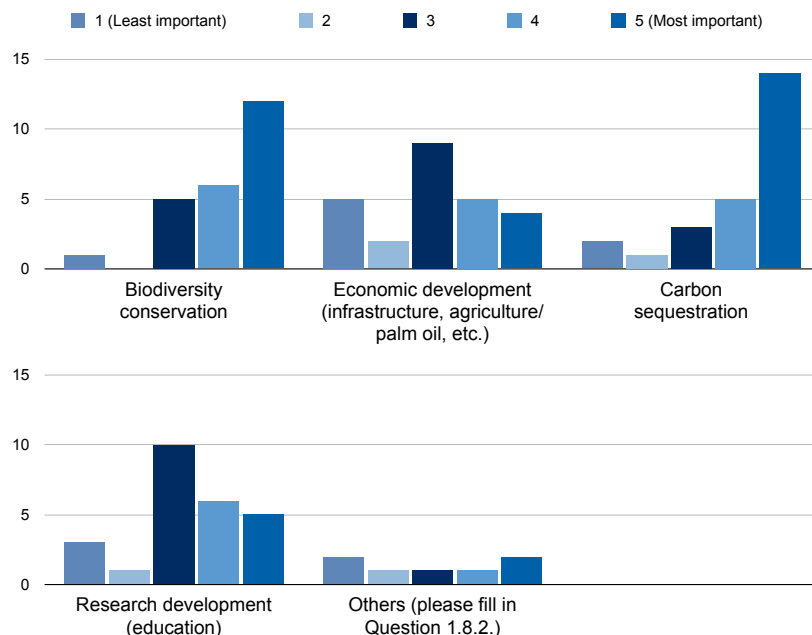
Based on the developments of recent years, the APMS 2023-2030 has been updated with clear objectives, actions, targets and verifiable indicators, as well as envisioned Results and Outcomes.

Engaging Regional and International Stakeholders

Stakeholders were engaged at multiple stages. Prior to the first task force meeting, an online questionnaire was distributed among AMS and a wider stakeholder group. While the questionnaire was ongoing, the revised FAs were described in the Inception Report submitted on 12 November 2021 and then presented and explained at the first AMS Task Force meeting, and with minor changes, was approved on 18 February 2022. Following discussions with AMS on the best way to align the old and new FAs, the final FAs were chosen.

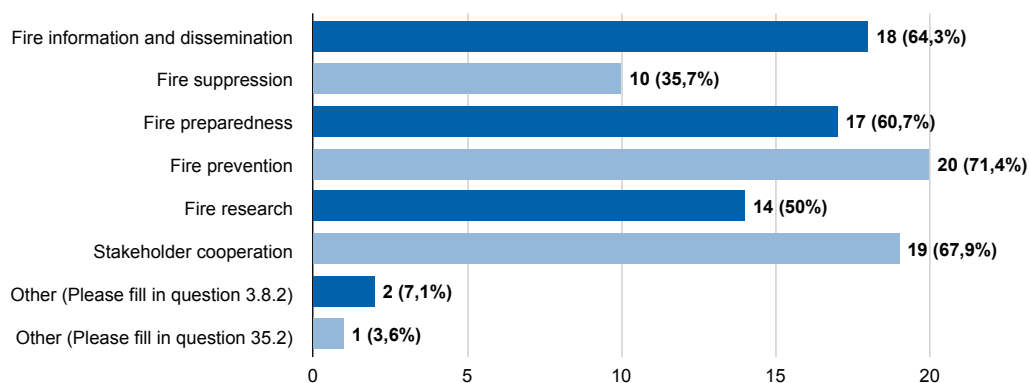
The online questionnaire comprised of 47 questions which were both quantitative and qualitative as well as both open- and close-ended (see Annex 3, Overview of Stakeholder Engagement Response). Questions were split into a general section and key FAs. The answers were quantitatively analysed using pie graphs or bar-charts, ranking of specific objectives in the action plan matrix are based on priorities identified in the questionnaire and qualitative information and suggestions were directly incorporated into the APMS, particularly into developing objectives, targets and time bound results in the Action Plan matrix.

For example, based on these polls, it was found that in particular, carbon sequestration, but also biodiversity conservation are considered the most important aspects of peatland management. This is followed by research development and economic development (See Figure 1).

Figure 1. Stakeholder Responses Related to Function of Peatlands

Note: Full question: ASEAN peatlands host endangered species, provide livelihoods and store large amounts of carbon. Balancing these issues is challenging. Please rate the importance of each of the following to overall ASEAN peatland management.

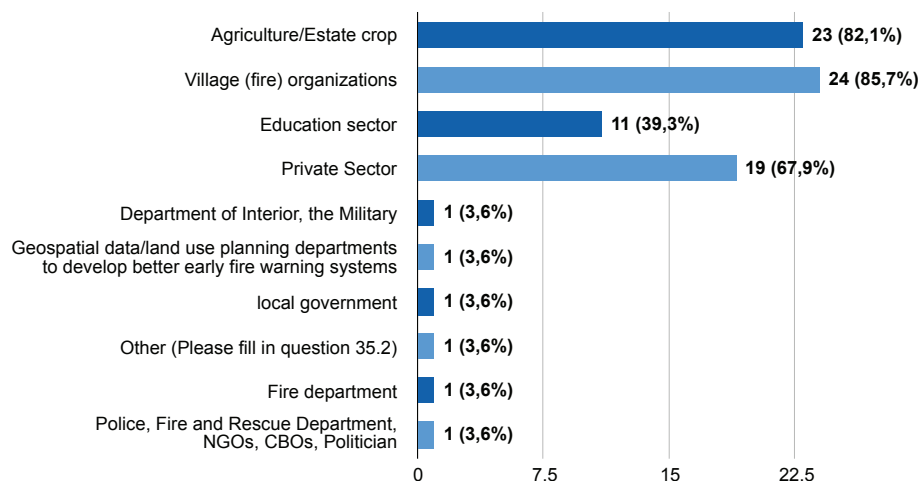
The importance of other elements was confirmed by the analysis of the questionnaire about fire management in the ASEAN region. Figure 2 shows there is room for improvements for successful Peatland Fire Management.

Figure 2. Stakeholder Responses Related to Stakeholder's Involvement on Fire Management

Note: Full question: In ASEAN there has been a heavy focus on fire suppression in the last three decades. However, haze events still occur. In which field of integrated fire management (IFM) should ASEAN member states improve its efforts, and how?

Figure 3 shows which other stakeholders should form (stronger) partnerships and commitments within an Integrated Fire Management framework beside the traditional forestry sector. Since fire ignition sources often lay outside the forestry sector, a stronger engagement of the agriculture sector in the development and implementation of wetland agriculture and fire free alternatives is recommended. Research and curriculum development about wetland agriculture techniques, peatland restoration and related capacity building programmes for the ASEAN agriculture extension services should therefore also be supported as fire prevention measures.

Figure 3. Important stakeholders within an Integrated Peatland Fire Management framework

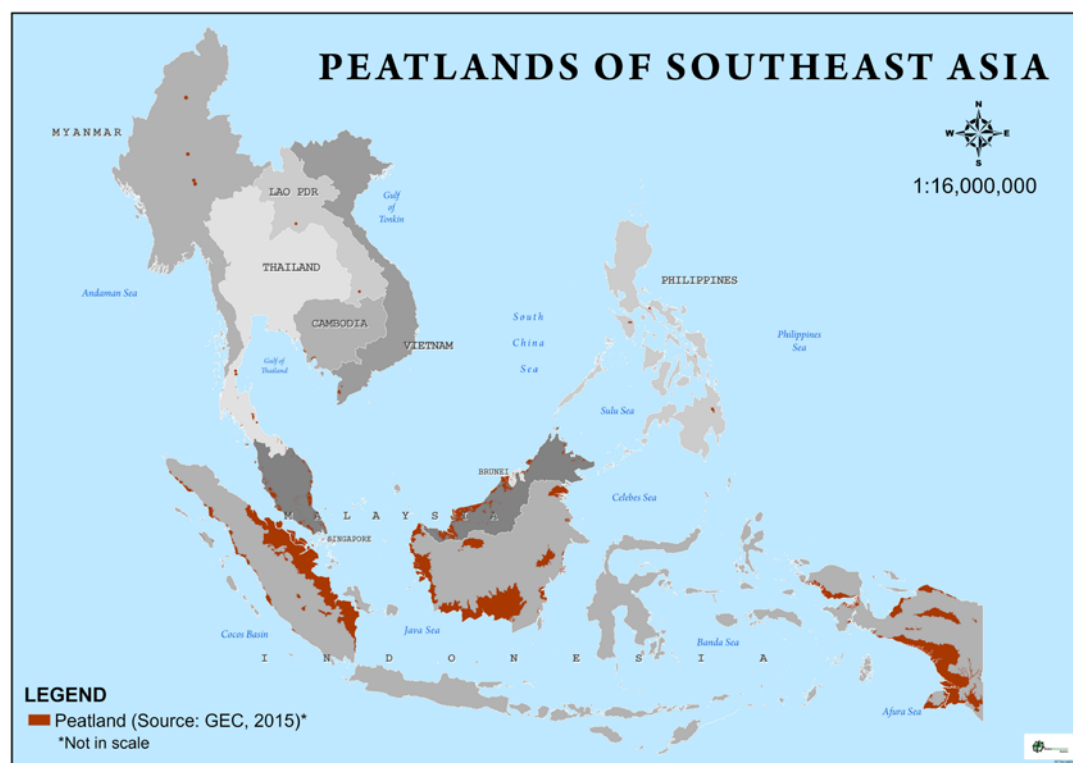


Note: Full question: In the past fire management/suppression has been traditionally handled by the forestry departments. Which other stakeholders need to be a part of an integrated fire management system?

1 Peatlands in ASEAN Region

Peatlands occur in every climatic zone around the world and cover an estimated 4.23 million km² which corresponds to 2.83% of the Earth's land surface (Xu et al. 2018). Peatlands in Southeast Asia encompass an estimated 25-30 million hectares or approximately 27-41% of the world's known tropical peatlands (Poulter et al. 2021). These peatland areas can be found throughout Indonesia, Malaysia, Brunei Darussalam, with smaller areas reported in Thailand, Viet Nam, Philippines, Cambodia, Lao PDR and Myanmar (Fig 4). The thickness of peat varies from 0.5 m to more than 25 m.

Figure 4. Distribution of peatlands in ASEAN².



Some AMS in the southern parts of ASEAN such as Indonesia, Malaysia and Thailand have extensive peatlands with large-scale peatland development, drainage and significant drivers of peatland degradation. They have a longer history of assessing and managing peatlands. One of the common challenges facing these countries is the degradation of peatlands leading to extensive fires and

2 Source: <http://www.aseanpeat.net/index.cfm?&menuid=62>

transboundary haze. In the northern ASEAN region where peatland areas are smaller in scale but are significant for biodiversity conservation and contribution to local livelihoods, most AMS are mainly still in the stage of assessment and mapping of their peatlands.

In most AMS, peatlands are designated as either conservation areas, production forests or agricultural lands. The extent of peatlands varies significantly between countries as indicated in Table 2.

Table 2. The distribution of peatland area in ASEAN Countries

Country	Area (ha)	References
Brunei Darussalam	90,900	National Action Plan on Peatlands (NAPPs), 2014
Cambodia	9,850	Assessment reports, 2014-2015, SEApeat Project
Indonesia	24,668,000	Ministry of Environment and Forestry, 2017 (peatland area distributed in Peatland Hydrological Unit, PHU)
Lao PDR	1,449	"Peatland management update in Lao PDR" presented by Lao PDR at 8 th ATFP, 20 July 2023
Malaysia	2,560,341	DOE, 2019
Myanmar	11,299	"Country update on peatland management", presented by Myanmar at 8 th ATFP, 20 July 2023
Philippines	20,188	Input provided to Joint Regional Training of SUPA and MAHFSA, September 2020; National Action Plan on Peatlands (NAPPs); Assessment reports, 2011-2015, APFP-SEApeat Project
Thailand	64,555	"Update on the status of implementation of NAPPs" presented by Thailand at 8 th ATFP, 20 July 2023
Viet Nam	24,000	Input provided to Joint Regional Training of SUPA and MAHFSA, September 2020; National Action Plan on Peatlands (NAPPs)
Total	27,450,582	

Note: The figures are approximate. The area of peatlands in Northern ASEAN countries as listed in the table are derived from very limited surveys and country updates at relevant meetings, with total areas likely to be significantly different once further surveys are completed. (Mekong Peatlands Project)

The area of undisturbed/pristine peatlands in the region is now very small. The last 20 years have significantly reduced the extent and quality of peatland resources, mainly due to peatland drainage and conversion for industrial and agriculture activities, degradation due to fires and infrastructure development. While development projects on peatland may have led to poverty alleviation in some areas, it has also resulted in significant loss of biodiversity, increased flooding risks, wildfires, carbon emissions and socio-economic problems in other areas (Miettinen et al. 2017; Wijedasa et al. 2018; Mishra et al., 2021; Merten et al, 2021; Hein et al., 2022).

1.1. Values of Peatland in the ASEAN Region

Being one of the largest terrestrial organic carbon stocks globally, peatlands are an important climate stabilisation system that stores twice as much carbon as the world's forests (Anisha *et al.* 2020; Poulter *et al.*, 2021). As the peatlands in ASEAN occupy approximately one third of all tropical peatlands, this makes the region one of the world's most important carbon stores. Furthermore, peatlands are important water stores – preventing floods in the rainy season and releasing water during dry seasons and support specialized biodiversity. They provide food, fuel and water for local communities including other co-benefits of eco-tourism possibilities as well as cultural and spiritual values.

Peatlands have important ecosystem services and other benefits:

- Carbon sequestration and storage – contributing to mitigating climate change
- Water quality and supply
- Wildlife habitats
- Natural resources for livelihoods
- Flood and erosion control
- Recreation and eco-tourism
- Education and research
- Peatlands serve as an inspiration for art, religion, and other cultural values

While most AMS recognise the need to approach extraction of natural resources sustainably, the functions and values of peatlands are largely unrecognised and more emphasis is needed on preservation and conservation values, including biodiversity and issues related to climate change and flooding.

2 Major Threats to Peatlands

Only intact, pristine, and undisturbed peatlands provide their full ecosystem services and carbon storage functions, such as regulating climate, flood mitigation and support unique and rich biodiversity. Intact peatlands contribute to human well-being by providing food, fibre, water and genetic resources (Osaki et al., 2021).

However, global peatlands are in decline with an estimated 11-15% of these ecosystems having been drained for agriculture, grazing, peat mining and forestry (Leifeld et al. 2019). A further 5-10% are degraded through vegetation removal or alteration. Peatland decline has slowed somewhat in temperate and boreal regions, but the loss of tropical peatlands continues at a high rate. If unchecked, the area of peatland converted in tropical regions could increase to around 300,000 km² by 2050 (Leifeld et al. 2019). This is almost double today's drained peatland area in the tropics.

Large areas of peatlands in ASEAN have been subjected to deforestation, peat fires, drainage and conversion to agricultural and forestry plantations. Meanwhile peat drainage posing the greatest direct threat, the impacts of climate change on peatlands provide the highest uncertainty (Murdiyarso, et al., 2010; Dohong et al., 2017).

Drained peatlands lead to subsequent and cascading degradation phases with multiple impacts on the ecological, social, economic, and human health conditions (Mishra et al, 2021). In addition, these disturbances cause changes to the peat's hydrology causing large fluctuation in the water table of the peatland hydrological unit (PHU), with consequences to the CO₂ emissions of peatlands becoming carbon sources instead of carbon sinks.

Consequently, problems have arisen such as over-drainage, loss of biodiversity and natural resources, as well as fire damage and smoke haze pollution over the entire SEA region.

2.1. Degradation of Peatlands Due to Drainage

Tropical peatlands naturally have high water tables and generally remain wet year-round in natural conditions although water tables will be lower in dry seasons. During strong drought e.g., El Niño years, further reduction in groundwater level may occur. Under natural conditions, the water table will be restored in the next rainy season.

Usually, canals in peatland are first dug to enable timber extraction (Wedeux, et al. 2020). These areas are further developed for drainage to permanently lower the water-table to convert wet to dry conditions, which would enable dry-land agriculture (Sumarga, et al., 2016; Zu et al., 2021).

Drainage as part of a peatland management unit usually extends beyond the drained area, such as in conserved areas, resulting in degradation often associated with fires (Page et al., 2002; Konecny et al., 2016). Further, drainage leads to drying of the peat which typically becomes hydrophobic, rendering it difficult to control fire (Perdana, et.al. 2018). These indirectly degraded areas, or areas abandoned when agriculture fails, are typically succeeded by secondary growth vegetation that may be more flammable and susceptible to fire (Hoscilo, et al. 2013).

The long-term effect of peat drainage is increased decomposition of peat, as the conversion of a wet anaerobic carbon rich system to a dry aerated system leads to increased peat degradation, decomposition and high greenhouse gas emissions. Drainage and degraded peatland releases CO₂ and reduces the natural capacity of peatlands to absorb and store water acting as a natural reservoir. With continued drainage related peat degradation and repeated fires, the peat surface eventually nears the ground water level, resulting in permanent flooding which means loss of arable land (Sumarga et al., 2016; Wijedasa et al., 2017; Hein et al, 2022).

While stopping drainage by re-wetting the peat (canal blocking) will rapidly stop CO₂ release as the system returns to anaerobic conditions, it can take many decades to restore the ecosystem to the stage where carbon sequestration again occurs (Kreyling et.al. 2021).

2.2. Peatland Fires

Land and forest fires in ASEAN continue to cause smoke and haze across the region, with air pollutants occasionally reaching hazardous levels over much of Southeast Asia. For almost three decades the annual toxic smoke and air pollution, mainly from peatland fires, pose a major health risk on communities throughout the region. Recent studies are just beginning to unravel the long-term effects of the smoke and haze on the next generations (Cheong et al., 2019).

Fires in equatorial Asia were responsible for 8% of global carbon emissions due to fires between 1997-2016 (Kiely et. al, 2021). Besides that, these fires have negatively impacted biodiversity, the regional environment and cause significant losses to ASEAN economies. For example, the 2015 peat fires, which were the largest in recent years resulted in economic losses totalling US\$28 billion, whilst the six largest fire events between 2004 and 2015 caused an estimated US\$93.9 billion in economic losses (Lin et al., 2017, Kiely et. al, 2021).

Intact peatland ecosystems, under normal conditions are wet and often water-logged, and like intact tropical rainforests naturally resilient against intense and damaging fires. While there is evidence of fires having occurred occasionally in the past (Biagioni et al., 2015; Cole et al., 2015), today fires on peatland are the result of human activities which lead to a degradation cycle of the peatlands making them susceptible to peat fires due to drainage.

There are two main types of fires in peatlands: above ground (surface) fires that consume biomass and below ground (sub-surface) fires that consume the carbon rich peat soils (Usup et al., 2004). The sub-surface fires lead to smouldering peat fires which can last for several months producing a significant amount of smog and haze along with increased greenhouse gas emissions that reduce regional air quality. Such fires are hard to extinguish by suppression efforts, with the 1997/98, 2006, 2015 fire seasons ended only by significant amounts of continuous rainfall.

The transition from surface to sub-surface fire is typically the result of drainage and/or long-lasting, often ENSO induced droughts and human-altered fire regimes in the peatland landscape. These fires are aided by deposits of dried up large sized logs, branches and tree roots which provide the necessary fuel type for initiating deeper peat fires (Goldstein et al. 2020).

2.3. Loss of Peatland Biodiversity

The Southeast Asian region is home to 9 per cent of the world's endemic birds, 11 per cent of mammal species (Sodhi et al., 2010; Posa et al., 2011; Giesen et al., 2018). This makes Southeast Asia the region with the largest proportion of endemic birds and mammals in the world. Similarly, Southeast Asia is home to an estimated 50,000 species, equivalent to 25 per cent of the world's endemic vascular plants (Middleton et al., 2019). Over the past two decades, more than 2,000 new species have been discovered in the Southeast Asian region.

In some parts of ASEAN, following the conversion of dry land forests into other land uses, peatlands make up a significant proportion of remaining forests (Vernimmen et al. 2020). These forests play an important role as refugia for biodiversity once present in other forest types. Peatland biodiversity is best known in the southern ASEAN region, where between 1,441 to 1,524 plant species, 123 mammal, 268 birds, 75 reptiles, 27 amphibians and 219 species of fish have been recorded as of 2011 (Posa et al. 2011; Giesen et al. 2018). Among this 80 of the 219 species of fish are restricted to peatlands, including the world's smallest fish.

Recently three new species were described from peatlands. One shrub endemic in Thailand, *Hanguana thailandica*, and two species of tree, *Dispeleum rawagambut* and *Lophopetalum tanagambut*, endemic to Indonesia (Wijedasa et al, 2016; Randi et al., 2022a & 2022b). Our knowledge of peatland biodiversity is limited to the presence or absence of species, with limited understanding of their ecology and survival within the habitats.

Peatlands are a refuge for several flagship species and many rare and endangered species, such as orangutans, tigers, endemic birds, and fish such as the iconic species of fighting fish (*Betta*) and the world's smallest vertebrate – *Paedocypris* (Kottelat et al., 2006). The rate of endemism is high, where some species are restricted to a single swamp or small region and nowhere else (Rüber et al., 2007). Similarly, species composition of peatland forests will differ across their geological range and the effect of land use changes on the survival of species and its conservation status within the remaining forest is not known (Giam et al., 2012). The environmental changes occurring due to climate change may as well alter the conservation status even in intact peatland forests.

The degradation of peatland causes significant negative impacts to the biodiversity in general and the entire ecosystem. Anthropogenic use of peatlands not only results in loss of biodiversity, but also leads to increased human-wildlife conflicts in areas with remaining peatland forest such as, poaching, and increased wildlife trade. This in turn may cause a rise in future pandemics due to close contact between humans and wildlife (Harrison et al. 2020). Biodiversity loss also occurs because of over-harvesting of peatland species such as timber trees and non-timber forest products (NTFPs). While sustainable harvesting of forest produce is possible, the loss of vast areas of lowland forests puts a larger pressure on remaining forests.

2.4. Peatland Conversion for Large- and Small-scale Land Use

Most of the peatlands in Southeast Asia are experiencing drastic disruption due to various anthropogenic activities, such as drainage and deforestation, and subsequent conversion for plantation development, agriculture, and infrastructure with little consideration to hydrology, peat thickness, biodiversity and the adverse effects to the carbon cycle (Omar et al., 2022). For private companies this may occur on areas thousands of hectares, mainly for oil palm or *Acacia* for the paper industry. Local farmers in contrary often occupy only a few hectares for subsistence farming. While middle range investors, occupy areas of sizes in between these large and small landowners and may do so in ways that do not easily allow them to be identified or engaged. Common for all is the aspiration to raise income generating crops, typically dry-land crops.

Most farmers, smallholders, middle range investors and private companies use drainage/canal systems as the common techniques for preparing agriculture on peatlands. Followed by slash and burn, this is considered the most efficient method for land preparation for agriculture. The method often causes uncontrolled fires and environmental damages leading to impacts on the economy. However, this level of dependence on peatlands is frequently in direct conflict with the interests of conservation and restoration of peatlands which is aimed at long term maintenance of peat soils which in most cases prevent the loss of land to permanent flooding.

The rapid land use change, exacerbated by climatic variability, has led to an increase in fire frequency, as the remaining peatland forests come under pressure from increased illegal logging, development for plantations and dry-land agriculture-based settlement, and, where economic development has failed, land abandonment.

Although the drainage system temporarily increases the soil productivity for dry-land agriculture, eventually problems with flooding will evolve due to subsidence, which is the lowering of the soil surface due to the removal of water and loss of carbon rich peat soils due to degradation and oxidation and natural geological sinking of land. Addressing these problems needs to include all peatland stakeholders, however while large companies and small holders can easily be identified, the middle range investors are often not easy to identify and may not be included in the engagement needed to manage peatland issues.

2.5. Peatland Carbon and Climate Change Vulnerability

Peatlands in ASEAN are estimated to store carbon equivalent to 10% of global atmospheric carbon. Keeping this globally significant carbon store in the ground will play an important part of meeting carbon neutrality by 2050 as in the Paris Agreement.

However, past and present land use and potentially climate change are causing the release of this carbon due to the loss of peat by decomposition, drainage and rapid release due to fires and erosion (Leifeld et al., 2019). Worldwide, up to 15% of the peatlands have been drained, but these drained peatlands (on 0.4% of the land area) are responsible for 5-6% of the global anthropogenic CO₂ emissions, mainly using peatlands for agricultural productions (Merten et al. 2021; Page et al. 2022).

Reducing these emissions is a key component of Nationally Determined Commitments (NDCs) made by AMS under the Paris Agreement to achieve carbon neutrality by 2050 (Leifeld & Menichetti, 2018). However, the effect of climate change on the ability of tropical peatlands to continue to retain and accumulate carbon is uncertain (Turesky et al. 2015; Baird et al., 2017; Loisel et al., 2021; Page et al., 2022). One such effect is the increased frequency of peatland fires over the past few decades, these increased fires could be due to climate change or land use change or a combination of both.

There are a limited number of peat cores studies that have shown the existence of forest fire events prior to human disturbance. They have also shown that fires have been far more frequent in the presence of man-made developments (Biagioni et al., 2015; Cole et al., 2015). This has been especially visible in El-Niño events that have led to regional peatland fire events. While studies have shown that the intervals between El-Niño events have shortened and is predicted to shorten further (Li et al., 2013; Hu et al., 2017), in recent years, major fire events on peatlands have also been occurring in non-El Niño years (Page et al., 2002; Gaveau et al. 2014; Wijedasa et al., 2018). This indicates that drainage and drying of peat is the core of the problem, and potential future fire events is also likely.

The main premise of peatland resilience to climate change depends on whether they can maintain or accumulate carbon or whether they will lose their carbon over time (neutral/positive vs negative carbon balance) (Turesky et al. 2015; Loisel et al., 2021). Rapid peatland land use change of the past forty years has had varying impacts across ASEAN resulting in a negative carbon balance, i.e. more carbon being lost than accumulated, as peatland is lost (Miettinen et al., 2017; Wijedasa et al., 2018). These changes have altered the ecosystem function of many peatlands with associated environmental impacts. It has thus far not been possible to separate the environmental impacts of land use change and climate change on the ecosystem function of intact as well as disturbed peatlands. While our understanding of climate change impacts is limited, rising sea levels, subsiding peatlands, and the loss of carbon will result in the loss of land surface due to permanent flooding of some low-lying coastal areas and peatlands adjacent to rivers (Wijedasa et al., 2017; Loisel et al., 2021).

Despite a limited understanding of climate change impacts on tropical peatlands, due to the difficulty in separating climate change from land use change impacts, what is known is that ecologically functioning peatlands play a role in regional and local climates; as wetland systems, peatlands store large quantities of water as well as carbon and that they will degrade further (releasing carbon) under increased droughts. The potential of peatlands to play a role in climate change mitigation relies on its ability to maintain its ecosystem function (Osaki et al., 2021; Riberio et al, 2021).

Emission reductions through peatland management is a key part of AMS emission reductions declared under NDCs under the United Nations Framework Convention on Climate Change (UNFCCC) to achieve carbon neutrality by 2050 as agreed in the Paris Agreement. The goal of carbon neutrality by 2050, will require that NAPPs include stepwise rewetting to first reduce emissions which is then followed by rehabilitation and restoration of peatlands prior to irreversible flooding. A key part of this are mitigation strategies based on the development of wet-agriculture techniques which have a neutral or net positive carbon balance. Such trials are underway and would need to be scaled up over a reasonable time scale to achieve the 2050 climate change goals. The climate mitigation potential of peatlands due to potential emission reductions and sequestration has the potential to attract investment that could have multiple other environmental benefits.

3 Current ASEAN Policies and Institutional Frameworks Relating to Peatlands

ASEAN and its member states have issued policies and regulations related to peatlands in recent years. At the regional level, numerous policies and initiatives have been developed to provide a framework for activities related to peatland management. Some regional policies provide guidance on how AMS address various common issues related to peatlands, including peat fire prevention and control, and peatland management. Other initiatives have been intended to strengthen regional cooperation and increase knowledge and capacity through promoting and sharing lessons learned on best practices of sustainable forest management.

The most prominent policy instruments directly or indirectly linked to the management, conservation and restoration of peatland are:

- ASEAN Agreement on Transboundary Haze Pollution (AATHP);
- ASEAN Peatland Management Initiative (APMI);
- ASEAN Peatland Management Strategy (APMS) (2006–2020);
- Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control with Means of Implementation (Haze-Free Roadmap) (2014–2020);
- ASEAN Guidelines on Peatland Fire Management.

Additionally, the ASEAN Programme on Sustainable Management of Peatland Ecosystems (APSMPE) was established to support collaboration among various stakeholders in the ASEAN region (including government, private sector, communities and civil society) to achieve the goals of the APMS.

Furthermore, the second version of the ASEAN Guidelines on Peatland Fire Management, outlining the concept of Integrated Fire Management and related actions, was recently endorsed by ATFP in August 2021.

At the national level, Member States have provided various policies and regulations related to peatland managements. Six Member States have developed NAPPs, namely Brunei Darussalam, Indonesia, Malaysia, the Philippines, Thailand and Viet Nam, in which Indonesia has issued more than 30 peatland-related regulations and policies in the past 15 years. Some Member States have developed regulations related to peatlands operating at the sub-national and local level to provide legal protection of peatlands. Further, peatland related issues are frequently incorporated into other policies and strategies such as national forestry and biodiversity action plans or environmental policies.

Different aspects of peatland management are governed by a variety of different policies, laws and regulations, both nationally and regionally. In most Member States, there are a very broad range of different Ministries and agencies with some roles or responsibilities related to peatland management.

ASEAN has already developed various policies and frameworks, both directly and indirectly related to the management of peat areas. Some policy instruments directly or indirectly linked to the management, conservation and restoration of peatland including the AATHP, Haze-Free Roadmap, APMI, APMS and APSMPE.

ASEAN also has included peatlands on various regional frameworks and strategic plan of actions, especially the ASEAN economic cooperation, including:

- ASEAN Integrated Food Security (AIFS) Framework & Strategic Plan of Action on Food Security in the ASEAN Region (SPA-FS);
- ASEAN Agricultural Research and Development Information System (ASEAN ARDIS), ASEAN Directory of Agricultural Research and Development Centres in ASEAN, and Guidelines for the Use of the Digital Information System;
- Memorandum of Understanding (MoU) on ASEAN Cooperation in Agriculture and Forest Products Promotion Schemes until 2009;
- ASEAN Ministerial Statement on Strengthening Forest Law Enforcement and Governance (FLEG) in ASEAN and Work Plan for Strengthening FLEG in ASEAN 2008 – 2015;
- ASEAN Regional Action Plan on Trade in Wild Fauna and Flora 2005-2010. ASEAN Wildlife Enforcement Network (ASEAN-WEN).

4 Regional Strategy for Peatland Management

ASEAN has provided guidance and frameworks for establishing programmes and initiatives that can synergise with issues related to the environment and other needs in the region. These include the ASEAN Vision, the medium-term plans of action, and meetings of the ASEAN Ministers on Environment.

The ASEAN Vision 2020 demands for "...a clean and green ASEAN with fully established mechanisms for sustainable development to ensure the protection of the region's environment, the sustainability of its natural resources, and the high quality of life of its peoples...". The demand is reiterated in the ASEAN Community Vision 2025, on the ASEAN Socio-Cultural Community that indicates the need for "...a sustainable community that promotes social development and environmental protection through effective mechanisms to meet the current and future needs of our peoples...".

The ASEAN cooperation on environment particularly focuses on the following key result areas under the ASCC Blueprint 2025:

- Conservation and Sustainable Management of Biodiversity and Natural Resources
- Environmentally Sustainable Cities
- Sustainable Climate
- Sustainable Consumption and Production

Thus, in extension of the APMS 2006-2020, and in support of the aims and purposes of ASEAN, in line with the APSMPE 2014-2020 targets, and guided by the ASCC Blueprint 2025, the overall goal of the APMS 2023-2030 is:

Overall Goal:

All peatland landscapes are sustainably managed in an integrated manner based on peatland hydrological units and with multi-stakeholder engagement.

4.1. Rationale for the New ASEAN Peatland Management Strategy 2023-2030

With their globally significant carbon store and effect on local environments, peatlands are vital for combatting the climate crisis. In addition, peatlands are providing a wide range of important ecological, economic and cultural benefits (IUCN, 2021). According to the Wetlands International (WI) and the Ramsar Convention, healthy peatland ecosystems contribute to the achievement of all 17 SDGs (See Annex 2). They represent a habitat for many unique and threatened species while also supporting water cycles, controlling pollution and sediments, serving as a source of locally harvested products, and existing as an inspiration for art, religion, and other cultural values. Economic assessments confirm that the benefits of these ecosystems are considerable. Investment in peatland conservation, restoration and sustainable management is a triple win for people, the climate, and biodiversity (United Nations Environment Programme (2021).

Since the APMS 2006-2020 was initiated, several divisions, task forces and working groups, such as the working groups under ASEAN Food Agriculture and Forestry Division and Ministry of Forestry, Agriculture and Environment in some ASEAN member states have adopted peat into their portfolio. However, peatlands are still being drained, degraded with biodiversity lost and declining while haze is still a problem.

With regards to on-the-ground management of peatlands, many similarities within the ASEAN region remain – such as drainage, fires, unsustainable livelihood options and weak enforcement of existing laws and regulations. In addition, there is still an urgent requirement of increased general awareness of the importance of intact peatlands to climate change, biodiversity and sustainable development.

However, there are also differences in managing peatlands between northern and southern ASEAN Member States – this relates to mapping, research, fire management and the development of NAPPs, where the southern Member States have progressed further than the northern Member States.

Peatlands are not uniform – they may vary in terms of peat thickness, amount of alluvial inputs, carbon content, and vegetation among other parameters. The Ramsar Convention has provided definitions of all types of wetlands, including peatlands (see Annex 5 - 13th Meeting of the Conference of the Contracting Parties: Resolution XIII.12, “Guidance on identifying peatlands as Wetlands of International Importance (Ramsar Sites) for global climate change regulation as an additional argument to the Ramsar Convention on Wetlands”). The main parameter for peat is defined as having a minimum of 30% organic materials (OM).

However, the Mekong Peatlands Project (IUCN) is advocating the use of Histosols (at least 20-30% OM) as the most relevant classification system for peat soils in Cambodia, Myanmar and Lao PDR, since the peats in these countries often receive significant inputs of colluvial or alluvial materials.

AMS should therefore consider adopting a definition of peatlands and classification of peat soils that is most relevant to the peatlands found in their country or region – based on data collected during field surveys and analysis of peat samples for OM and carbon.

5 Principles of Integrated Peatland Management (IPM)

Recognising the important provision of ecosystem services and the exceptional ability of peatlands to sequester and store carbon, actions are required to prevent further degradation of this relatively poorly understood ecosystem(s). However, it is also important to recognise the need for food security and development for poverty alleviation has resulted in most peatlands suffering from degradation and unsustainable management to various degree.

Sustainable peatland management needs to integrate protection, restoration and management aspects into one strategical approach, here called IPM. Such an approach incorporates sustainable community livelihood options based on agriculture and agroforestry business models alongside protection and restoration efforts which are scientifically sound and data driven.

To balance between the conservation and protection of peatland and the support of the wise use and management for livelihood and economic development, a holistic approach of IPM in the ASEAN region needs to be adopted and advances shared among the Member States. The elements and supporting cross cutting issues of IPM are interrelated and connected with each other and needs to be supported by applicable data management, research, guidelines, information sharing as well as implementation recommendations. This would include strengthening respective national policies in general and further promote regional cooperation.

This chapter shall briefly present some key and cross-cutting elements for an IPM framework for ASEAN peatlands.

Overall, these elements form the basic principles of IPM that lead to the FAs (Chapter 6).

5.1. Key Elements of Integrated Peatland Management

There is no “one way” to view sustainable management – this will always depend on from which perspective and what part and needs of society this is viewed; scientific community, private enterprise, decision maker, local farmers and fishermen, or other specific interests, such as biological conservation and climate change. Hence, the participation and support of these stakeholders is essential for successful sustainable peatland management.

Peatland zoning identifying suitable land-use options for an integrated approach to the peatland protection and restoration is at the heart of an IPM strategy. The specific types of activity and zonation should be knowledge-based and take a participatory stakeholder approach.

Following Applegate *et al.* 2022, the Peatland Hydrological Unit (PHU) may consist of various land use types and, like the concept of a UN Biosphere Reserve, has a core protection zone and a management or development zone. Such an integrated approach to peatland management, including land-use zonation, across the whole of the hydrological unit, allows for water management aiming at rewetting drained areas by blocking the canals to restore and maintain core protection zones. It further permits for the use of the shallow peat and mineral soils for agriculture and forestry for local income generation. At a landscape level one or more PHU would define the PMU that includes all the hydrological features from river to river, coast to coast or under the right conditions between any other landscape features, usually with a peat dome at the centre supplying the surrounding areas with water.

The peatland zoning including the land-use options should be based on a thorough PHU inventory and recent mapping. Based on the data and deduced information, peatland conservation and development zones can be defined. For each zone further specific conservation, protection and development targets can be set such as re-wetting and re-vegetation, fire management and prevention as well as peatland use for income generating livelihood options (Table 3.)

Table 3. Key Elements of Integrated Peatland Management

Key Element	Requirement/Need
5.1.1. Peatland Hydrological Unit (PHU) inventory and mapping	Inventory, mapping and assessing the PHU to define peatland management units for conservation and developments zoning with respective conservation & management targets.
5.1.2 Re-wetting and re-vegetation of peatland	Climate stabilization, water regulation, disaster risk reduction such as fire calamities and flooding.
5.1.3 Suitable peatland use options to improve livelihoods	Food security and income generation
5.1.4 Conservation and protection of peatlands	To protect carbons sink functions, endangered species, natural resources and maintain water regulation function in a warming climate.
5.1.5 Integrated peat fire management and prevention	Reduce fire hazards and smoke haze pollution to lessen ecological, economic and health damage.
5.1.6 Addressing Climate change	Adapting to a changing climate while enabling carbon sequestration on peatlands

In the following, the key elements of IPM are briefly described:

5.1.1. Peatland Hydrological Unit (PHU)

The PHU is connected by water, resulting in actions taken on one part of a peatland inevitably affects other parts. This is best seen in the effect of drainage for agriculture on part of a hydrological unit resulting in unintentional drainage of conserved forests in other parts of the same or adjacent hydrological unit.

For the sustainable management of peatlands and the respective zoning for the protection, restoration and development, an inventory of the (hydro-) geological and biophysical data of the PHU must take

place. This can be done by remote sensing technique and ground truthing data. Peatland maps are often 3-dimensional and serve as a basis to calculate water-mass, hydrology and carbon content as well as to define conservation and management zones. While this has been done for some PHUs, it needs to be the basis of development of all local and regional peatland management – information needs to be gathered for each unit.

In addition, for successful and sustainable peatland management, the governance of peatlands integrating environmental, social, economic aspects needs to be defined. Such Peatland management units (PMU) may be defined and set at the landscape management level with one or more adjacent PHUs, which are connected and interact with other non-peatland land uses. PMUs shall provide for the organisational partnerships and arrangements even across jurisdictional and landscape boundaries to cater for the social and economic requirements for sustainable peatland managements amongst various stakeholders.

Peatland inventory and mapping is the basis to develop a PMU plan and needs to be based on national and regional guidelines that would allow management, integration and sharing among the ASEAN member states.

5.1.2. Rehabilitation and Restoration of Peatland

To restore degraded peatlands and their water regime, the artificial drainage must be stopped. There are presently two main methods: One, constructing dams using various materials, such as cement and timber, that allows for small boat access to the interior. Another method uses permanent blocks consisting only of compacted peat in a manner that prevents canal access to the interior. The former is costlier, requires maintenance, allows (reduced) drainage but takes social aspects into consideration. The latter is far cheaper, stops drainage but effectively also prevents access, hence is less community friendly. There are several variations around these two main methods.

Following the stopping of drainage, re-vegetation can take place – either by attempting to restore the ecosystem by supporting natural re-vegetation or rehabilitating severely degraded areas by planting appropriate tree species. This may include wet-land agroforestry and silviculture systems or the development of paludiculture systems – the cultivation of economically beneficial peat adapted species on rehabilitated peat (Tan et al., 2020). At least 512 native peatland species exist that have economic potential, including 81 species with a major economic use and 379 with use as non-timber forest products (Giesen, W., 2021). This represents viable potential for economic development that could be environmentally sound and is fire resistant. This second step, however, is still in its infancy and further research is required to find the most efficient methods and species benefitting both biodiversity and local communities.

“Restoration” is reached when vegetation cover is sufficiently mature so that total ecosystem carbon sequestration is higher than its carbon release (CO_2 and CH_4).

5.1.3. Peatland Use to Improve Livelihoods

There are no exact figures for the number of people (indigenous and local) who live on, near or are dependent on peatlands, but a conservative estimate is several millions. Many are farmers living in poverty and their methods of farming are often not suitable for the environment they live in – based on

drainage, fire and dry-land crops which results in carbon loss and eventual loss of peat soils and water management problems.

According to studies by CIFOR, economically viable and environmentally sustainable livelihood options and alternatives for smallholders in peatlands are limited, underdeveloped, and urgently need to be enabled and expanded. (Hergoualc'h, et.al. 2018). They further state that integrated fire management interventions will struggle to achieve their objective of fire-free futures, unless appropriate mixes of sanctions and incentives can be identified to successfully engage diverse stakeholders, including smallholders, agri-business, small- and medium-sized enterprises, and absentee investors. Additional problems faced by local communities are conflicts of land tenure (tenure security), lack of capital for agriculture development and market access for the products they produce.

There is a need to transform the way peatlands are utilized to sustainable peatland management (SPLM) practices and business models, involving reversing drainage and utilizing NTFPs or crops that are adapted to wet conditions. Such practises would need to be included in IPM unit plans, involving economically valuable wet-land species along with non-drainage based wet-land cropping systems. These systems could include NTFPs and fish-pond development in selected areas. At a PMU landscape level, a patchwork of SPLM practices would not only mitigate the negative environmental impact of fires, but also support sustainable community livelihoods and economic development.

Community based SPLM practices need to be underpinned by the appropriate land use policies and economic incentives as well as multistakeholder processes. Exploring areas of shared concern among various stakeholders will provide an entry point for dialogue, action, and policy change towards a SPLM system supporting sustainable (small-scale) aqua, agri- and silviculture as well as agroforestry and conservation on peatlands.

5.1.4. Conservation and Protection of Peatlands

Based on the inventory and mapping of the ASEAN peatlands, the conservation and protection of still intact and pristine peatlands within ASEAN has a very high priority. Intact peatlands not only provide water security and other ecological benefits, ranging from new crops and medicines, timber and other natural products to climate stabilization. Emissions from intact peatland are even during extreme drought situations twice as less than disturbed peatlands (Deshmukh et al. 2021). In addition, intact tropical peatlands are less fire prone due to the high-water level than disturbed areas.

Furthermore, pristine peatlands overlap with biodiversity hotspots, and are often a remaining refuge area for the threatened species of the diminishing ASEAN lowland dipterocarp forests. The lowland forests of ASEAN have been converted to agriculture, and peatland forests comprises most of the remaining forests. Protection and preserving peatlands mean preserving unique biodiversity hotspots while simultaneously maintaining their carbon storage and sequestering functions. Pristine forests, especially peatland forests, sequester carbon more efficiently than secondary forests or plantations, which is an important aspect when considering climate change and carbon market potential.

5.1.5. Integrated Peatland Fire Management and Prevention

Re-wetting and rehabilitating peatlands will significantly reduce the fire risk in peatlands. Therefore, past and current government actions have focused on biophysical and technological prevention

measures such as canal blocking (water table management) and early warning systems (Fire Danger and satellite-based fire detection). Such fire management measures are undoubtedly important to address the fire risk in peatlands. However, one of the major underlying fire causes in ASEAN is poverty and the attempt by local people to improve their livelihoods with agriculture practices that often include fire as it is still the most economically short-term viable instrument for land management.

Integrated peatland fire management is not only a technical aspect of fighting (forest) fires, but a socio-economic, cultural and political land management challenge. It requires an effective network of partners, agreements and co-operation strategies to achieve the balance between socio-economic development, environmental (peat forest) protection and conservation. Technology transfer and training in technical fire management is only one aspect to face the fire problem.

Successful fire management is a cross-sectoral issue, where it is important to involve the concerned land management agencies, private sector and local communities for the implementation of the necessary technical, logistical, operational and social programmes striving to balance between developing, using and conserving natural resources and managing unwanted fires. Integrated Fire Management (IFM) involves the coordination of actors and stakeholders in the implementation of the fire management key principles. These are:

- Prevention (Risk Reduction)*
- Preparedness (Readiness) *
- Suppression (Response) *
- Restoration (Recovery) *
- Research & Analysis
- Data & Information production & dissemination
- Interagency cooperation, planning and budgeting of key stakeholders based on clear functions and role.

Note: Where * indicates Key elements while the remaining are supporting elements

The emphasis in fire prevention lies besides technical measures of re-wetting and rehabilitation of fire prone areas, on addressing the underlying causes of fires. Providing economic models and incentives for local farmers for SPLM without burning, need to be scaled up. In order to be competitive and take advantage of the new opportunities that are arising, farmers increasingly must adapt their farm business to market changes and improve efficiency, profitability and income. Supporting local farmers in better land management practises on peatland for sustainable livelihood options is key to fire prevention and to mitigate the smoke haze problem in the region.

For IPM and IFM to be successful, the involvement and participation of local communities in SPLM and respective fire prevention and control planning is crucial. The involvement includes the consideration of rural socio-economic conditions and the necessary enabling policy, legislation, and regulatory framework at the respective national and administrative levels.

5.1.6. Climate Change

Addressing climate change issues is a critical part of IPM. Peatlands are the most important ecosystem in the terrestrial biosphere for storage of carbon and regulation of climate change. Globally peatlands cover 3% of the land surface but store about 25% of the soil carbon. In ASEAN, peatlands are one of the most important carbon stores – storing up to 10 times more carbon per ha than adjacent forests on mineral soil. Peatlands are also vulnerable to climate change – with increasing temperatures and more extreme droughts – Peatlands will be more vulnerable to degradation and fires.

An IPM strategy must look at how to maintain and enhance peatland carbon stores through rewetting and rehabilitation as well as supporting measures to help the peatlands as well as local communities to adapt to climate change with enhanced resilience.

Climate change impacts on peatlands in ASEAN in the past, present, and future are not well known. The main premise of peatland resilience to climate change depends on whether they can maintain or accumulate carbon or whether they will lose their carbon over time (neutral/positive vs negative carbon balance) (Ribeiro et al., 2021).

5.2. Supporting and Cross-cutting Elements

The key elements of successful IPM are interlinked and underpinned by sound research, awareness and capacity development with support from sound policies and legal tools. Applied research results must be rendered and prepared into usable information for different stakeholders at various levels e.g. for awareness raising of the importance of the peatlands for climate stabilization at local and international scale, to improve conservation efforts or, for development and implementation of wet-agriculture practices and respective training methodologies. (See also Table 4).

Furthermore, as IPM is a multi-stakeholder effort it requires concerted efforts at horizontal and vertical stages of all levels of society and government institutions. Stakeholder mapping, analysis and process facilitation at various levels, to improve inter-alia on community participation and cooperation for peatland management and to resolve conflicts (if any) over resources and interests, is essential.

Table 4. Supporting and cross-cutting elements of IPM

Supporting and Cross-cutting Elements	Requirement/Need
5.2.1 Research	Research on the impact and consequences of climate change, wet agriculture practice, water table management, as well as methodologies of peatland inventory and mapping support PMU establishment for improved management and climate change mitigation. Management becomes data driven.
5.2.2. Supporting national policies and legislation	Stakeholder and community participation and cooperation is essential to promote conservation, reduce conflicts over resources and increase ownership and responsibilities on SPLM.

Supporting and Cross-cutting Elements	Requirement/Need
5.2.3 Information Sharing, Awareness and Capacity Development	Research results are rendered into information about the importance of peatland ecosystems for food security, water storage and climate stabilization - to develop awareness and capacities on sustainability at all stakeholder levels. Information is made readily available.
5.2.4 Sustainable funding mechanisms	Local, national, regional and international funding mechanisms are identified and developed into a sustainable funding mechanism specific to sustainable peatland management.
5.2.5 Monitoring and Evaluation of peatland management	Are the various elements addressed and how are they integrated with each other? Using the appropriate tools to monitor integration and approach.

5.2.1. Research

Strides have been made by AMS in the last decade in terms of understanding peatlands and peatland management, especially with regards to fire and haze, peatlands. However, peatland forests are still one of the least studied and understood complex ecosystems with highly interconnected biological and (hydro-)geological processes. *Omar et al., 2022* found that available (hydro-)geological data from the Southeast Asian peatlands is still incomplete and non-comparable to each other because each study has a different focus. Details, such as the type of peat-forming plants, age of peat, peat thickness, substrate type and the pH value are not sufficiently reported within the ASEAN region, while other important geological data, such as the ash yield and the carbon content of peat are even less investigated. However, a basic data set is required to understand the evolution of a peatland, their adaption to climate fluctuations and to develop a Sustainable Peatland management plan.

Rapid peatland transformation of the past forty years has had varying impacts across ASEAN resulting in a negative carbon balance as peatland is lost. These changes have altered the ecosystem function of many peatlands with associated environmental impacts (Murdiyarso et al., 2010). It has thus far not been possible to separate the environmental impacts of land use change and climate change on the ecosystem function of intact as well as disturbed peatlands (Ribero et al., 2021). While our understanding of climate change impacts is limited, rising sea levels, subsiding peatlands, and the loss of carbon will result in the loss of land surface due to flooding some low-lying coastal areas and peatlands adjacent to rivers (Saputra, 2019; Anshari et al., 2021).

Despite a limited understanding of climate change impacts on tropical peatlands, due to the difficulty of separating impacts due to land use from climate change, what is known is that ecologically functioning peatlands play a large role in regional and local climates (Dommain et al., 2018; Deshmuk et al., 2021). The current negative effect of land use change and disturbance on this ecosystem function are well known (Hiraishi et al., 2014; Krisnawati et al., 2021). Of particular concern for the agricultural sector is how long current agriculture practices on peatlands can continue before the environment is no longer suitable, or whether this may occur faster due to climate change (Wijedasa et al., 2016; Evans et al. 2019; Osaki et al., 2021).

Climate change has meant that the intervals between El-Niño occurrences has shortened and is predicted to shorten further (Li et al., 2013; Hu et al., 2017). How this will affect peatlands in the future is poorly studied and unknown (Riberio et al., 2021).

For ASEAN wide national peatland inventories, a set of standards or guidelines for data collection (what is collected, how is it collected, analysis tools used, etc.) should be developed. Like the REDD Sourcebook, a sourcebook of methods and procedures for mapping, monitoring and measuring and reporting on peatlands, would allow easy integration and comparison of information within and between AMS.

5.2.2. Supporting Policies and Legislation

Policies need to be in place that promotes management and development of peatland that is not based on drainage. National policies that may be in conflict need to be identified and resolved.

Actors involved in the use, management and restoration of peatlands are comprising inter-alia of local communities, private companies, middle range investors, government, research institutions and NGOs. Those actors have often detrimental interests and perceptions resulting in conflicts about how peatlands should be managed for their respective benefits. There is a need for better accounting for complex governance arrangements and diverse stakeholder perceptions and move away from oversimplification of actor behaviors and their involvement in complex environmental issues.

In complex multi-level governance arrangements, there is an increased awareness that stakeholder cooperation is best designed based on a thorough stakeholder mapping exercise (Carmenta et al., 2017) and to generate agreements and inform communications to lever behavioural change (Achyar et al., 2015), as well as to learn from and up-scale lessons. Areas of common interest need to be defined providing entry points for stakeholder dialogues and participation processes. Improved understanding of stakeholder perceptions has potential to: give voice to marginalized communities; enable transparent mediation of diverse priorities; inform public education campaigns, and shape future policy and governance arrangements (Carmenta et al., 2017). A mix of targeted policy measures, stakeholder engagement and platforms for dialogue between diverse groups will be essential in designing and implementing a sound, high performing, IPM approach.

5.2.3. Information Sharing, Awareness and Capacity Development

The International Tropical Peatland Center (ITPC) with its interim Secretariat based in Jakarta was established in 2018 and is supported by several international organisations, such as CIFOR, GPI, UN Environment Programme and the UN FAO. ITPC plays a significant role in promoting conservation and sustainable management of tropical peatland (<https://www.tropicalpeatlands.org/about-us/>).

Furthermore, ITPC works towards enabling inter-disciplinary research, knowledge exchange capacity development, and enhanced cooperation among stakeholders to achieve effective conservation, restoration, and sustainable management of peatlands in ASEAN and worldwide. As an operational tool, ITPC has launched a peatland knowledge portal, which serves as an access point for finding and sharing information on tropical peatlands, in the service of knowledge exchange, capacity building, awareness-raising, new knowledge creation, and as media for a community of practice. ITPC provides support to an existing ASEAN institution - ACC THPC, which also has a haze portal.

Meanwhile such platforms are an excellent basis for information and knowledge exchange, as well as to help disseminate best management practise, there is a need for applying this knowledge not only to support the necessary set up of agreements at international, regional and national level. For example, in Indonesia main drivers of successful peatland restoration were found to be the awareness by local communities, followed by community engagement and technology and practices applied. Hence, the challenges ahead are applying existing information and knowledge in the AMS for their individual solutions on sustainable peatland management and restoration at community and other stakeholder levels. In addition, there is need to scale up this sustainable solution and build the necessary awareness and capacity training programme of the various elements and processes of successful IPM.

5.2.4. Sustainable Financing Mechanisms

One of the outcomes of the 2021 UNFCCC COP26 was reiterating the urgency of managing carbon and financial opportunities to store and sequester carbon - the peatland forests in ASEAN have huge potential to tap into this market which includes carbon credits and restoration licences. Establishing partnerships with private companies for carbon offsets have attracted funding in some ASEAN countries to mobilize the flow of private capital into climate change mitigation measures by protecting peatlands through ecosystem restoration and conservation (Verra, 2021).

Other funding opportunities include bilateral and multilateral support. For example, the implementing agencies of Global Environment Facility (GEF) and Global Climate Fund (GCF) such as the International Fund for Agricultural Development (IFAD) has been supporting ASEAN and some AMS in peatland related activities since 2009 through a series of linked projects and initiatives, including on topics of climate and environment, land, and institutions and organisations (IFAD, 2021).

Financing mechanisms to conserve, restore and use the most important nature-based solution to mitigate and adapt to climate change, must not only come from international funding schemes, but must be incorporated into national finance mechanisms as well as the financing mechanism of the NAPPs and NDCs of the AMS. The ASEAN Investment Framework for Haze-Free, Sustainable Land Management³, is established specifically to provide long-term and sustaining support for the implementation of the APMS as well as the ASEAN Haze-Free Roadmap⁴.

There are other initiatives – for example, the \$8.5 billion Climate Investment Fund (CIF), established in 2008, representing one of the most ambitious efforts to allow business investments in climate change opportunities, ranging from nature conservation/management to technology-based solutions. The CIF has managed to ensure \$61 billion in co-financing (both private sector and government) while simultaneously ensuring the sustainable management of more than 45 million hectares of forest in the process.⁵ Although CIF has yet to invest in peatlands in ASEAN, the scope and potential to tap into this investment fund is vast. Other significant funding opportunities include the GEF and GCF as well as and private sector partnerships (often linked to ESG requirements).

3 Development has been supported by the regional programme, IFAD-funded Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia (MAHFSA).

4 Draft document for the ASEAN Investment Framework for Haze-free Sustainable Land Management, ASEAN Secretariat, July 2023.

5 <https://climateinvestmentfunds.org/about-cif>.

5.2.5. Monitoring and evaluation of IPM

To structure the ASEAN approach for IPM, the current APMS segregates features and elements into principle FAs to better focus on achievable goals while recognising there are elements that either reach into or are supporting other areas.

In integrated management, it is important to monitor if all the elements in the FAs are addressed. To this end, each FA can be monitored and verifiable indicators are presented in the Action Plan (Chapter 7).

5.3. Combining Features and Elements into Principle Focal Areas

The elements and supporting cross-cutting issues of IPM are interrelated and connected with each other. To structure the ASEAN approach for IPM, the current APMS segregates features and elements into principle FAs to better focus on achievable goals while recognising there are elements that either reach into or are supporting other areas.

6 Focal Areas of Actions and Recommendations

6.1. Focal Area 1: Inventory, Mapping and Assessment

An important step to sustainably manage peatland is a comprehensive peatland inventory. The Final review of the previous APMS has reported progress of 70% across AMS on national peatland inventories. However, land use patterns and stakeholder involvement on peatlands in ASEAN have changed since the first APMS in 2006 with vast areas now under agriculture and plantation development.

The first objective of this FA is the continuation of peatland inventory and assessment, while also integrating the dimension of mapping in order to develop PMU plans. Mapping is thus the first step in development of IPM including all stakeholders based on individual PHUs.

To manage the water table of peatlands, the landscape level PHUs need to be defined and mapped along with the associated land use of communities and the private sector (Gunawan et al., 2021). Based on these maps, peatland can be defined and zoned in ways that include forest and landscape restoration (Guariguata et al. 2020). The zoning shall provide for core conservation & protection zones as well as development zones with respective conservation, management and rehabilitation targets. A reference can either be found under *Applegate et al. 2022*, or follows the zoning concept of the UNESCO Biosphere Reserves.

1. Peatlands and the PHU are mapped to:
 - define peatland zones such as core conservation and protection zone as well as development zones and set biodiversity conservation & hydrological management targets.
 - create the baseline for GHG estimates and carbon accounting.
2. Map land-use change within PHU and in surrounding landscape to include changes that might affect the PHU over time.
3. Define a peatland zoning concept that includes core protection and development zones with clear conservation & management targets, including determination of peat dome when present and peat degradation status.
4. Once mapped, conversion and degradation of any part of pristine peatlands is prevented to avoid further negative impacts on the eco-hydrological character of the entire peatland.

6.2. Focal Area 2: Restoration and Rehabilitation

To protect intact peatlands (i.e., ecologically intact and where ecosystem function remains similar or close to an undisturbed or pristine peatland) and restore degraded areas, a policy framework and strategy specifying such actions are important.

In recent decades much of the original peatland has been affected by development – much has been drained and converted to various forms of agriculture and some has been affected by fires. This has had various negative consequences affecting both health, climate change, biodiversity and sustainable socio-economic development. Climate change is increasing in its importance and peatlands are widely recognised as vital ecosystems for sequestering carbon. There is now wide agreement in ASEAN that this trend must be reversed, and degraded peatland rehabilitated and restored.

Significant progress has been made in developing methods for rewetting and re-vegetating peatlands in ASEAN, especially in the southern ASEAN countries. This involves canal-blocking (re-wetting the peat) and frequently, re-vegetating the area(s) in question. Such efforts should be scaled up, so that remaining degraded and drained peatlands are re-wetted through canal blocking. Re-wetted peatland can be utilized for wetland agriculture, restored by planting native plants or other adapted cultivation plants with economic value e.g., in agroforestry schemes.

Peatland conservation, restoration and rehabilitation requires that:

1. Legal frameworks that support strict conservation of remaining pristine peatlands are developed and approved by Member States.
2. Conversion and degradation of any part of intact peatlands is stopped, to avoid further negative impact on the eco-hydrological and climate stabilisation character of the entire peatland or PHU.
3. Degraded peatlands are restored, and non-drainage-based agriculture systems are being applied on all peatlands already in use for agriculture.

6.3. Focal Area 3: Community Livelihoods

There is an urgent need for the development and wide-spread use of environmentally friendly agricultural technologies across sectors that are suitable for peatlands and also to support capacity building in peatland agriculture, such as paludiculture. There is also a need for collaborative studies on the socio-political and economical aspects that have an impact on conservation of peatland biodiversity. Sustainable peatland management is key to saving peat and at the same time developing or maintaining community livelihoods. The interests of preserving the environment with the interests of the national economy and people's lives must be harmonised. It must be recognised that people who live on or are otherwise dependent on peatlands, such as forestry and plantation workers and/or owners, are important actors and key stakeholders in any management model.

Today, local farmers on peatlands have only limited options to intensify existing patterns of production and diversify their farm enterprises to improve their livelihoods and must increasingly adapt their farm

businesses to market changes and land suitability to improve efficiency, profitability and income – without degrading the environment. Awareness raising and capacity building/training on wet-agriculture techniques and appropriate species is paramount to improving livelihoods on peatland without causing further degradation and fire hazards.

Sustainable management of peatlands will require that:

1. Policies need to be in place that specifically address and support alternatives to local community livelihoods and socio-economic development in peatlands that is drainage-free as opposed to business as usual, using canals and fire.
2. Land tenure conflicts should be resolved based on public and community participation and collaboration processes.
3. Wide-spread introduction of appropriate drainage-free agriculture for peatlands replaces existing agriculture requiring drainage.
4. Stakeholder engagement (at all levels such as government, NGO, community and private sector) is sufficiently addressed in peatlands and needs to be strengthened as the basis for sustainable peat management.

6.4. Focal Area 4: Peatland Biodiversity and Ecosystem Conservation

The high levels of endemism coupled with high rates of land use conversion poses an extinction threat to peatland biodiversity in ASEAN. However, despite the threats, peatland biodiversity across ASEAN remains poorly studied and only a fraction of species had their IUCN conservation status assessed (Posa et al., 2011). Even when done, these assessments are not based on the ecology of these species, which is mostly not known, or to what extent these species will be affected by climate change. Besides endemic species of peat swamps and forest, with most lowland forest converted to agriculture, peatlands are a refuge for several flagship, rare and endangered species, such as orangutans, tigers, birds and fish.

As of 2011, only 9% of ASEAN peatlands were in protected areas (Posa et al., 2011). While there has been a rise in the number and extent of protected areas across ASEAN, including in previously poorly studied areas in the Northern region, this has not been extended to added protection of rare and threatened species outside of protected areas. A significant amount of peatland biodiversity is currently found outside of protected areas and within other land uses such as plantations and small-holder landscapes. Insufficient management or protection of these areas is calling for better conservation measures, including restoration. The proximity of this high biodiversity areas to human populations does pose a health risk due to the potential to be a reservoir for diseases. A similar situation occurred with the first reported case of Ebola in 1976 from a peatland (Harrison et al. 2020).

Biodiversity conservation in ASEAN needs to be based on data driven management and monitoring of species populations and habitat monitoring of ecosystems to ensure viable populations of species are maintained. Data driven management should be based on species level IUCN conservation assessments that get refined as more data is collected and monitored. Starting from a basic assessment based on distribution and remote sensing of forests, which is then updated based on habitat/ecology

and finally incorporating threats due to current and future climate change. Together this data forms part of a comprehensive peatland inventory of biodiversity and how it is related to changes in ecosystem function.

The above IUCN assessments should contribute to the development of biodiversity management plans that ensure biodiversity conservation both inside protected areas, which should be expanded to meet the Convention on Biological Diversity (CBD) targets, and through other effective area-based conservation measures (OECMs⁶) for areas outside of protected areas. The ecosystem management plans should include engagement with all relevant stakeholders such as communities, private companies and non-government organisations. While ecosystem management should be monitored regularly for species and habitats at the PHU, national and regional levels.

Peatland biodiversity conservation should:

1. Protect and monitor Rare, Threatened and Endangered (RTE) peatland species. Monitoring should be through data that drive habitat management.
2. Species specific and/or habitat-based management plans for key species are designed and implemented across ASEAN.
3. 30% of peatland ecosystems in ASEAN included in protected areas and OECMs by 2030 to meet the GBF targets.

6.5. Focal Area 5: Fire Prevention, Control and Monitoring

ASEAN has recently been updating a comprehensive guideline on Peatland Fire Management. The guideline covers the main elements of IFM such as prevention, preparedness, response and recovery and related actions to be implemented. It furthermore states the importance of planning and coordination amongst stakeholders, coupled with a community-based fire management approach for greater effectiveness at landscape level. Information and knowledge sharing as well as public communications and training are cross cutting all the elements.

Fire prevention efforts need to be strengthened at various angles and level. To prevent long-lasting unwanted fires on degraded and drained peatland, controlling land-use and drainage of peatlands is the most effective way to reduce fire occurrence and associated haze and emissions. Peatlands that are under development and land-use which requires drainage, should restore a water table depth of at least 50cm, or higher based on regionally collected and monitored data, below the surface as best management practise. A zero-burning policy on peatland must be adopted for all land management purposes and stakeholders. Peatland uses should eventually maintain water tables as similar as possible to intact peat swamp forest ecosystems.

The successful implementation of alternatives to the use of fire and drainage for farming and income generation is at the heart of a peatland fire prevention and management strategy. Sustainable land management practices based on non-drainage-agriculture and silviculture as well as agroforestry

6 See for example, <https://www.worldwildlife.org/stories/oecms-a-new-paradigm-for-area-based-conservation>

are considered key elements of successful IFM. Private sector, governments and local community partners need to collaborate as partners in such sustainable land management-based fire prevention programmes. Thus, active stakeholder participation and cooperation has been identified as an important factor as well for effective fire prevention on peatlands.

Despite numerous freely available sources of fire information such as active fire detection, burned area maps, fire danger rating based on spatially improved satellite sensors and weather models, there is apparently still a need for more tailored and ready-to-be-used information for preparedness and suppression efforts. As some AMS seem more advanced on the production and application of fire information, some others might need advanced training and capacity development in the interpretation and use of the data for informed peatland (fire) management on the ground.

For example, sub-surface fires are more frequent during droughts, hence the current ASEAN Specialised Meteorological Centre (ASMC) fire and Fire Danger Rating Systems (FDRS) as well as forecast systems of up-coming drought situations needs to be coupled with precise land and water table management information which feeds back into management of peatlands on the ground. Additionally, such information will assist to map fire prone areas with varies degrees if further combined with ancillary data such as burned area information.

It is important for countries to systematically map burned areas and integrate the results as part of national fire information. Understanding the burned areas and vegetation types is critical information needed each year to assess the effectiveness of fire management measures and identify areas that may require additional investment. However, few studies, present and use clearly described methodologies for estimating burned area. In addition, not all AMS countries publish burned area data on a regular basis. Furthermore, it is difficult to make consistent and meaningful comparisons among burned area estimates across AMS. The ASEAN Secretariat through MAHFSA has initiated a process in March 2023 to develop a guideline on burned area mapping and estimation that incorporates best practices from the international fire community and is applicable to AMS of varying capacities and resources.

Village (fire) organisations form the heart of any community-based fire and natural management approaches and has rightfully been pointed out by the participants of the questionnaire as important stakeholders besides the private sector. Both can play a vital role in forming fire free alliances as well as education and awareness programmes on peatland and fire management at local and landscape level.

In summary peatland fire management in ASEAN should focus on:

1. Fire prevention. Preventing the further conversion and drainage of peatland through stopping and reversing peatland drainage, water table management and zero-burn policies for stakeholders on peatlands.
2. Further capacity development in the ASEAN regions on the production, use and interpretation of fire information, inter-alia active fire, burned area, fire danger, fire risk areas and parameters.
3. Research and development of community-based wetland agriculture (e.g., paludiculture) for fire free income generation.
4. Development of awareness building programme(s) for all stakeholders on the elements of community fire management approaches and the importance of intact peatlands in preventing fires.

6.6. Focal Area 6: Peatland and Climate Change

Peatlands are ASEANs largest carbon sink, and emission reductions through peatland management is a key part of AMS emission reductions declared under NDCs under the UNFCCC to achieve Net Zero Emission by 2050 in relation to the Paris Agreement. However, climate change may affect whether AMS are able to achieve UNFCCC commitments of carbon neutrality. Temperature, rainfall volume and frequency across ASEAN have changed over time, with the twenty hottest years on record being between 1998 and 2021. These changes have interacted with geographical differences across ASEAN resulting in peatlands in different regions experiencing drought while others have had excessive rainfall and storm damage. Future climate change scenarios, while not conclusive, project further changes in climate with potentially significant effects on peatlands in ASEAN.

Achieving Net Zero Emission will require regional monitoring of climate change impacts on peatlands and different peatlands uses across ASEAN, that feed directly into on the ground management plans. The data from these studies need to feed into adaptation and mitigation plans for peatlands at a local, national and regional levels. Such plans also need to take into account that our current understanding of peatland ecosystem function and restoration is limited. For instance, whether peatland carbon balance could ever return to a net positive situation of carbon accumulation is not known with any certainty. This data driven monitoring should feed into adaptation and mitigation actions to achieve the UNFCCC goal of carbon neutrality by 2050.

Requirements for sustainably managing ASEAN peatlands in lieu of climate change include:

1. Management of peatland ecosystems managed based on PHU level carbon balance in relation to land use change and changing environmental conditions. This will be supported by data on peatland ecosystem function which informs management actions.
2. Enhance resilience and adaptation of peatland ecosystems and related communities to climate change through monitoring and sustainable peatland management.
3. Peatland GHG emissions reduced to enable carbon neutrality by 2050.

6.7. Focal Area 7: Integrated Peatland Management

Sustainable and integrated management of peatlands requires multi-sector engagement and coordination where delineation of responsibilities and authority are sometimes not clear. Peatlands need to be managed on the basis of peatland ecological or hydrological units to ensure maintenance of ecosystem services and functions.

IPM needs to be based on a holistic planning process involving many sectors, including land and water management, forestry and agriculture, local community development, biodiversity conservation and research. All relevant sectors and stakeholders must be appropriately engaged for peatland management to be integrated and sustainable. Holistic planning should be based on the evaluation on decision-making processes and be compared to what is happening on the ground.

In order for peatland management to be managed in a truly integrated manner the following needs to be in place:

1. Management on the basis of PHU or landscapes to ensure ecological viability.
2. Water management is the most important element of peatland management and so different uses, and water regimes need to be harmonised across a landscape to prevent conflicts in the water regimes and peatland degradation.
3. Utilisation of peatlands needs to be undertaken in such a way that does not seriously impact the hydrological and ecological integrity of the ecosystem.
4. Monitoring and encouragement of agencies, institutes and projects engaged in sustainable development/management of peatlands.
5. Evaluating methods, results, costs, failures/success, etc. to improve development and management of peatlands.
6. Collaboration between all relevant sectors and government is a necessity for the integrated management of peatlands. Considering climate change, this becomes ever more important.

6.8. Focal Area 8: National Policies and Legislation

Several studies have indicated that the existing peatland regulatory and policy measures should be reviewed and strengthened (Wetlands International, Tropenbos International, 2016; Dohong et al. 2017). This includes peatland land-use zoning and water management regulations in order to put into place a regulatory system(s) that can effectively address sustainable management issues.

While it is recognised that peatland management in ASEAN countries is complicated, it needs to be resolved comprehensively, not only at the regional/national level but also at the sub-national/provincial level (Hergoualc'h et al. 2018).

To maintain the integrity and functioning of its ecosystems and the ecosystem services they provide, innovative programmes and mechanisms based on no-drainage need to be developed and implemented. Policy and regulations need to address peatland degradation and its associated impacts.

To provide a framework for effective implementation in addressing peatland issues, increasing cooperation, improving strategic policy and regulations at both the regional and national levels are important. Prior to developing frameworks, national policies and legislation are developed based on the local context and then adapted to create regional policies which lay framework for regional cooperation. These different types of cooperation can be implemented through information exchange and sharing, research and partnerships in implementation of activities as well as in generating resources. More coherent actions at the regional level are needed, particularly to improve and narrow the knowledge-gap and advance sustainable peatland management in the region. There is a need for further coordination in the regional efforts for supporting the implementation of other related regional mechanisms.

Therefore, additional actions are needed. The policy and regulatory frameworks should capture and facilitate the integrated management and innovative programmes through cross-sectoral collaboration among related stakeholders.

National Policies and legislation actions include:

1. Develop and adopt cross-sectoral collaboration programmes among relevant stakeholders involving biodiversity, wetland agriculture, fire prevention and climate change.
2. Enhance multi-stakeholder partnerships to support peatland management.
3. Synthesis of relevant legislation, policy or regulations specifically related to peatlands, their biodiversity, hydrology, agriculture and preservation is developed to enhance coordination and ensure effective management.
4. Incorporate peatlands into national development plans which include national climate mitigation and adaptation plans. Improve and enforce regulations on biodiversity conservation and peatland protection.
5. Improve and enforce regulations on biodiversity conservation and peatland protection.
6. Improve monitoring and evaluation of the implementation of existing policy frameworks at national level.

6.9. Focal Area 9: Research

Research is a cross-cutting FA that is key to support the achievements of almost all other FAs. It is important to note that the APMS focuses on research that would contribute to improved management of peatlands. The purpose of research in this context is that it is only required when information needed for peatland management does not already exist, conditions have changed (e.g., climate change) or when inventory and monitoring data (e.g., water tables, environmental changes) needs to be analysed so as to inform and update peatland management plans and follow up actions.

There is a difference in research needs between the northern and southern ASEAN countries. The southern ASEAN states are well advanced in management actions following research and are implementing actions such as mapping, rehabilitation and fire control of peatlands, as well continuing ongoing studies. Meanwhile, the northern ASEAN states have indicated the need for more research and capacity building as their peatlands are poorly understood and require more understanding that would lead towards the development of management plans.

To support peatland management, research requirements and needs include:

1. Basic standards for measuring, monitoring, and reporting on peatlands and peatland emissions.
2. Impact and consequences of climate change on peatlands.
3. Peatland restoration practices – such as species, costs, methodologies, including long-term monitoring of tree growth and CO₂ sequestration.
4. Natural re-vegetation.
5. Development of sustainable agriculture and agroforestry business models for peatland restoration.
6. Wet agriculture not based on drainage (e.g., paludiculture) and other sustainable management practices, including economical aspects of alternative agriculture practices.

7. Economic values of intact peatland, managed peatland under various cropping systems and costs of degraded peatland.
8. Biodiversity and ecosystem function in both intact peat landscapes and degraded peatlands.
9. Research in areas that support sustainable peatland management and results more readily available (information sharing).

6.10. Focal Area 10: Information Sharing, Awareness & Capacity building

While much has already been learned regarding the understanding of the critical roles that tropical peatlands play and best practices in peatland management, it has been shown that this knowledge and skills still needs to be improved (capacity) and information more readily shared (awareness).

In order to strengthen stakeholders working on peatlands and for the sustainable development and protection of peatlands to be in line with the Sustainable Development Goals (SDGs), increasing human and technical capacity as well as the transfer of knowledge and skills, is essential. Knowledge and awareness improvement along with tangible demonstrations on the ground should be further strengthened through provision of capacity building and improved regional cooperation on sustainable peatland management. Peatland matters could also be included in university curriculum development.

There is a need for added focus on:

1. Innovative awareness campaigns, which includes improving the engagement with media, education institutions, etc. for governments, private sectors and communities concerning the dos and don'ts in peatland management – with a particular focus on water management and no-drainage/no-burn agriculture methods, biodiversity and ecosystem services.
2. Strengthening cooperation and stronger linkages amongst experts and peatland managers - with a focus on improving capacity and knowledge of both stakeholders and others.
3. Capacity building of government officials and managers in the aspects of sustainable peatland management, including hydrology, biology, climate relations, wet-land agriculture, peatland inventory, mapping, monitoring and assessment as well as the management of peatland, fire risk warning and prevention, monitoring and evaluation of peatland fire and haze occurrence, peatland rehabilitation and conservation, and best management practices for sustainable community land management, etc., should be advanced to improve management of peatlands.
4. Establishing south-north exchange programmes within ASEAN on improved peatland management.
5. Improved research and knowledge sharing among the institutions of higher learning, NGOs, development agencies and governments.

6.11. Focal Area 11: Regional Cooperation

The important roles of peatlands as natural ecosystems with high value for biodiversity conservation, climate regulation and social economic developments in Southeast Asia is well-documented. To protect such important values, AMS that have peatlands are all developing or have already developed various policies related to peatland management. These policies are developed to address different issues, including peatland degradation, agricultural techniques, the status of peatland carbon storage, climate change, best management practices and community livelihood improvement. However, data and information on those policies are still limited and scattered in related institutions, and often not available for disseminating or sharing among the AMS.

Peatlands have been a central issue regarding climate change, which is recognised by international agreements and conventions, including the UNFCCC, CBD and the Ramsar Convention on Wetlands. The Aichi Target of CBD has mentioned the need to restore degraded ecosystems, thereby contributing to climate change mitigation and adaptation while the Ramsar Convention on Wetlands has explicitly recognised the importance of peatlands for climate change and has suggested countries to minimize the degradation, as well as promote restoration, and improve management practices of peatlands. Intensive action for sustainable use of peatlands has become a global priority.

However, the lack of clear regulatory and policy measures on peatland conservation, protection and restoration, as well as inconsistent enforcement of the existing regulations on peatland conservation and protection, is considered one of the major causes of peatland deforestation and degradation in the Southeast Asian region (Koh et al., 2009). In order to improve on these policies, closer regional collaboration is needed, especially on law enforcement, regulations on biodiversity conservation and peatland protection.

Hence, activities leading to better peatland management should be improved. The development of policy and regulatory frameworks should involve multi-stakeholders and trans-boundary agreements. The application of monitoring and evaluation systems should be an integral component of the policy cycle that can be synergised at the both the regional and national levels.

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. IPM is incorporated into Regional Collaboration Plans and Agreements - which include climate mitigation targets and adaptation plans.
3. Law enforcement of regulations on biodiversity conservation and peatland protection is improved.
4. Monitoring and evaluation of the implementation of existing policy frameworks at the regional level is improved.

6.12. Focal Area 12: Sustainable Financing

There is significant movement on developing financing mechanisms for combatting haze and managing forests, in particular peat forests in the ASEAN Region – The ASEAN Investment Framework for Haze-Free, Sustainable Land Management has already been mentioned. However, it is pertinent that not only fire issues, but all aspects of peatland development and management needs sustainable funding source(s), ranging from research and education, ecosystem restoration and development of markets for alternative crops from wet-agriculture.

Private sector engagement in sustainable financing is also maturing but with insufficient advantage taken thereof. ASEAN should exploit the momentum of the COP26, the ASEAN Investment Framework initiative, the SDG and Kunming-Montreal Global Biodiversity Framework (GBF) targets and the opportunities sought by the private sector for climate and ecosystem restoration investment prospects. The opportunity to tap into and develop such mechanisms is open.

Some countries have budgets set aside specifically for peatland management, in particular addressing the haze problem, while others do not. The issues outlined in chapters 2 and 5 suggest that peatland management budgets be developed or increased as a matter of some urgency.

Sustainable financing requirements include:

1. Establishment and operation of the ASEAN Investment Framework to help generate resources for implementation of the APMS.
2. A long-term ASEAN Sustainable Peatland Development Fund or Framework is recommended be developed by 2030 targeting all aspects of sustainable management of peatlands, including research, community development, restoration and fire prevention.
3. Establishing national and regional partnerships with private companies for carbon offsets, (for peatland restoration). This has the added benefit of addressing biodiversity issues, climate change mitigation and land degradation, including haze. Carbon credits and ecosystem restoration concession licences are avenues to explore in order to attract private sector funding.
4. Establish opportunities for and attract (foreign and domestic) investments in peatland restoration. (An example of domestic investments is restoration licencing as applied by Indonesia, while approaching Climate Investment Fund (CIF) for investing in restoration programmes is an example of foreign investment).
5. Increased national budgets specific to peatlands.



7 Action Plan

Objective	Actions	Specific Targets
Focal Area 1. Inventory, Mapping and Assessment		
1.1 Peatlands in all of ASEAN are mapped based on their Peatland Hydrological Units (PHU) and management status.	1.1.1 Define peatland zoning concept that includes core protection and development zones with clear conservation & management targets, including determination of peat dome when present and peat degradation states. 1.1.2 Establish the baseline for carbon accounting and measuring carbon balance for each PHU that is integral part of wise peatland management. 1.1.3 Initiate (or finalise) mapping of peatlands in the ASEAN Region at the scale 1:50.000. Including information on use and conservation/protected areas.	• By 2025 PHU-based assessment tools have been developed and are used by all member states. • By 2025, all AMS have baseline data for carbon accounting and measuring carbon balance of peatlands. • By 2030, a Peatland conservation and management zoning concept has been developed and approved by all AMS. • By 2030, 100% of peatlands in each AMS have been mapped and delineated/demarcated based on PHU at landscape level, including land uses, associated stakeholders and level of degradation.
1.2 Management of Peatland ecosystems is based on PHU level carbon balance in relation to land use change and changing environmental conditions.	1.2.1 Review existing and improve inventory data (e.g., peatland extent, thickness, etc.) to understand PHU level ecosystem function and carbon balance prior to land use change. 1.2.2 Map land-use change within PHU and in surrounding landscape changes that might affect the PHU over time. 1.2.3 Determine environmental conditions (i.e. determine extreme weather conditions over time including temperature, droughts, rainfall patterns, flooding and sea level rise, and changes in El-Niño recurrences). 1.2.4 Conduct workshops/ seminars on land use change and environmental change/extreme weathers data for peatland management. 1.2.5 Use past and present land use and environmental information to understand and manage peatlands under existing and changing climates.	• By 2024, AMS to update NAPPs. • By 2025, AMS that are still mapping peatlands to complete mapping peatlands and determination of ecosystem function/carbon balance by 2030. • By 2027, AMS that are advanced in mapping to complete work needed to understand ecosystem function/carbon balance at PHU and National level. • By 2030, knowledge sharing between AMS through workshops/ seminars are carried out to improve ASEAN level land use change and understanding of environmental change and changes in extreme weather events.

	Results	Verifiable indicators	Notes
	- By 2030, 30% of peatlands in northern and 100% in southern ASEAN have been mapped and the boundaries are delineated based on PHU in scale of 1:50.000. - By 2035, all ASEAN peatlands mapped, and conservation and development zones defined, including determination of peat dome when present and peat degradation states - PHU level delineation of land use, stakeholders and degradation status allows conservation prioritization across all boundaries. - By 2030, montane peatlands in ASEAN mapped.	- Maps of PHU. - Annual reports. - Reports/documents of baseline data development. - Database of PHUs with carbon accounting and carbon balance. - Concept of peatland conservation & management zone.	UNESCO Biosphere Reserves provide a useful reference in zoning uses that include: I.) conservation of biodiversity and cultural diversity, II.) economic development that is socio-culturally and environmentally sustainable, III.) Logistic support, IV.) Underpinning development through research, monitoring, education and training).
	- Climate change mitigation and adaption is based on scientific data. - Carbon sequestration data of peatlands is updated and can be used for management plans and climate change related policies (e.g., for carbon trading). - ASEAN level fire and climate monitoring has already been implemented and being used in some parts of ASEAN.	- Publications. - Reports. - Online database/maps for PHU/National/ASEAN level peatland management. - Documents/reports of workshops.	This will require research to synthesize existing data and new research to develop metrics for peatland ecosystem function which can be assessed over time. There is thus an overlap with FA8.

Objective	Actions	Specific Targets
Focal Area 2. Restoration and Rehabilitation		
2.1 Legal frameworks that support strict conservation (preferably IUCN Category 1a) of remaining pristine peatlands are approved by all Member States.	2.1.1 Strengthen existing policies and regulations related to current status of pristine and/or intact peatlands and its management. 2.1.2 Enforce existing national laws/regulations on peatland conservation and management.	• By 2025, National policies and/or strategies have been identified and/or developed that specifically address intact peatland conservation and protection. • By 2025, new or/and improved law enforcement strategies are developed and implemented.
2.2 Degraded peatlands are restored, and non-drainage-based agriculture systems are being applied on all peatlands used for agriculture.	2.2.1 Drained peat is rewetted (canal blocking) in order to restore ecological and hydrological functions of peatlands. 2.2.2 Promote development of alternative non-drainage-based peatland agriculture techniques over dry-land crops. 2.2.3 PHU level target for restoration defined and included in the national target for restoration. 2.2.4 Microfinancing schemes for small holders for sustainable peatland management practises/agriculture. 2.2.5 Feasibility and Market study for wet-agriculture products undertaken.	• By 2030, 30% of degraded peatlands in ASEAN are under rehabilitation. This is to contribute towards the targets under the CBD and UNFCCC. • By 2030, demonstration plots of wetland agriculture (i.e., paludiculture) system are developed in each AMS. • By 2030, long term plans for eventual restoration of peatlands to be developed. • By 2030, all agriculture systems on peatlands are either non-drainage based or have plans for restoration. • By 2050, all peatlands are restored or under non-drainage-based agriculture. • For AMS advanced in PHU level mapping and restoration, by 2025 all nationally determined PHU level restoration to be started. • For AMS less advanced in PHU level mapping, PHU level restoration targets to be set by 2025 and restoration to begin by 2027.

	Results	Verifiable indicators	Notes
	Legal protection and enforcement of protection for conservation of pristine peatlands is strengthened across ASEAN.	• (Relevant) meeting notes leading to agreements. • Existing laws/regulations/ action plans reviewed and updated. • Laws/regulations enforced.	
	• Non-drainage-based agriculture techniques have been developed and widely applied. • Peatland hydrology is managed at the PHU level and included in PHU management plans. • Appropriate interventions are being implemented to ensure ecosystem function of the peatland is maintained.	• Annual reports/plans. • Eventual retirement and restoration included in PHU management plans.	• It is important that restoration activities of peatlands include local communities in the whole process – from planning to wet-land agriculture support. • UN Decade of Ecosystem restoration 2021-30.

Objective	Actions	Specific Targets
Focal Area 3. Community Livelihoods		
3.1 Local community livelihoods and socio-economic development in peatlands that is drainage-free are developed.	3.1.1 Developing peat management models in both Northern and Southern ASEAN. 3.1.2 Develop strategy and action plans involving multi stakeholders in peatland management (contributing to NAPPs). 3.1.3 Develop national policies (if applicable) and models for alternative sustainable livelihoods, especially in Northern AMS.	• Models of peatland management types are mapped. • By 2030 livelihoods of local communities dependent on peatland has measurably improved in each AMS. • By 2030 alternative peatland management methods, not based on drainage is widely acknowledged.
3.2 Land tenure conflicts on peatland are minimized.	3.2.1 Develop maps – including village mapping for the identification of existing or potential conflict areas and identify solutions. 3.2.2 Enhance conflict resolution.	• By 2027, Communities living on or using peat areas are mapped and mitigation of (potential) conflicts commenced if applicable. • By 2030, conflict mitigation in peat areas have been measurably reduced.
3.3 Existing agriculture on peatlands has adopted drainage-free agriculture models with no further conversion of peatland.	3.3.1 Include communities in the development of PHU level management plans. 3.3.2 Development of products, markets and financing models for drainage free agricultural products. 3.3.3 Capacity building in drainage free agriculture (e.g. paludiculture).	• By 2030, where applicable, local community organisations, NGOs, etc. have organised activities promoting sustainable management of peat areas. • By 2030 alternative peatland management methods, not based on drainage is replicated and widely used in all ASEAN countries.
3.4 Stakeholder engagement (in both government, NGO, community and private sector) is strengthened [improved].	3.4.1 Enhance stakeholders' engagement in sustainable peatland management.	• By 2030, 75% of all communities whose livelihoods depend on peat areas are fully involved in sustainable peat management. • By 2025, all ASEAN countries have developed and implement a strategy that specifically targets community involvement in PHU level sustainable peatland management

	Results	Verifiable indicators	Notes
	• By 2030, every ASEAN country has policies that support alternative livelihoods for people in peat areas. • By 2030, sustainable management policy is implemented across 30% and 100% of the total area of peat northern and southern ASEAN countries	• NAPPs • Policies that support alternative livelihoods for people in peat areas	
	• Improved peat management due to tenure security. • By 2030, local community's rights to peat management and control have been recognised in ASEAN countries.	• Maps. • Stakeholder meetings. • Document of Stakeholder agreements • State recognitions Ips Land	It is necessary to consider that conflicts continue to transform, so that continuous capacity building is needed in managing conflicts on peatlands
	• Increasing community capacity in peat areas. • Drained peatlands are re-wetted. • Alternative income opportunities for local communities are in place.	• Report of the establishment of Community Organisations. • Document/report of Increased number of wetland farm areas that are not drained.	Need to consider advances in peatland management technology.
	By 2025 Stakeholder engagement (i.e., communities, government, NGOs, and private sector) is used as the standard procedure in all peat management and/or development activities throughout ASEAN. This includes the use of FPIC where applicable.	Stakeholder meetings, Document of Village agreements/ contracts.	Taking into account international obligations, national conditions and laws, and bearing in mind that the United Nations General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples; The Rights of indigenous peoples and local communities in peatland areas is acknowledged, including obtaining Free, Prior and Informed Consent (FPIC) prior to planned activities.

Objective	Actions	Specific Targets
3.5 Community based no drainage sustainable agriculture techniques, including paludiculture, is the main agriculture method being implemented on ASEAN peatlands.	3.5.1 Conduct detailed wetland agriculture studies, both advanced and applicable in both regions of ASEAN (i.e., northern and southern Member States). 3.5.2 Promote research results and provide assistance to communities to adopt no-drainage agriculture, including paludiculture. 3.5.3 Support further studies on sustainable fire-free income generating opportunities on peatland (identification of sustainable drainage-free access methods; identification of new economically viable species; etc.)	• By 2025, each AMS has supported the establishment of community-based wetland agriculture in the peatland development zones. • By 2030, new studies on wetland agriculture (i.e., paludiculture) are implemented and published to support sustainable peatland development in AMS. • By 2025, AMS establish sufficient pilot sites, representing all peat types, to deliver data and best practises information on wetlands agriculture (i.e., paludiculture) to inform sustainable peatland management.
Focal Area 4. Peatland Biodiversity and Ecosystem Conservation		
4.1 Conservation management of peatland biodiversity is data driven and aiming for international standards across ASEAN.	4.1.1 Determine species level IUCN conservation status or national conservation status (for those AMS that do not follow IUCN guidelines). 4.1.2 Identify and include biodiversity vulnerability to land use and climate change – for species level IUCN conservation species. 4.1.3 Assess habitat level IUCN Red lists across all peatland regions, contributing to species/habitat level management plans. 4.1.4 Where management plans have not yet been developed: develop data-driven management plans for remaining intact peatlands and data-driven management plans for restoration of degraded peatlands. 4.1.5 Areas hosting Rare and threatened biodiversity outside of protected areas to either be added to protected areas or conserved under OECMs that involve all stakeholders. 4.1.6 Ensure sufficient funds are found/available to execute the management plans.	• Habitat (PHU) level peatland ecosystem function assessed to determine the potential of the habitat to currently support species populations. • Threats and interventions identified and quantified to ensure peatland ecosystem function into the long term. • Habitat level ecosystem function and identified threats incorporated into biodiversity management plans.

	Results	Verifiable indicators	Notes
	• An understanding of which wet agriculture techniques, including species and management, maintains long term ecosystem function of peatlands is achieved. • Demonstrable pilot plots that can feed into regional management plans for long-term peatland management.	• Integration of wetland agriculture into the NAPPs as a mean to reduce fire and mitigate climate change. • Publications. • Documents of MoU.	Some overlap with 5.2, FA8 and FA9.
	• By 2025, IUCN Red List assessment completed based on distribution maps, remotely sensed land change maps and government land use plans is carried out. • By 2030, species populations in peatlands are managed monitored at the PHU, AMS and regional levels based on IUCN Red List criteria. • By 2030, Species based threat assessments updated to include land use and climate change. • By 2030, detailed Red List assessment based on updating remote sensing based Red List assessment to include habitat level understanding of species populations is carried out. • By 2030, detailed study of representative sites to determine species populations within sites and threats is carried out. • By 2030, management plans that addresses threats and outlines interventions to maintain species populations are developed	• IUCN Red List assessment (for those AMS that follow IUCN guidelines) of all species is completed. • Species populations in peatlands are managed monitored at the PHU, AMS and regional levels based on IUCN Red List criteria. • IUCN Red List assessments updated with land use and climate change information. • Species managed at the PHU level. • Real time monitoring system implemented. • National/regional/PHU level conservation management plans.	• This will require understanding of species distributions and populations in the region and within swamps. • This will require species ecology and how it is affected by land use and climate change. • This assessment is to include present ecosystem function and how this has already and might further change under a changing climate. • As much of this requires research, there is an overlap with FA9.

Objective	Actions	Specific Targets
4.2 Management plans to improve conservation status of species- and/or habitat are designed and implemented across ASEAN.	4.2.1 Create guidelines management and strategies to protection of biodiversity outside of protected areas. 4.2.2. Protection and management strategies of in situ species is implemented to ensure species survival to be developed. 4.2.3. Develop a monitoring system for biodiversity within PHU and at the regional level. 4.2.4. Carry out ex-situ conservation. 4.2.5 Promote peatland Biodiversity conservation through local knowledge. 4.2.6 Increase stakeholder capacity for biodiversity conservation outside protected areas (training courses). 4.2.7 Implement networks and programmes for exchanging experiences on the protection of peatland biodiversity among ASEAN countries. 4.2.8. Adopt a community-based approach to implementing Management strategies at local level. 4.2.9 Increase community-based monitoring and patrolling approach on protected forests and peatlands.	• By 2025, in-situ protection and management strategies developed to enhance conservation status of all species or indicator species. • By 2025, forum of peatland biodiversity conservation is established to promote sharing of knowledge among AMS to achieve 2030 species specific targets listed here. • By 2027, ex-situ conservation is implemented where required in each AMS.
4.3 Halt the conversion and degradation of any part of intact peatlands, to avoid further negative impact on the eco-hydrological and climate stabilisation character of the entire peatland.	4.3.1 Identification of remaining intact peatlands. 4.3.2 Assess of past land use change and present land use plans on remaining intact peatlands to determine conservation status and threats. 4.3.3 Update land use plans to preserve intact peatlands either inside or outside of protected areas. 4.3.3 Develop conservation and management plans for all intact peatlands to ensure long-term maintenance of ecosystem function. 4.3.4 Restrict development of natural or intact peatlands outside of protected areas and set aside for protection.	• By 2025, conversion of intact/ pristine peatland forests/areas for other land use is halted. • By 2027, management plans for intact/pristine peatlands are developed. • By 2030, all intact/ pristine peatlands are managed to retain their ecosystem function. • By 2030, peatlands in ASEAN to be included in national targets to reach protected areas of 30% in line with the Global Biodiversity Framework.

	Results	Verifiable indicators	Notes
	• Viable populations of all peatland species across ASEAN by 2035. • For species under threat, sufficient genetic diversity preserved both in-situ and ex-situ by 2035. • By 2030, increased protection of Biodiversity through Multi stakeholder engagement. • Increased capacity to manage biodiversity among all stakeholders both inside and outside protected areas. • Engagement with local communities through the FPIC approach. • Strengthening legal cooperation and enforcement for the prevention of trafficking in Appendix I species within ASEAN Countries. • Mitigation of human-wildlife conflicts through capacity building. • Protection of biodiversity is measurably improved.	• In-situ and ex-situ management strategies. • Documents/reports of biodiversity conservation using local wisdom. • Documents/reports of Training, seminar, workshop, communication and advocacy. • Documents/reports of network/forum establishment. • Documents of Community engagement/based approached use.	Commitment and support of ASEAN leaders in the ASEAN Socio-Cultural Community Blueprint (ASCC) 2025 which contains related strategic steps in responding to the conservation and sustainable management of biodiversity and natural resources.
	• Preservation of intact peatland ecosystems – preserving biodiversity. • Updated land use plans that preserve intact/pristine peatlands and their ecosystem functions. • Conservation of intact peatland ecosystem contributing to climate change mitigation and adaptation. • Further negative impact on the eco-hydrological character of the entire peatland is prevented. • Fire risks is reduced.	• Publications. • Reports. • Land use plans that preserve ecosystem integrity and function. • Intact/pristine peatland management plants.	Some overlap with other FAs.

Objective	Actions	Specific Targets
4.4 Protected areas and OECMs are expanded in numbers and/or size to CBD targets.	4.4.1 Enhancement of the protection status of the remaining peatlands to conserve and ecosystem function. 4.4.2 Develop montane peatland Management strategies where applicable. 4.4.3 Develop Peatland degradation Mitigation. 4.4.4 Identify additional peatlands as protected area or protection status increased. 4.4.5 Designate additional regionally or internationally important peatlands into ASEAN Heritage Parks, Ramsar Sites, Important Bird Areas and Key Biodiversity Areas.	• Peatlands in ASEAN to be included in national targets to reach protected areas of 30%. • Peatlands to be included in AMS targets to restore 20% of degraded freshwater, marine and terrestrial ecosystems to achieve the Convention on Biological Diversity (COP 15) targets by 2030. • By 2030, a strategy of upland peatland management is developed. • By 2025, a peatland degradation mitigation plan/strategy is developed in all AMS. • By 2030, additional peatland areas are identified (if applicable) or management of existing protected peatland areas are improved to meet CBD targets
Focal Area 5. Fire Prevention, Control and Monitoring		
5.1 The ASEAN Guidelines on peatland fire management, which includes the IFM approach, is fully implemented across ASEAN.	5.1.1 Promote implementation of ASEAN Guidelines on Peatland Fire Management to all relevant stakeholders in AMS. 5.1.2 Shift focus from fire suppression towards fire prevention including PHU level water management. 5.1.3 Develop IFM curriculum based on the ASEAN Guidelines on peatland fire management to be adopted by forest and agriculture training institutions in ASEAN. 5.1.4. Cross sectoral implementation of IFM is included in NAPPs. 5.1.5 Conduct regular workshops and seminars across the Region to promote the ASEAN guidelines on peatland fire management.	• By 2025 the institutional framework to effectively implement ASEAN Guidelines on peatland fire management is established by AMS. • By 2025, all AMS have established baselines that contribute towards development and inclusion of their own national fire management strategies for their various ecosystem types and peatlands in their NAPPs.

	Results	Verifiable indicators	Notes
	• Network of protected areas that conserve all peatland biodiversity across ASEAN is established. • Designated legal status of remaining intact peatlands as local or national protected areas. • Restoration and long-term conservation of degradation peatland.	• Documents/reports on updated peatland data/information from protected areas. • Upland Peatland Management Strategies document. • Peatland degradation Mitigation document. • Document/report.	The APMS 2010-2020 Final Review, Recommendations.
	• Reduction in extent of fires in years with extreme weather events and in normal years. • Reduction of smoke-haze related health issues.	• Reports of workshops/seminars. • Document of IFM. • Document of IFM curricula.	The Guidelines were first adopted in 2016 by all AMS and are already being applied - but need to be further promoted to all levels and stakeholders and resources allocated for their full implementation. Updated version of the Guidelines was adopted by AMS in 2021.

Objective	Actions	Specific Targets
5.2 Improved environmental education among all levels of stakeholders on the importance of intact peatlands and the fire risks involved of drained peatland.	5.2.1 Establish a series of awareness and capacity building programmes on fire risks on drained peatlands for all sectors and stakeholders. 5.2.2 Establish awareness on co-benefits of the climate and water stabilisation function in a warming climate by prevention of conversion and drainage of intact peatland. 5.2.3 Zero-burn practises on peatland for large, medium enterprises and small-scale farmers is applied, either through incentives, fire free alternatives or other means (i.e., including stricter law-enforcement, penalties, etc.).	• By 2025, all AMS have developed a capacity building programme on fire reduction and management. • By 2030, zero-burn practices within peatland areas is applied.
5.3 Improved fire information and early warning system is developed and applied.	5.3.1 Further develop an advanced fire information system across ASEAN by combining, active fire, burned area, drought forecast (regional) and water table levels (local). 5.3.2 Support AMS in developing burned area mapping based on lessons learnt from Indonesia. 5.3.3 Develop training programme for burned area mapping guidelines. 5.3.4. Support training on the interpretation and application of fire information at various user levels in support of the effective IFM.	• By 2025, a burned area mapping guideline for ASEAN is developed. • By 2025 a training programmes for burned area mapping has been launched for the ASEAN region. • By 2030, existing fire information and warning system in each AMS is strengthened to enhance implementation of fire management.

	Results	Verifiable indicators	Notes
	• No further conversion and drainage of intact/pristine peatlands. • Zero-burn strategies practised on all peatlands. • Reduced haze and loss of biodiversity.	• Documents of programmes / reports. • Training courses held. • Reports of zero-burn.	Zero Burning is strictly restricted by law for peatlands in Indonesia (2004), Malaysia (2003) and Thailand and has been mandatory for RSPO certification since 2007. ASEAN Guidelines on Zero Burning were adopted in 1999 and Controlled Burning in 2003 and these have been widely promoted since 2006. However, there are challenges in the implementation of zero burning regulations especially in remote regions where enforcement agencies have little capacity.
	A (continuously) improved early warning system is in place in all AMS. resulting in better fire behavior understanding and in consequence fewer fires in the region.	• Documents /report. • Reports/Publications. • Training programme designed.	• Some overlap with FA10 (10.5) • A Peatland Fire Prediction and Early Warning System has been developed incorporating Fire Danger Rating System (FDRS) and is actively used in a large number of fire prone peatlands (https://hazeportal.asean.org/). • The ASEAN Specialised Meteorological Centre (ASMC) monitors hotspots and haze daily as well as makes short- and medium-term weather forecasts for ASEAN and disseminates information to all AMS. Tools that can combine local and regional data which can more accurately predict fire risks such as those in Indonesia that incorporate peatland water tables with fire risk are useful starting points to develop a regional system.

Objective	Actions	Specific Targets
5.4 Adaptive CBFiM Framework for fire free community programmes in ASEAN is adopted by Member States.	5.4.1 Development of framework and policy for adaptive CBFiM by AMS based on regional /international best practices examples and literature review. 5.4.2 Development of a CBFiM engagement toolbox.	• By end of 2023 review literature and lessons learned on sustainable livelihoods on peatland has been compiled in manner that it can serve as basis for the ASEAN CBFiM framework. • By 2023, best practices on fire free community and sustainable livelihoods are identified and synthesized. • By 2025 the ASEAN Guidelines on Peatland Fire Management is further developed including a CBFiM framework. • CBFiM framework adopted and promoted by all AMS by 2025 and implemented by 2030.

Focal Area 6. Peatland and Climate Change

6.1 Synthesis of data and knowledge to develop Management plans for peatland ecosystems management based on PHU level carbon balance in relation to land use change, and changing environmental conditions.	6.1.1 Review existing and gather missing data (e.g. peatland extent, thickness, etc.) to understand PHU level eco system function and carbon balance prior to land use change. 6.1.2 Map land-use change within PHU and in surrounding landscape changes that might affect the PHU over time. 6.1.3 Determine environmental conditions and extreme weather over time such as temperature, droughts, rainfall patterns, sea level rise, and changes in El-Niño recurrence. 6.1.4 Conduct workshops/ seminars on land use change and environmental change/extreme weathers data for peatland management. 6.1.5 Use past and present land use and environmental information to understand and manage peatlands under existing and changing climates.	• By 2025, AMS that are still mapping peatlands to complete mapping peatlands and determination of ecosystem and PHU function/carbon balance by 2030. • By 2027, AMS states that are advanced in mapping to complete work needed to understand ecosystem function/carbon balance at PHU and National level. • By 2030, knowledge sharing between AMS through workshops/seminars are carried out to improve ASEAN level land use change and understanding of environmental change and changes in extreme weather events.
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	Results	Verifiable indicators	Notes
	An ASEAN CBFiM framework based on the principles of adaptive management will improve community stakeholder engagement and participation in peatland fire management and sustainable livelihood development.	• Reports • Best practices from different regions are documented and compiled into framework.	The ASEAN Guidelines on peatland Fire management has been extend with an adaptive CBFiM framework and community participation toolbox for ASEAN.
	• Climate change mitigation and adaptation is based on scientific data. • Carbon sequestration data of peatlands is updated and can be used for management plans and climate change related policies (e.g., for carbon trading). • ASEAN level fire and climate monitoring has already been implemented and being used in some parts of ASEAN.	• Publications. • Reports. • Online database / maps for PHU / National/ASEAN level peatland management. • Documents / reports of workshops.	• Some overlap with FA1 and FA7. • This will require research to synthesize existing data and new research to develop metrics for peatland ecosystem function which can be assessed over time.

Objective	Actions	Specific Targets
6.2 Peatland ecosystems and communities' resilience to climate change is improved based on PHU management.	6.2.1 Adopt data driven management of PHUs based on ecosystem function, carbon balance, land use change and environmental data to adapt to climate change. 6.2.2 Assess existing and develop new interventions to mitigate PHU vulnerability to environmental extremes and climate change. 6.2.3 Updating and extending National Action Plans on Peatlands (NAPPs) to include climate change vulnerability and allow for timely interventions. 6.2.4 Develop PHU level management plans that incorporate climate change adaptation and mitigation activities.	• By 2030, PHU level ecosystem vulnerability to climate change is determined. • All NAPPs to include a fine scale PHU based vulnerability evaluation to climate change by 2027 for AMS with advanced mapping and by 2030 for AMS states still mapping peatlands. • By 2030 all NAPPs to include a basic PHU-based response plan to climate change based on remote sensing, and expert opinion.
6.3 Reduced Green House Gas Emissions from peatland to help meet the ASEAN Target of Net Zero Emission by 2050.	6.3.1 Assess current GHG emission baselines as the business-as-usual scenario to reflect emissions from peatlands and potential emissions under climate change scenarios. 6.3.2. Strengthen and expand the actions in existing NDCs to meet the emission reduction targets for AMS and to achieve the UNFCCC target of net zero emissions by 2050.	• Peatland specific emission reductions meet targets in the NDCs. • Large scale peatland rehabilitation, restoration and transformation of production practices meet the goals of the Paris Agreement implemented across all peatlands. • All AMS effectively incorporate measures to protect and rehabilitate peatlands as part of their NAPPs by 2025 and implement effective measures to address climate change vulnerability. These measures are included in the respective NDCs. • Rewetting and rehabilitation of peatland vegetation and halting of peatland fires by 2030 and restore peatlands fully by 2050 to reach the UNFCCC targets.
Focal Area 7. Integrated Peatland Management		
7.1 All agriculture, plantations and forestry on peatlands are managed in a sustainable manner	7.1.1 Develop clear guidelines and regulations to ensure sustainable management of agriculture, plantations and forestry on peat. 7.1.2 Document and promote best management practices on SPM to all peatland stakeholders and managers.	All peatlands used for production are managed in line with identified SPM criteria and regulations by 2030 especially in relation to improved water management and active fire prevention.

	Results	Verifiable indicators	Notes
	Climate change mitigation and adaptation is based on scientific data.	• Documents /report of synthesis • Documents /report of assessments • Documents /report • Documents of updated NAPPs	Some overlap with FA1 This will need to be implemented across different natural environments (i.e., different climatic areas, coastal, higher elevations, etc.) and under different scenarios of change (i.e., areas undergone land use change and areas already experiencing climate change).
	• Rewetting and restoration included in NAPPs. • Updated NAPPs with GHG reductions based on changes in national policies and NDCs.	National emissions declarations under the UNFCCC shows adequate emission reductions from peatlands to meet NDCs.	Some overlap with FA2 and FA5. The Indonesia and Malaysia target to reduce emission intensity is (GHG/\$GDP) by 40% by 2030. Correct ASEAN term is ASEAN Target of Net Zero Emission by 2050
	By 2025, all peatlands used for production are improved in line with identified SPM criteria and regulations.	• Field reports • Adjusted national policies on peatlands.	Some overlap with all FAs.

Objective	Actions	Specific Targets
7.2 Non-drainage-based agriculture techniques, including paludiculture, is the main agriculture method being implemented on ASEAN peatlands.	7.2.1 Conduct wetland agriculture studies, both advanced and applicable in both regions of ASEAN (i.e., northern and southern Member States). 7.2.2 Provide increased support to ASEAN peat and agriculture research centres on the dissemination and implementation of research results on wetland agriculture systems (i.e., paludiculture). 7.2.3 Increase support to adopting no-drainage on peatlands across all sectors. 7.2.4 Promote and support with technical assistance and funds for communities to adopt paludiculture”.	• By 2025 each AMS has supported the establishment wetland agriculture in the peatland development zones. • By 2030 sustainable wet agriculture is the only allowed form of agriculture on wetlands in ASEAN. • By 2030, new studies to support development of wetland agriculture (i.e., paludiculture) are developed, published and readily available to support wet agriculture development. • By 2025 10(ten) pilot sites are established, across ASEAN, representing all peat types, to deliver data and best practises information on wetlands agriculture (i.e., paludiculture).
7.3 Monitoring and evaluation of the implementation of sustainable peatland management at the national levels is improved.	7.3.1 Compile available and applicable monitoring and evaluation systems on peatland protection and management in AMS. 7.3.2 Develop mechanism/tools for monitoring and evaluations with clear output indicators of policy implementation involving multi-stakeholders. 7.3.3 Integrate SPM into the existing monitoring and evaluation mechanism of other relevant sectors/natural resource management.	• By 2025, Document or compilation of best monitoring and evaluation practices on peatland protection in conjunction to APMS implementation is provided. • By 2025, all AMS have at least 1 (one) comprehensive) set of or improved mechanisms for monitoring and evaluation of policy implementation related to peatland protection and APMS implementation with specific, clear output indicators.
7.4 Peatland ecosystems management is based on PHU level carbon balance in relation to land use change and changing environmental conditions.	7.4.1 Review existing and gather missing data (e.g. peatland extent, thickness, etc.) to understand PHU level ecosystem function and carbon balance prior to land use change. 7.4.2 Map land-use change within PHU and in surrounding landscape changes that might affect the PHU over time. 7.4.3 Determine environmental conditions and extreme weather over time such as temperature, droughts, rainfall patterns, sea level rise, and changes in El-Niño recurrence.	• By 2025, AMS that are still mapping peatlands to complete mapping peatlands and determination of ecosystem and PHU function/carbon balance by 2030. • By 2027, AMS states that are advanced in mapping to complete work needed to understand ecosystem function/carbon balance at the PHU and National level.

	Results	Verifiable indicators	Notes
	• An understanding of which wet agriculture techniques, including species and management, maintains long term ecosystem function of peatlands is achieved. • Demonstrable pilot plots that can feed into regional management plans for long-term peatland management.	• Integration of wetland agriculture into the NAPPs as a means to reduce fire and mitigate climate change. • Publications. • Documents of MoU.	Some overlap with FA3 and FA9.
	• Compilation of monitoring and evaluation system on peatland protection/APMS implementation in each AMS. • By 2025, a set(s) of monitoring tools and guidelines on peatland management developed and used for APMS implementation in each AMS.	Documents/reports of improved mechanisms.	• Some AMS have specific mechanisms/tools for monitoring and evaluation related to peatland management. • However, some other AMS do not have such mechanisms. Instead, monitoring and evaluation is part of other systems within natural resource managements
	• Climate change mitigation and adaptation is based on scientific data. • Carbon sequestration data of peatlands is updated and can be used for management plans and climate change related policies (e.g. for carbon trading). • ASEAN level fire and climate monitoring has already been implemented and being used in some parts of ASEAN.	• Publications. • Reports. • Online database / maps for PHU / National/ASEAN level peatland management. • Documents / reports of workshops.	Some overlaps with several FAs

Objective	Actions	Specific Targets
	7.4.4 Use past and present land use and environmental information to understand and manage peatlands under existing and changing climates and conditions. 7.4.5 Conduct cross-sectoral workshops/seminars on land use change and environmental change/extreme weathers data for improved peatland management.	• By 2030, knowledge sharing between line-departments through workshops/seminars are carried out to improve national land-use change, understanding the changing climate and its relation to SPM. • By 2030, knowledge sharing between AMS through workshops/seminars are carried out to improve ASEAN-level land use on peat-lands
7.5 Multi-stakeholder partnerships to support IPM are developed.	7.5.1 Address partnership development among stakeholders through the APMS/ NAPPs and related activities. 7.5.2 Develop partnerships at the local and national levels among key stakeholders, including government agencies, NGOs, community and private sector to implement IPM.	• By 2025, new collaborations are established or strengthened with the private sector in all AMS, including financial institutions, research centers, agriculture companies (for example, palm oil), international/donor agencies, and civil society/NGOs to implement APMS/NAPPs. • By 2030, multi-stakeholder initiatives are established addressing peatland related issue at local and country level in all AMS. • By 2050, coordination and effective management of peatlands is ensured.
7.6 IPM is incorporated into national development plans - which include national climate mitigation and adaptation plans.	7.6.1 Update and extend NAPPs to cover period to 2030 and beyond. 7.6.2 All AMS with or without NAPPs to incorporate peatlands into national development plans and policies including climate change plans. This includes provision of technical support.	• By 2025, Cambodia, Lao PDR, and Myanmar have initiated the NAPPs process (which may include request for support). • Brunei Darussalam, Indonesia, Malaysia, the Philippines, Thailand and Viet Nam to review, revise and extend their NAPPs from 2023 to 2030. • By 2025, peatlands are included/ incorporated into national policies of related issue where relevant. • By 2030, NAPPs and APMS are fully implemented.

	Results	Verifiable indicators	Notes
	• By 2023, multistakeholder forum on peatland is initiated consisting of private sector, government, civil society/NGO, and international development agency. • By 2030, peatland management is supported by different stakeholders in various type of collaborations.	• Documents/report • MoUs and other agreements	
	• By 2025 all AMS have developed (or updated) NAPPs. • By 2030, NAPPs and APMS are implemented in all AMS.	• Documents of NAPPs. • Documents of other national action plans, such as climate change action plans.	Based on the final review of APMS, policies, regulations and NAPPs have been developed in six of AMS (Brunei Darussalam, Indonesia, Malaysia, the Philippines, Thailand and Viet Nam).

Objective	Actions	Specific Targets
Focal Area 8. National Policies and Legislation		
8.1 Policies that specifically addresses and supports alternatives to local community livelihoods and socio-economic development in peatlands are developed.	8.1.1 Develop integrated peat management systems in both Northern and Southern ASEAN 8.1.2 Develop strategy and action plans involving multi stakeholders in peatland management (contributing to NAPPs). 8.1.3 Develop national policies (if applicable) and models for alternative sustainable livelihoods, especially in Northern AMS	• Models of peatland management are mapped. • By 2030 livelihoods of local communities dependent on peatland has measurably improved in each AMS. • By 2030 alternative peatland management methods, not based on drainage, is widely acknowledged.
8.2 Strengthen relevant legislation, policy or regulations specifically related to peatlands, their biodiversity, hydrology, agriculture and preservation, as required.	8.2.1 Compile current, applicable regulations, policies, laws, and other relevant documents related peatlands. 8.2.2 Take stock and organise workshop to discuss and finalize the stock report of relevant policy on peatlands. 8.2.3 If applicable, strengthen legal tools relevant to peatland management and conservation.	By 2030, each AMS has review and strengthened policies and legislations relate to peatlands as appropriate.
8.3 Legal tools and regulations of biodiversity conservation and peatland protection is improved.	8.3.1 Assess legislation related to biodiversity and protection of peatlands in particular and develop additional legislation if existing laws are inadequate for conservation. 8.3.2 Develop strategy and action plans involving multi stakeholders in conducting law enforcement. 8.3.3 Increase in the number of operations / campaigns to address infringement on national laws and regulations, especially on biodiversity and peatlands.	• By 2025, all AMS have developed at least 2 (two) strategies/action plans on multi-stakeholder coordination and operation mechanism in conducting law enforcement on peatland ecosystem/ protected forests • By 2025 all AMS have assessed existing regulations on peatland conservation and taken steps to address weaknesses in the law(s).

	Results	Verifiable indicators	Notes
	• By 2030, every ASEAN country has policies that support alternative livelihoods for people in peat areas. • Sustainable, integrated management is implemented across 30% by 2030 and 100% by 2050 of the total area of peat in both Northern and Southern ASEAN.	NAPPs. Policies that support alternative livelihoods for people in peat areas.	Some overlap with FA7.
	Improved legal tools for the conservation and management of peatlands.	• Publications. • Reports.	• Some overlap with FA7. • Based on the Final Report of the APMS Final Review, most AMS have various policy and regulations related to peatlands. The largest number of regulations being produced is in Indonesia which has developed 24 peatland related regulations and policies in the past 15 years.
	• By 2025, at least 2 (two) multi-stakeholder coordination and operation strategies / action plans are developed. • Number of reported encroachments on protected and peatland areas decrease each year. • Improved coordination strategies and operations are developed and implemented each year. • Protection of biodiversity is measurably improved.	• Document of strategy and action plans. • Annual reports. • Police reports.	In some AMS, including Indonesia, the government agencies, private sector and local community who are land managers of most of cultivated peatland areas have been engaged in sustainable management.

Objective	Actions	Specific Targets
Focal Area 9. Research		
9.1 Sustainable Peatland Management (SPM) is widely studied and results readily shared leading to improved management of peatlands in ASEAN.	9.1.1 Undertake research activities where needed, that lead to maintaining ecosystem function and integrity of intact peatlands. Such as biodiversity, wet agriculture (e.g., paludiculture), fire prevention, geo-spatial mapping, socioeconomics, climate change and peat restoration. 9.1.2 Specific research under different FAs is completed and brought together into a SPM for individual PHUs in support of both national and regional level management of peatlands.	• By 2030, research activities on SPM are published to fill gaps in SPM identified by each AMS. • Research is more targeted at sustainability, conservation and community development on peatlands.
Focal Area 10. Information Sharing, Awareness & Capacity Building		
10.1 Raised awareness of sustainable management of peatlands in both government, private sector and communities.	10.1.1 Improve and sustain a series of innovative awareness campaigns, including for governments, private sectors and communities, concerning the dos and don'ts in peatland management in local and international languages. 10.1.2 Improve the engagement with media, education-, and research Institutions. 10.1.3 Develop curricula and introduce to schools and education centres, materials on peatlands – importance to climate, food and water security and conservation. Bachelor's and Master's degrees in peatland studies should also be considered.	• By 2025, Campaigns in place in all AMS promoting good governance and management practices on peatlands. • By 2030, measurable increased information traffic in all media, including social media.

	Results	Verifiable indicators	Notes
	• An understanding of interventions needed to maintain intact/pristine peatland ecosystem function has been developed and serves as the basis for zoning. • Legislation and management plans for intact peatlands is knowledge based with a foundation in SPM.	• Journal publications. • International Workshops and Seminars. • Information availability on-line • Improved legislation reflecting SPM.	• Some overlap with FA11. • There has been an increase in the amount of research on peatlands being undertaken across the ASEAN region with less than 80 publications being produced related to peatlands in Southeast Asia prior to 2006 and more than 1,300 being produced between 2006 and 2020. The level of research activity and publications is greatest in Indonesia, followed by Malaysia and other countries. • Due to the supporting nature of research, there are many overlaps with other FAs and several research Objectives can be found under their respective thematic areas.
	• Less haze. • Less drainage. • Increased wetland agriculture.	• Increased number of apps, WA-groups, Facebook, etc. and websites discussing peat. • More information coverage in the traditional media.	It is noted that awareness raising alone only <i>contributes</i> to the desired results.

Objective	Actions	Specific Targets
10.2 Awareness on IPM is raised throughout ASEAN.	10.2.1 With a focus on improving capacity and knowledge of all stakeholders, design targeted training courses for stakeholders on IPM. 10.2.2 Conduct a series of training courses on IPM across all stakeholder levels (e.g. Managers, local communities, decision makers, private sector.).	• By 2025, regular regional training programmes are carried out for government level stakeholders on IPM based on the needs of each AMS. • By 2025 several training courses on IPM for local stakeholders have been held in each AMS.
10.3 Improved technical knowledge and skills among relevant government officials and other managers of IPM.	10.3.1 Training courses on all aspects of peatlands, including hydrology, biology, climate relations, wet-land agriculture, peatland assessment and mapping, fire risk warning systems and prevention, monitoring and evaluation of peatland, peatland rehabilitation and conservation, and best management practices for sustainable community land management.	• By 2025, capacity of government, civil society, private sector and academe for implementing APMS, NAPPs and local plans enhanced at regional, national and local levels on par with management needs and requirements. • By 2030, managers are better informed, and decisions made are based on best management practices.
10.4 Improved knowledge sharing between institutions of higher learning, NGOs, development agencies and governments.	10.4.1 Central data base, or similar data access system on peatland management issues is established. 10.4.2 Regional Workshops and seminars. 10.4.3 MoUs established between institutions of higher learning, government departments, relevant NGOs etc, established on collaboration on research and management development. 10.4.4 Document best management practices with the purpose of replicating to other peatland areas in the region.	• By 2028, data and management information are easily accessible through shared resources, literature and data. • By 2030, MoUs on specific collaborations and sustainable peatland management are established based on AMS needs.

	Results	Verifiable indicators	Notes
	Raised capacity of stakeholders at all levels in IPM.	Training modules/documents.	
	• Fewer degraded peatlands. • Fewer fires/less haze. • Fire-prone peatlands are re-wetted. • Wetland agriculture (e.g., paludiculture and agroforestry systems) is promoted over dry-land crops.	• Changes in management. • Changes in crop types. • Number of peatlands being restored.	
	• Accessible, up-to-date knowledge base. • All AMS are able to access necessary case studies, data and expertise from across ASEAN to aid peatland management.	• Documents of data centre. • Documents of MoU.	

Objective	Actions	Specific Targets
10.5 Awareness of Improved fire information and early warning system is widespread and applied.	10.5.1 Further raise awareness on advanced fire information system across ASEAN. 10.5.2 Develop a training programme for burned area mapping. 10.5.3. Provide training on the interpretation and application of fire information at various user levels in support of the effective IFM.	• By 2025, a burned area mapping guideline for ASEAN is applied. • By 2025 a training programmes for burned area mapping has been launched for the ASEAN region. • By 2030, fire information and warning system is developed and applied in all AMS.

	Results	Verifiable indicators	Notes
	A (continuously) improved early warning system is in place in all AMS, resulting in better fire behavior understanding and in consequence fewer fires in the region.	• Documents /report. • Reports/Publications. • Training and awareness programmes conducted	• Some overlap with FA5 (5.4) • A Peatland Fire Prediction and Early Warning System has been developed incorporating Fire Danger Rating System (FDRS) and is actively used in a large number of fire prone peatlands (https://hazeportal.asean.org/) • MAHFSA is planning to support the development of strategies for countries to systematically map burned areas and integrate the activities as part of national fire information. Understanding the burned areas and vegetation types is critical information needed each year to assess the effectiveness of fire management measures and identify areas that may require additional investment. • However, not all AMS publish burned area data on a regular basis. Furthermore, it is difficult to make consistent and meaningful comparisons among burned area estimates across AMS. As a result, there is a need for the development of a guideline on burned area mapping and estimation that incorporates best practices from the international fire community and is applicable to AMS of varying capacities and resources.

Objective	Actions	Specific Targets
Focal Area 11. Regional Cooperation		
11.1 Cross-sectoral collaboration programmes among relevant stakeholders involving biodiversity, wetland agriculture, fire prevention and climate change in ASEAN are developed and adopted.	11.1.1 Promote exchange of expertise of different sectors working on related peatland issues. 11.1.2 Increase collaboration among 'networks or centers of excellence' in the region for peatland assessment and management.	• By 2025 at least 5 (five) regional workshops/conferences *) and meetings are organised annually on peatlands related topics, including (not limited to) climate change, wetland agriculture, biodiversity, and peat fire prevention. • By 2023, 2 (two) peatland assessment and management workshops are conducted annually in collaboration with networks or centers of excellence located in ASEAN countries.
11.2 Regional frameworks specifically related to peatlands, their biodiversity, hydrology, agriculture and preservation are identified.	11.2.1 Compile current policy framework and other relevant documents related peatlands. 11.2.2 Take stock and organise workshop to discuss and finalize the stock report of relevant policy on peatlands.	By 2030, ASEAN Secretariat publishes 4 (four) synthesis of policy on peatland managements in the region, beginning 1 (one) document in 2023 followed in 2025, 2027, and 2030 subsequently.
11.3 Existing frameworks on environment and peatland related agreements and regional cooperation mechanisms are strengthened.	11.3.1 Incorporate peatland issues into ASEAN frameworks related to Nature Conservation and Biodiversity, Multilateral Environment Agreements, Water Resource Management, Forestry and Agriculture; and Education. 11.3.2 Provide inputs on peatland issues into related global conventions (including Ramsar Convention, Convention on Biological Diversity, Convention to Combat Desertification, and UN Framework Convention on Climate Change).	• By 2025, 2 (two) peatlands related topics, are included into an action of regional working groups related to climate change, forest management, and biodiversity. • By 2025, at least 2 (two) joint statements/ declarations on peatland related issues are submitted to global conventions annually.

	Results	Verifiable indicators	Notes
	• By 2023, 2 (two) technical visits and exchanges are organised each year on a bilateral or regional level amongst countries and one of them is conducted between the northern and southern regions. • By 2030, at least 6 (six) collaborations are established with some of technical networks and centers of excellence in the region (for example, CIFOR, ACB, RECOFTC, SEARCA, member of IUFRO from ASEAN country), International Tropical Peatland Center (ITPC), etc.).	• Memorandum of Understanding (MoU)/ Letter of Agreement. • Meeting reports.	
	Compilation and assessment of existing regional policy related to peatlands.	• Publications. • Reports.	Based on the Final Report of the APMS Final Review, most AMS have various policy and regulations related to peatlands. The largest number of regulations being produced is in Indonesia which has developed 24 peatland related regulations and policies in the past 15 years.
	• By 2023, peatland conservation is discussed and integrated into an action plan/work plan/ programme of at least 3 (three) ASEAN Working Groups or Center (e.g., ASEAN Working Group on Climate Change (AWGCC), ASEAN Working Group on Forest and Climate Change (AWGFCC), ASEAN Working Group on Forest Management (AWGFM), ASEAN Centre for Biodiversity, or other working groups under guidance of ASEC).	• Memorandum of Understanding (MoU) or agreements. • Meeting reports.	• AMS have been involved and support the regional cooperation mechanism of ASEAN frameworks through regular meetings, workshops, such as: ASEAN Centre for Biodiversity, ASEAN Heritage Parks, the ASEAN Conferences of Biodiversity, Forestry and Agriculture Management, ASEAN Working Group on Climate Change; and also, to global framework of the CBD, UNFCCC and the Ramsar Convention on Wetlands.

Objective	Actions	Specific Targets
Focal Area 12. Sustainable Financing		
12.1 To have established a Peatland Sustainable Management and Development Fund.	12.1.1 Attracting donations through the private sector e.g. via tax incentives, willingness to pay for ecosystem services and/or via other large funds. 12.1.2 Work with other regional programmes/projects to expand the ASEAN Investment Framework (2030) to cover research, restoration and the development of wet agriculture not based on drainage.	• ASEAN approves of a broader Fund for peatland conservation and management. • Business models for investment opportunities in peatland conservation and management developed.

	Results	Verifiable indicators	Notes
	• By 2023, APMS is discussed at the AATHP meeting. • By 2023, at least 3 (three) joint statements/ declarations on peatland related issues are submitted to global conventions.		• There has been good partnership between multiple stakeholders from civil society and the private sector through the Roundtable on Sustainable Palm Oil (RSPO). Multi-stakeholder coalitions have also been established at site or landscape level to support integrated management of peatlands. • The 4th UNEA Resolution: Conservation and sustainable management of peatlands (UNEP/EA.
	• By 2030 €50 million* are targeted in the Fund. • By 2040 €200 million* are targeted in the Fund. • By 2050 €1 bln* are targeted in the Fund.	• Minutes of relevant meetings leading to Fund development and agreements. • Agreement / MoUs to develop the Fund.	• Building on the 10-Year investment framework for Haze-Free, Sustainable Land Management in South-East Asia (2021-2030) under MAHFSA, the proposed Fund should target all aspects of sustainable management of peatlands, including research, community development, restoration and haze. • Appropriate mechanisms to channel resources from the Fund to local government or community groups, NGOs, research, etc. should be established in each Member State to support sustainable management and rehabilitation activities. *) The amounts targeted are minimum figures

Objective	Actions	Specific Targets
12.2 To have established national and regional partnerships with private companies for carbon offsets and other investments.	12.2.1 Establish carbon offset partnerships with the private and the government sectors which support peatland conservation and protection. 12.2.2 Knowledge sharing between AMS on successful national policies and legal frameworks being used to attract funding for carbon projects in individual AMS. 12.2.3 Regional workshop to discuss policies and legal frameworks for carbon investment markets.	• By 2030 partnership frameworks and agreements have been established and are operational. • Regional agreements or recommendations for carbon investment markets
12.3 Operationalise the ASEAN Investment Framework (AIF) for Haze-free Sustainable Land Management to generate resources to support APMS implementation.	12.3.1 Develop suitable concepts for priority APMS actions and promote funding and investment through the AIF. 12.3.2 Develop bankable projects and investment opportunities related to peatland ecosystem restoration, sustainable use and carbon markets. 12.3.3 Increase in the number of investment opportunities in conservation management and restoration.	• By 2025 new major private sector investment opportunities have been developed and approved in each AMS. • By 2030 new investment licences/ programmes have been initiated in each AMS. • By 2030 a carbon credit system has been developed.
12.4 National budgets specific to peatlands is developed by 2030.	12.4.1 Develop specific budgets to support sustainable peatland management at the government level.	By 2028, budgets being allocated to address peatland management issues, including for conservation, restoration, and integrated management.

	Results	Verifiable indicators	Notes
	Number of partnerships increase each year.	• MoUs on partnerships • Minutes of meetings.	
	• Number of investment opportunities increase each year. • Carbon credit market developed for ASEAN peat.	• Investment contracts. • Working Carbon trade market	• Post Glasgow COP26. • One example from Indonesia is the “ecosystem restoration concession licence” system, others may include the carbon market, debt-swap programmes, donations, company pledges, etc.
	National budgets specific to peatlands is developed (or increased) by 2030 for AMS with peatlands.	• Peatland budgets being discussed at the ministerial levels. • National budgets.	Some AMS has already budgets for peatland restoration.

8 Implementation Mechanisms

Since the onset of the APMS 2006-2020 numerous implementation mechanisms have been developed, both at the regional and the national levels, while local level mechanisms are still relatively weak. In particular, stakeholder engagement has been found to be under-developed.

8.1. Regional Level Implementation Mechanisms

To address specific haze and its associated issues, ASEAN has established the AATHP that was signed by the ten AMS on 10 June 2002 in Kuala Lumpur, Malaysia. The Agreement contains provisions on monitoring, assessment and prevention, technical cooperation and scientific research, mechanisms for coordination, lines of communication, and simplified customs and immigration procedures for disaster relief. The Agreement also provides for the establishment of an ASEAN Coordinating Centre for Transboundary Haze Pollution Control (ACC THPC).

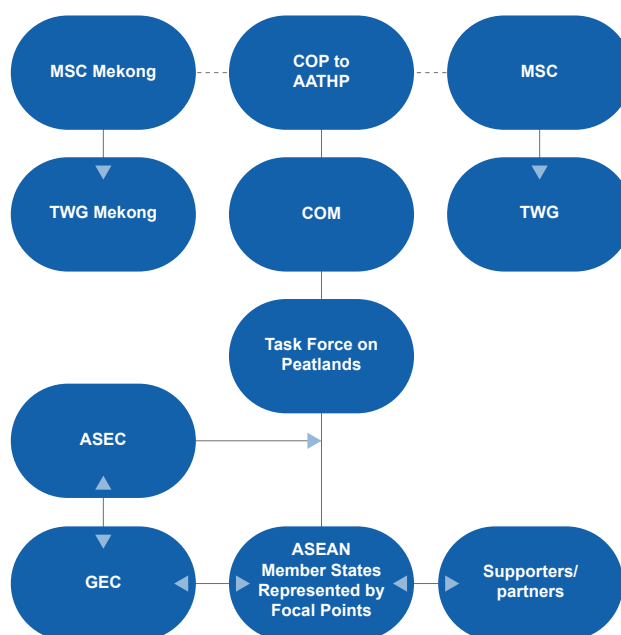
ASEAN has established the Conference of the Parties (COP) to AATHP in 2003 to oversee the implementation of the agreement. The COP AATHP provides overall coordination, guidance and policy decisions on ASEAN cooperation on transboundary haze pollution. The COP AATHP is at ministerial level and meets annually supported by Senior Officials in the form of the Committee under the COP to AATHP (COM AATHP) that meets at least once a year depending on the necessary tasks.

To support the implementation of AATHP in the southern ASEAN region, ASEAN has established the Sub-Regional Ministerial Steering Committee (MSC) on Transboundary Haze Pollution in November 2006. The MSC is intended to oversee the implementation of the Plan of Action (PoA) of AATHP in addressing regional haze problems in the short, medium, and long term in the southern portion of ASEAN which is particularly linked to peatland fires. The MSC programmes and activities include enhancing haze control management, early warning/monitoring, fire prevention and fire suppression capabilities, bilateral collaboration, and Regional Haze Training Network. Members of the MSC are Brunei Darussalam, Indonesia, Malaysia, Singapore and Thailand. The MSC is supported by a Technical Working Group (TWG) to implement programmes as directed by the MSC.

In northern ASEAN region, the TWG on Transboundary Haze Pollution in the Mekong Sub-region (TWG Mekong) was established in 2008 to review the issues related to transboundary haze in the Mekong sub-region. The member countries of the TWG Mekong are Cambodia, Lao PDR, Myanmar, Thailand and Viet Nam. In October 2010, the Sub-Regional MSC on Transboundary Haze Pollution in the Mekong Sub-region (MSC Mekong) was established to address the growing problem of transboundary haze in the Mekong region which is particularly linked to land clearing by fire and burning of agricultural residues. The MSC Mekong oversees programmes and activities to enhance cooperation among ASEAN Member States in the Mekong Sub-Region on fire and haze pollution control. The MSC and

MSC-Mekong meet at least once a year back-to-back with the TWG/TWG Mekong to deliberate on the progress and challenges in resolving the transboundary haze problems. Progress with work undertaken to address peatland management in this sub-region have been reported to the TWG and TWG Mekong on a regular basis in addition to the direct reporting to the COM AATHP.

Figure 5. Diagram to show the current regional institutional framework to guide the implementation of APMS



To address specific peatland related issues, ASEAN established APMI in February 2003 together with an initial workplan (2003-2005). The APMI objective is to promote sustainable management of peatlands in the ASEAN region through collective actions and enhanced cooperation to support and sustain local livelihoods, reduce risk of fire and associated regional haze, and contribute to global environmental management. With significant inputs from AMS and supported by the GEC, ASEAN Secretariat developed regional strategy of peatland management in the region.

Within this framework along with AATHP, the Strategy and Action Plan for Sustainable Management of Peatlands in ASEAN Member Countries (APMS) was developed to guide actions to support management of peatlands in the region for the period of 2006-2020. The strategy primarily focused on four objectives: (1) to enhance Awareness and Knowledge on Peatlands, (2) to address Transboundary Haze Pollution and Environmental Degradation, (3) to promote Sustainable Management of Peatlands, and (4) to enhance and Promote Collective Regional Cooperation on Peatland Issues. These objectives are still highly relevant.

ATFP was established in 2013 to assist the COMAATHP in monitoring and supporting the implementation of APMS 2006-2020. Its main role is to realise the objectives of the APMS through oversight of the design and implementation as well as monitoring of the APSMPE and other relevant programmes/projects, facilitate cooperation with relevant partners. To implement the APMS, ASEC undertakes the formal coordination amongst AMS and facilitates the main regional activities and meetings. The

APMS partners provide support for the implementation of the strategy while supporters include donors, research or educational institutions, private sector and the media provide funds or technical guidance, promote the initiative and other support.

To improve and strengthen the current regional institutional framework and mechanism for implementing APMS, the ATFP Focal Points should involve actively in the Multi-Sectoral Framework for Climate Change, Agriculture and Forestry towards Food and Nutrition Security and Achievement of SDGs under the Ad Hoc Steering Committee on Climate Change and Food Security (AHSC-CCFS). This framework can be used by AMS, especially ASEAN to exchange and harmonise programmes on peatlands through their working groups, such as the ASEAN Working Group on Climate Change (AWGCC), ASEAN Working Group on Forest and Climate Change (AWGFCC), ASEAN Working Group on Forest Management (AWGFM), and other working groups under the guidance of ASEAN Secretariat (Environment and Food, Agriculture and Forestry Divisions respectively).

In addition, to broaden and strengthen the current institutional framework, the representative/focal points of APMS may be involved in activities organised by the technical advisory body to the ASEAN Centre for Biodiversity (ACB), such as the ASEAN Working Group on Nature Conservation and Biodiversity (AWGNCB). This group aims to intensify cooperation in addressing issues related to the conservation and sustainable use of biological diversity and to become a consultative platform to further strengthen regional coordination and cooperation in overcoming issues related to biodiversity. This includes to take concrete action to ensure that areas rich in biodiversity such as peatlands are protected, conserved and sustainably managed. The AWGNCB should also monitor and develop ASEAN joint statement where applicable to international and regional conventions and agreements related to nature and peatland biodiversity conservation.

Kindly refer to Annex 4 for references to international agreements and Conventions of relevance to peatlands.

Providing a research facility is established as proposed in the Final Review (Recommendation 9), it should be multidisciplinary in nature and be formally structured within ASEAN. It should be established with the purpose of advancing scholarly activities primarily through collaborative research across institutes, research training, research dissemination and conduct or coordinate both basic research as well as applied research. While the ASEAN Haze Portal (<https://hazeportal.asean.org/>) – ASEAN knowledge management platform on sustainable peatland and haze management is set up for information sharing, it is mainly targeted for general public consumption. A research facility would address the scientific community. It is envisioned that the facility will facilitate and incubate scientific collaboration, secure research resources and provide research support, offer a sense of community and promote continued learning and, function as a centralized database for all peatland studies intended to provide guidance on sustainable management of peatlands that is knowledge-based, and data driven. Peer-reviewed studies on fire management, restoration techniques, peatland biodiversity conservation, silvi- and paludiculture, etc. are examples of topics that could be shared here. A suggested name could be “ASEAN Peatland Research and Management Facility”. The Facility could operate within or be overseen by one of the existing institutes or centres, as determined by a suitable regional body, such as the ATFP. The Facility should have four main purposes: exploration, description, explanation, and application with the purpose of achieving sustainable management of these ecosystems.

8.2. Country Level Implementation Mechanisms - National Action Plans on Peatlands (NAPPs)

Peatlands provide economic and social economic and environmental services, including carbon storage. If undisturbed, peat layers are an effective permanent store of carbon. Peatlands can be part of an effective climate change mitigation strategy, and they could help countries meet their NDCs to global climate action.

The AMS is responsible to facilitate the implementation of the APMS strategy at national level and achieve the general and its operational objectives. This includes the development of NAPPs and other peatland related activities. Each AMS provides NAPPs updates during ATFP meetings.

AMS have different strategies and policies to manage their peatlands. Subsequently, some AMS have different ministries and agencies with specific roles and responsibilities related to peatland managements. Some countries have put peatland management under the responsibility of the Ministry of Agriculture, Forestry or Environment while others have established a specific agency to handle it.

In countries with smaller area of peatlands, they are managed by a range of different institutions from national to local levels. Some countries may delegate peatland managements to local agencies with strong support from central/federal governments through financial allocations and technical assistance to handle the peatland related challenges.

Several AMS have provided integrated policy frameworks to address peatland issues through the development of a NAPPs or have incorporated peatlands into other plans and legislative frameworks. Other ASEAN countries, including from the Mekong sub-region have yet to develop their NAPPs as they are still in the process of undertaking inventories of their peatlands. AMS with existing NAPPs should update and extend them in parallel with the revised APMS while for AMS without NAPPs should either develop a NAPPs or integrate peatlands into other appropriate plans and strategies.

Kindly refer to Annex 4 for references to national policies and regulation of relevance to peatlands.

9 Monitoring and Evaluation Mechanism

To ensure that the implementation of peatland-related activities is achieved successfully on the ground, ASEAN and the member states have established monitoring and evaluation (M&E) mechanisms. Such mechanisms are important to ensure that initiatives and activities remain consistent with the overall goals and objectives and are responsive to emerging issues and priorities. The mechanism also can be used to take corrective measures and refine the implementation strategy as needed.

Progress of APMS implementation has been reported regularly to the ATRP, followed by the COM AATHP. AMS provides updates on the status of development and progress in implementation of their respective NAPPs in the ATRP meetings. Different stakeholders, relevant regional and international agencies and individuals are invited to attend to the open sessions of the ATRP meetings to share information on on-going projects, and to promote collaboration and partnerships.

This current mechanism has been able to provide updates of the APMS implementation, including providing guidance for incorporating other relevant initiatives and project activities into regional and national planning frameworks. However, there is a need to develop clear targets, criteria and indicators to enable effective monitoring and evaluation. Such criteria and indicators can be adjusted to different actions, depending on their stated objectives. A baseline situation at the beginning of the strategy implementation should be established as a reference point for the formal review during the monitoring and evaluation phases. ASEAN Secretariat may propose such development in the next meeting of ATRP or relevant coordination meeting on peatlands.

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ANNEXES

Annex 1

Priorities list from the Final Review 2021 and How They Relate to the APMS 2023-2030 (From Table 13 in the Final Review)

Table 13 (from the Final Review): Priorities for the period 2021 to 2030 as identified by feedback by ATPF National Focal Points and other national stakeholders in response to the APMS Review.

Focal Areas/ Operational Objectives		Future Priorities	Corresponding points in APMS 2022-2030
Focal Area 1. Inventory and Assessment			Focal Area 1. Inventory, Mapping and Assessment is retained.
1.1 Determine the extent and status of peatlands in the ASEAN region	Brunei Darussalam Recognition of the Brunei's PSF Cambodia High priority to identify and map all peatland areas in the country Indonesia To accelerate inventory on peatland ecosystem characteristics at scale of 1:50.000 based on Peatland Hydrological Unit (KHG) Lao PDR High priority to identify and map all peatland areas in the country Malaysia High priority to determine extent and status of peatland in Malaysia; information (spatial data/ maps/dataset) to be accessible for sharing for better management	Myanmar High priority to identify and map all peatland areas in the country Philippines High priority to increase capacity of trained personnel to conduct assessment Thailand High priority to determine the extent and status of peatlands in the country Viet Nam High priority to identify and mapping all peatland areas in the country	Included in Focal Area 1. Corresponds to Objective 1.1 Peatlands in all of ASEAN are mapped based on their Peatland Hydrological Units (PHU) and management status. Corresponding Actions 1.1.1 Define peatland zoning concept that includes core protection and development zones with clear conservation & management targets, including determination of peat dome when present and peat degradation states 1.1.2 Establish the baseline for carbon accounting and measuring carbon balance for each PHU that is integral part of wise peatland management. 1.1.3 Initiate (or finalize) mapping of peatlands in the ASEAN Region at the scale 1:50.000. Including information on use and conservation/protected areas. With the following Results: • By 2030, 30% of peatlands in northern and 100% in southern ASEAN have been mapped and the boundaries are delineated based on PHU in scale of 1:50.000.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
			• By 2035, all ASEAN peatlands mapped and conservation and development zones defined, including determination of peat dome when present and peat degradation states • PHU level delineation of land use, stakeholders and degradation status allows conservation prioritization across all boundaries. • By 2030, montane peatlands in ASEAN mapped.
1.2 Assess problems and constraints faced in peatland management	Indonesia To recover hydrological function and rehabilitation as well as improve local community livelihood Philippines High priority to assess problems and constraints. Profiling and assessment of peatland area and inclusion of peatland in Permanent Protected Area	Viet Nam High priority for monitoring and evaluating peatland management and use	Included in Focal Area 1. Corresponds to Objective 1.2 Management of Peatland ecosystems is based on PHU level carbon balance in relation to land use change, and changing environmental conditions. With the following Actions: 1.2.1 Review existing and improve inventory data (e.g. peatland extent, thickness, etc.) to understand PHU level ecosystem function and carbon balance prior to land use change. 1.2.2 Map land-use change within PHU and in surrounding landscape changes that might affect the PHU over time. 1.2.3 Determine environmental conditions (i.e. measure determine extreme weather conditions over time including temperature, droughts, rainfall patterns, flooding and sea level rise, and changes in El-Niño recurrences). 1.2.4 Conduct workshops/ seminars on land use change and environmental change/extreme weathers data for peatland management. 1.2.5 Use past and present land use and environmental information to understand and manage peatlands under existing and changing climates.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
1.3 Monitor and evaluate peatland status and management	Indonesia Monitoring on canal, land cover, GWL, hotspot, burned scar, pyrite and quartz layers Malaysia Medium/high priority to identify problems and constraints; different perception by different stakeholder on peatlands (plantation, agriculture, etc.)	Thailand High priority to Monitor and evaluate peatland status and management	Included in Focal Area 1. Corresponds to Objective 1.2 Management of Peatland ecosystems is based on PHU level carbon balance in relation to land use change, and changing environmental conditions.
Focal Area 2. Research			Corresponds to Focal Area 9. Research In addition, specific focal area centric research objectives are under the respective focal area. This was based on requests by AMS to move these under the respective focal areas.
2.1 Undertake priority research activities	Indonesia - To study on commodity site matching for each PHU, inc. oil palm/aca-cia adaptive to flooding - To study on environmental services from peatland Malaysia Medium/high priority to monitor and evaluate the peatland including develop an integrated management and monitoring system, and with sufficient budget to operate the system	Philippines - High priority for research. Support needed to local academe (financial, equipment, infrastructure) to conduct scientific R&D activities - Research and Development in peatland for Carbon Storage, Assessment of Flora and Fauna population and extensive Hydrology Study, Flood Risk - Assessment and Impact including Mitigation Measures. - High priority in the conduct of scientific R & D on drought and fire risk assessment. Thailand High priority to undertake priority research activities on biodiversity, carbon storage, adaptation and mitigation to climate change	Research actions are more precisely described in Focal Area 9. Research and Objectives/Actions under each focal area.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
Focal Area 3. Awareness and Capacity Building			Corresponds to Focal Area 10. Information Sharing, Awareness and Capacity Building
3.1 Enhance public awareness on importance of peatlands, their vulnerability to fire and the threat of haze through implementation of a comprehensive plan	Brunei Darussalam Encourage awareness and participation from community level Indonesia - To establish Desa Mandiri Peduli Gambut (Peatland Care Independent Villages) - To establish working group on peatland management and protection (TK-PPEG) in each village with BUMDes (Village Enterprises) support Lao PDR High priority to enhance public awareness for local communities on the importance and sustainable use of peatlands Malaysia High priority to enhance CEPA programmes to improve public awareness especially at local peat-dependence communities and through educational events with young generation	Myanmar Capacity building on remote sensing and GIS application for peatland identification and mapping is essential Education and awareness raising on importance of peatlands is also essential Philippines - Medium/High priority to scale up awareness to various institutions, stakeholders and community especially policy makers, need more local experts - To enhance CEPA programmes to improve public awareness especially for local communities and through educational events with young generation Thailand High priority to enhance public awareness on importance of peatlands, their vulnerability to fire and the threat of haze through education programme for communities/youth in and around the peatland area Viet Nam High priority to raise community awareness about peat conservation, development and sustainable use	Included in Focal Area 10. Corresponds to Objective 10.1 Raised awareness of sustainable management of peatlands in both government, private sector and communities. With the following Actions: 10.1.1 Improve and sustain a series of innovative awareness campaigns, including for governments, private sectors and communities, concerning the dos and don'ts in peatland management in local and international languages. 10.1.2 Improve the engagement with media, education-, and research Institutions. 10.1.3 Develop curricula and introduce to schools and education centres, materials on peatlands – importance to climate, food and water security and conservation. Bachelor's and Master's degrees in peatland studies should also be considered.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
3.2 Build institutional capacity on management of peatlands	Lao PDR High priority to enhance capacity of government staff and relevant agencies at national and local level on peatland assessment and management.	Malaysia High priority to enhance competency and capacity of institutions/agencies to monitor and manage the peatlands, also enhancing enforcement, with financial support to prevent fire on prone area	Included in Focal Area 10. Corresponds to: Objective 10.2 Awareness on Integrated Peatland Management (IPM) is raised throughout ASEAN. Objective 10.3 Improved technical knowledge and skills among relevant government officials and other managers of IPM. Objective 10.4 Improved knowledge sharing between institutions of higher learning, NGOs, development agencies and governments. Objective 10.5 Awareness of Improved fire information and early warning system is widespread and applied.
Focal Area 4. Information Sharing			Corresponds to Focal Area 10. Information Sharing, Awareness & Capacity Building
4.1 Enhance information management and promote sharing	Brunei Darussalam Encourage exchange knowledge through peat symposium Indonesia - To integrate information system of Management and Protection of Peatland Ecosystem (SIPPEG) - To promote information dissemination to site level community - To include multi-stakeholder approach in information sharing Philippines - Medium/High priority to share peatland management related information (i.e. peat area, drought monitoring) - Need continuity effort through publications, information centre, websites, workshops, conferences and field advisory, need media engagement	Malaysia - Medium priority on information sharing as there are existing platforms for sharing - Sharing information through publications, information centre, websites, workshops, conferences and field advisory, need media engagement - Being coordinated and facilitated through State Steering Committee, National Peatland Working Committee and National Peatland Steering Committee, National Peatland Steering Committee on Wetlands Viet Nam Medium priority on information sharing as there are existing platforms	Included in Focal Area 10. Corresponds to: Objective 10.1 Raised awareness of sustainable management of peatlands in both government, private sector and communities. Objective 10.2 Awareness on IPM is raised throughout ASEAN. Objective 10.3 Improved technical knowledge and skills among relevant government officials and other managers of IPM. Objective 10.4 Improved knowledge sharing between institutions of higher learning, NGOs, development agencies and governments. Objective 10.5 Awareness of Improved fire information and early warning system is widespread and applied.

Focal Areas/ Operational Objectives	Future Priorities			Corresponding points in APMS 2022-2030
Focal Area 5. Policies and Legislation				Corresponds to Focal Area 8. National Policies and Legislation
5.1 Develop or strengthen policies and legislation to protect peatlands and reduce peat fire	Indonesia To strengthen implementation of peatland management plan (RPPEG) in provincial and district level Lao PDR To develop specific regulations for peatlands and integrate peatlands into other relevant policies and legislation. Malaysia • High priority to strengthen implementation of policies and action plans in relation to peatland management – NAPPs 2021-2030 and NPBD 2016-2025, National • Policy on Wetlands (being finalised) • Need close coordination between national and state levels for acceptance and implementation (policy development at federal vs adoption at state level) and state agencies with plantation sector (e.g. Sarawak companies with NREB) • Strengthen peatland issues in the EQA • To strengthen enforcement and reference to existing guidelines (SOP by DOE and Bomba)	Myanmar • To establish a Peatland Task Force • To enhance understanding of peatlands and mainstream the peatlands elements onto policy and institutional frameworks • To assess effectiveness of current regulations and policies to mitigate/ manage impacts on peatlands Philippines High priority to develop and strengthen policies and legislation Mainstreamed peatland in the Work and Financial Plan of the concerned agencies Thailand To strengthen regulations, rules, or agreement with communities in and around peatlands in order to protect peatlands and reduce peat fire Viet Nam High priority to complete policies for effective management of peatland management and use	No change to the Action(s) All activities under: Objective 8.1 Policies that specifically address and supports alternatives to local community livelihoods and socio-economic development in peatlands are developed. Objective 8.2 All relevant legislation, policy or regulations specifically related to peatlands, their biodiversity, hydrology, agriculture and preservation, and inherent weaknesses are identified and improved if required. Objective 8.3 Legal tools and regulations of biodiversity conservation and peatland protection is improved.	

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
K7Focal Area 6. Fire Prevention, Control and Monitoring			Corresponds to Focal Area 5. Fire Prevention, Control and Monitoring
6.1 Reduce and minimise oc- currence of fire and associated haze	Brunei Darussalam Encourage technology transfer in fire prevention and rehabilitation effort Indonesia • To establish ‘Desa Mandiri Peduli Gambut’ integrated with ‘Mas- yarakat Peduli Api’ (Fire Care Community) • To strengthen patrol system and zero burn- ing implementation • To strengthen fire mon- itoring and integrate monitoring system (LAPAN MODIS Cat- alog, Sipongi, FDRS, SIPALAGA, SIMATAG) Malaysia • High priority to have multi-stakeholder col- laboration in preventing peat fire • Reference to all rele- vant SOP (DOE and Bomba) and guidelines, need more commitment and enforcement on the regulations and national programme on peatland management • Need budget • Continue dissemination of FDRS and hotspot information, good to have fire scars informa- tion to prevent repeated peat fires • Linkage to climate change and Nationally Determined Contribu- tions (GHG emission)	Myanmar High priority to tackle increasing hotspot count due to forest fires and other types of fires during dry season, prevention measures are necessary for haze from huge forest fire Philippines High priority to have multi-stakeholder col- laboration Linkage to climate change and NDC (GHG emission) Thailand Strengthen multi-stake- holder collaboration in prevention, partrol and suppression of forest fire Viet Nam High priority to reduce occurrence of fire	Corresponds to Objective 5.1 The ASEAN Guidelines on peatland fire management, which includes the Integrated Fire Man- agement (IFM) approach, is fully implemented across ASEAN. With the following results: • Reduction in extent of fires in years with extreme weather events and in normal years. • Reduction of smoke-haze relat- ed health issues.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
Focal Area 7. Conservation of Peatland Biodiversity			Corresponds to Focal Area 4. Peatland Biodiversity and Ecosystem Conservation
7.1 Promote conservation of peatland biodiversity	Indonesia - To identify endemic species of flora and fauna in peatlands - To strengthen site conservation and germplasm - To promote Ramsar Sites management Lao PDR To conduct inventory on peatlands sites and its natural resources including flora and fauna. Malaysia - High priority to provide comprehensive biodiversity information through assessment at locations to identify endemic species of flora and fauna in peatlands - Need greater protection and connectivity and proper land-use planning - Develop more seed banks for suitable species for rehabilitation - Consider to develop incentive scheme for State that gazette peatland as protected area, for carbon financing mechanism to help offset emission and opportunity to encourage the State Government to protect and manage the peatlands more sustainably (e.g. Pahang and Selangor on carbon offset programmes) - Meet CBD target of 17% of peatlands in totally protected areas	Philippines - High priority to promote biodiversity conservation for peatlands - Implementation of Philippine Biodiversity Strategy and Action Plan (2015-2028); Agusan Marsh acknowledged as a key biodiversity area in PBSAP Thailand High priority to have comprehensive survey on biodiversity in peatland Viet Nam High priority to identify species of flora and fauna in peatlands	Corresponds to Objective 4.1 Conservation management of peatland biodiversity is data driven and aiming for international standards across ASEAN With the following actions: 4.1.1 Determine species level IUCN conservation status or national conservation status for peatland biodiversity at site. (for those AMS that do not follow IUCN guidelines) 4.1.2 Identify and include biodiversity vulnerability to land use and climate change – for species level IUCN conservation species. 4.1.3 Assess habitat level IUCN Red lists across all peatland regions, contributing to species/habitat level management plans. 4.1.4 Where management plans have not yet been developed: develop data-driven management plans for remaining intact peatlands and data-driven management plans for restoration of degraded peatlands. 4.1.5 Areas hosting Rare and threatened biodiversity outside of protected areas to either be added to protected areas or conserved under OECMs that involve all stakeholders. 4.1.6 Ensure sufficient funds are found/available to execute the management plans. And Corresponds to Objective 4.2 Management plans to improve conservation status of species-and/or habitat are designed and implemented across ASEAN And Corresponds to Objective 4.3 Halt the conversion and degradation of any part of intact peatlands, to avoid further negative impact on the eco-hydrological and climate stabilisation character of the entire peatland.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
Focal Area 8. Integrated Management of Peatlands			Corresponds to Focal Area 7. Integrated Peatland Management
8.1 Promote multi-agency involvement in peatland management	Brunei Darussalam To involve relevant government agencies such as the Brunei Darussalam Climate Change Secretariat (BCCS) under the Ministry of Development, NGO and private sectors Indonesia • To strengthen multi-stakeholder partnership in supporting DMPG • To implement peatland management plan (RP-PEG) in provincial as well as District level • To establish ‘Desa Mandiri Peduli Gambut’ Malaysia • High priority to improve coordination and commitment of agencies for cross-sectoral collaboration, and information sharing for integrated practices to conserve the biodiversity and undertake rehabilitation work • To strengthen multi-stakeholder partnership (government, private sector, research institute, CSOs and community) – identify strategic partners • To develop State Action Plans on Peatlands (SAPP) for peat states (SMPEM project and departmental fund)	Myanmar • To form a Technical Group on peatland survey and assessment, GIS and spatial analysis, community engagement and sustainable livelihoods, peatland management and policy. • Need to develop a plan on integrated and sustainable peatland management and reducing impacts on peatlands Philippines • High priority to promote IPM • Include the Leyte Sab-a on the current Masterplan Formulation of Leyte Riverbasin planning facilitated by the DENR RBCO • Enhance stakeholder engagement and support include delineate boundaries Viet Nam High priority to strengthen the capacity of management agencies at national and local levels, especially for the national focal agency in the management and use of peatlands in the country	This corresponds to: Objective 7.5 Multi-stakeholder partnerships to support IPM are developed.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
8.2 Promote integrated water resources and peatland management using a basin-wide approach and avoiding fragmentation	Indonesia To implement sustainable peatland management based on PHU Need to develop FDRS using water level in peatland area as an indicator	Malaysia High priority to have sufficient background information (baseline) on topo-hydrological information and systematic data for water management as most important aspect for peatland management Viet Nam High priority to integrate management of water and fire prevention	This corresponds to Objective 1.2 Management of Peatland ecosystems is based on PHU level carbon balance in relation to land use change, and changing environmental conditions. And the following Actions: 1.2.1 Review existing and improve inventory data (e.g. peatland extent, thickness, etc.) to understand PHU level ecosystem function and carbon balance prior to land use change. 1.2.2 Map land-use change within PHU and in surrounding landscape changes that might affect the PHU over time. 1.2.3 Determine environmental conditions (i.e. measure determine extreme weather conditions over time including temperature, droughts, rainfall patterns, flooding and sea level rise, and changes in El-Niño recurrences). 1.2.4 Conduct workshops/seminars on land use change and environmental change/extreme weathers data for peatland management. 1.2.5 Use past and present land use and environmental information to understand and manage peatlands under existing and changing climates. Also Objective 7.4 Peatland ecosystems management is based on PHU level carbon balance in relation to land use change and changing environmental conditions. And the following Actions: 7.4.1 Review existing and gather missing data (e.g. peatland extent, thickness, etc.) to understand PHU level ecosystem function and carbon balance prior to land use change.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
			7.4.2 Map land-use change within PHU and in surrounding landscape changes that might affect the PHU over time. 7.4.3 Determine environmental conditions and extreme weather over time such as temperature, droughts, rainfall patterns, sea level rise, and changes in El-Niño recurrence. 7.4.4 Use past and present land use and environmental information to understand and manage peatlands under existing and changing climates and conditions.
8.3 Promote integrated forest and peatland management	Malaysia Medium/High priority to promote and revise IMP – some expired and IMP NSPSF active in implementation (2014-2023); JPSM has guidelines and format for developing IMP; need competent officer, sufficient manpower and funding	Thailand Apply “Sufficiency Economy” philosophy to promote integrated peatland management Viet Nam High priority to promote integrated forest and peatland management	This corresponds with Focal Area 7. Integrated Peatland Management
8.4 Manage agriculture in peatland areas in integrated manner	Indonesia • To develop paludiculture technology in peatland area • To promote agroforestry and sylvo-fishery using species site matching for better peatland management and enhance community livelihood	Viet Nam Medium priority to manage agriculture in peatland areas in integrated manner	This corresponds with Objective 3.3 3.3 Existing agriculture on peatlands has adopted drainage-free agriculture models with no further conversion of peatland. And associated Actions: 3.3.1 Include communities in the development of PHU level management plans. 3.3.2 Development of products, markets and financing models for drainage free agricultural products. 3.3.3 Capacity building in drainage free agriculture (e.g. paludiculture).

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
			This also corresponds with Objective 7.1 7.1 All agriculture, plantations and forestry on peatlands are managed in a sustainable manner With associated Actions: 7.1.1 Develop clear guidelines and regulations to ensure sustainable management of agriculture, plantations and forestry on peat 7.1.2 Document and promote best management of practices on SPM to all peatland stakeholders and managers
8.5 Promote integrated community livelihood and peatland management	Lao PDR High priority to engage local community due to their traditional knowledge on valuing the peatland (identification of peatland is needed for management and conservation)	Viet Nam • High priority to support development of community livelihoods to protect peatland resources • Medium priority to promote integrated community livelihood and peatland management	This corresponds with Focal Area 3. Community Livelihoods and Focal Area 7. Integrated Peatland Management.
Focal Area 9. Promotion of Best Management Practices of Peatlands			Corresponds to Focal Area 10. Information Sharing, Awareness & Capacity Building
9.1 Promote best management practices through documentation and demonstration sites	Indonesia • To identify and document best practices in peatland management (conservation and cultivation areas) • To promote exchange knowledge and experience on best practices • To strengthen DMPG implementation Malaysia • Medium/High priority to document BMPs and promote as demonstration sites • Need to widely promote the BMPs and replicate the BMPs to other areas	Philippines • High priority to identify and document best practices in peatland management (conservation and cultivation areas) • To promote the BMPs and replicate the BMPs to other areas • Provide appropriate peatland friendly livelihood support/trainings to the local organisation/community to effectively manage the peatland	This corresponds with Objective 10.1 Raised awareness of sustainable management of peatlands in both government, private sector and communities. Objective 10.2 Awareness on IPM is raised throughout ASEAN. Objective 10.3 Improved technical knowledge and skills among relevant government officials and other managers of IPM

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
	• Need to optimise function of Centre of Excellence at North Selangor Peat Swamp Forest and Klias Peat Swamp Field Centre and at other PAs such as Maludam National Park and Loagan Bunut National Park • To identify and document best practices in peatland management (conservation and cultivation areas) • To promote exchange knowledge and experience on best practices	Thailand To promote best management practices through documentation and demonstration sites Viet Nam Medium priority to promote best management practices	Objective 10.4 Improved knowledge sharing between institutions of higher learning, NGOs, development agencies and governments. Objective 10.5 Awareness of Improved fire information and early warning system is widespread and applied.
Focal Area 10. Restoration and Rehabilitation			Corresponds to Focal Area 2. Restoration and Rehabilitation
10.1 Develop appropriate techniques for the restoration or rehabilitation of degraded peatlands	Indonesia • To identify valuable species adaptable to peatland condition • To promote agroforestry in peatland Malaysia • High priority on restoration and rehabilitation of peatland ecosystems • To identify valuable species adaptable to peatland condition and seed banks • To promote agroforestry in peatland • Need better coordination to collate relevant research and tested techniques Myanmar • To develop a restoration and rehabilitation plan for peatlands in Myanmar Viet Nam • Medium priority to develop a restoration and rehabilitation plan for peatlands	Philippines • High priority to develop appropriate techniques include identify indigenous and typhoon-resistant species • A direct intervention programme under the Philippine Biodiversity Strategy and Action Plan (PBSAP) • To increase investment/development fund for innovative technologies and application of tested techniques at the site (some available cost effective techniques identified and to be replicated at site) • Reinstatement and Reversion of "CARPed distributed lands" in the Leyte Sab-a Peat Swamp through DENR and DAR collaboration and partnership Thailand • Promote environmental Corporate Social Responsibility (CSR) mechanism in restoration or rehabilitation of degraded peatlands	This corresponds with Objective 2.2 Degraded peatlands are restored and non-drainage-based agriculture systems are being applied on all peatlands used for agriculture. And associated Actions: 2.2.1 Drained peat is rewetted (canal blocking) in order to restore ecological and hydrological functions of peatlands. 2.2.2 Promote development of alternative non-drainage-based peatland agriculture techniques over dry-land crops. 2.2.3 PHU level target for restoration defined and included in the national target for restoration. 2.2.4 Microfinancing schemes for small holders for sustainable peatland management practices/agriculture. 2.2.5 Feasibility and Market study for wet-agriculture products undertaken.

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
10.2 Rehabilitation burnt, drained and degraded peatlands	Indonesia • Mapping of degraded peatland area in detail • To extent rehabilitation of degraded peatland area	Malaysia • High priority to increase investment/development fund for innovative technologies and application of tested techniques at the site (some available cost effective techniques identified and to be replicated at site)	This corresponds with Objective 2.2 Degraded peatlands are restored and non-drainage-based agriculture systems are being applied on all peatlands used for agriculture.
Focal Area 11. Peatland and Climate Change			Corresponds to Focal Area 6. Peatland and Climate Change
11.1 Protect and improve function of peatlands for carbon sequestration and storage	Indonesia • To strengthen multi-stakeholder partnership for climate change mitigation • To implement climate change mitigation from related sectors (Forestry and Agriculture) Malaysia • High priority to strengthen multi-stakeholder partnership for climate change mitigation • To explore possible carbon financing mechanisms to encourage peatland protection and conservation (results from long term carbon flux assessment as reference/baseline)	Philippines • High priority to improve peatland function for carbon storage and incorporate into climate change adaptation processes • Mainstreaming climate change in biodiversity planning and management • To promote rehabilitation and restoration of degraded peatlands for carbon sequestration and storage. Thailand • High priority to strengthen multi-stakeholder partnership for climate change mitigation • To protect and improve function of peatlands for carbon sequestration and storage	This corresponds to Objective 6.1 Synthesis of data and knowledge to develop Management plans for Peatland ecosystems management based on PHU level carbon balance in relation to land use change, and changing environmental conditions. Objective 6.2 Peatland ecosystems and communities' resilience to climate change is improved based on PHU management. Objective 6.3 Reduced Green House Gas Emissions from peatland to help meet the ASEAN Target of Net Zero Emission by 2050

Focal Areas/ Operational Objectives	Future Priorities		Corresponding points in APMS 2022-2030
11.2 Support incorporation of peatlands into climate change adaptation processes	Indonesia To incorporate peatlands into National Action Plan for Climate Change Adaptation (RAN-API) Malaysia Medium priority to incorporate peatlands into climate change adaptation – NDC, SDGs, REDD+	Thailand High priority to support incorporation of peatlands into climate change adaptation processes	This corresponds to Objective 6.2 Peatland ecosystems and communities' resilience to climate change is improved based on PHU management. And associated Actions: 6.2.1 Adopt data driven management of PHUs based on ecosystem function, carbon balance, land use change and environmental data to adapt to climate change. 6.2.2 Assess existing and develop new interventions to mitigate PHU vulnerability to environmental extremes and climate change. 6.2.3 Updating and extending National Action Plans on Peatlands (NAPPs) to include climate change vulnerability and allow for timely interventions. 6.2.4 Develop PHU level management plans that incorporate climate change adaptation and mitigation activities.
Focal Area 12. Regional Cooperation			Corresponds to Focal Area 11. Regional Cooperation
12.1 Promote exchange of expertise in addressing peatland management issues	Indonesia - To strengthen collaboration among AMS in peatland management - To promote exchange knowledge and experience on best practices in regional level Lao PDR To exchange knowledge and lessons learnt on peatland management at the regional level and require experts to support Lao PDR on peatland assessment	Myanmar - Development of common guidelines for conservation and sustainable use of peatland resources to enhance peatland management in ASEAN region - APMS to support climate-responsible peatland management Philippines - Medium/high priority to strengthen collaboration among AMS in peatland management - Ongoing regional programmes/projects: EU-SUPA, IFAD-MAHF-SA	This corresponds to Objective 11.1 Cross-sectoral collaboration programmes among relevant stakeholders involving biodiversity, wetland agriculture, fire prevention and climate change in ASEAN are developed and adopted. And the associated Actions: 11.1.1 Promote exchange of expertise of different sectors working on related peatland issues. 11.1.2 Increase collaboration among 'networks or centers of excellence' in the region for peatland assessment and management.

Focal Areas/ Operational Objectives	Future Priorities	Corresponding points in APMS 2022-2030
12.2 Establishment of 'networks or centres of excellence' in the region for peatland assessment and management	Indonesia To incorporate peatland related programme with the International Tropical Peatland Center (ITPC) launched in Jakarta on 30 October 2018.	This corresponds to Objective 7.2 Non-drainage-based agriculture techniques, including paludiculture, is the main agriculture method being implemented on ASEAN peatlands And the associated Actions: 7.2.1 Conduct wetland agriculture studies, both advanced and applicable in both regions of ASEAN (i.e. northern and southern Member States). 7.2.2 Provide increased support to ASEAN peat and agriculture research centres on the dissemination and implementation of research results on wetland agriculture systems (i.e. paludiculture). 7.2.3 Increase support to adopting no-drainage on peatlands across all sectors. 7.2.4 Promote and support with technical assistance and funds for communities to adopt paludiculture"
12.3 Contribute to the implementation of other related agreements and regional cooperation mechanisms	Malaysia • Medium priority to strengthen collaboration among AMS in peatland management and establishment of "networks or centres of excellence" • To promote exchange of knowledge and experience on best practices in regional level • Ongoing regional programmes/projects: EU-SUPA, IFAD-MAHFSA	This corresponds to Objective 11.2 Regional frameworks specifically related to peatlands, their biodiversity, hydrology, agriculture and preservation are identified. And associated Actions: 11.2.1 Compile current policy framework and other relevant documents related peatlands. 11.2.2 Take stock and organize workshop to discuss and finalize the stock report of relevant policy on peatlands. This also corresponds to Objective 11.3 Existing frameworks on environment and peatland related agreements and regional cooperation mechanisms are strengthened.

Focal Areas/ Operational Objectives	Future Priorities	Corresponding points in APMS 2022-2030
		And associated Actions: 11.3.1 Incorporate peatland issues into ASEAN frameworks related to Nature Conservation and Biodiversity, Multilateral Environment Agreements, Water Resource Management, Forestry and Agriculture; and Education. 11.3.2 Provide inputs on peatland issues into related global conventions (including Ramsar Convention, Convention on Biological Diversity, Convention to Combat Desertification, and UN Framework Convention on Climate Change).
12.4 Enhance multi-stakeholder partnerships to support peatland management	Indonesia - To enhance the role of multi-stakeholder on peatland management - Scaling-up the BMPs of multi-stakeholder programmes on peatland management	This corresponds to Objective 11.1 11.1 Cross-sectoral collaboration programmes among relevant stakeholders involving biodiversity, wetland agriculture, fire prevention and climate change in ASEAN are developed and adopted.
Focal Area 13. Financing of the Implementation of Strategy		Corresponds to Focal Area 12. Sustainable Financing
13.1 Generate financial resources and incentives required for the programmes and activities to achieve targets of the strategy	Malaysia - High priority in securing financing to implement the APMS – national (e.g. RMK-12 and RMK-13) and international funding (development organisations – GEF-IFAD SMPPEM, EU-SUPA) - To identify, search and attract financial support for peatland e.g. carbon projects, CSR, etc. - Develop rules and incentives for private sector engagement Brunei Darussalam Attract more funding opportunities and private sectors engagement Indonesia To Identify, search and attract funding allocation from national and international sources for peatland management Philippines High priority to identify, search and attract financial support for peatland e.g. carbon projects, CSR, etc. (domestic and international funding) Thailand High priority to identify, search and attract funding allocation from national and international sources for peatland management	This corresponds to Objective 12.1 To have established a Peatland Sustainable Management and Development Fund. Objective 12.2 To have established national and regional partnerships with private companies for carbon offsets and other investments. Objective 12.3 Investment opportunities are developed specifically for sustainably managed peatlands and restoration programmes in order to attract private sector funding. Objective 12.4 National budgets specific to peatlands is developed by 2030.

Annex 2

How Wetlands Support the Achievement of the SDGs

SDG 17 – PARTNERSHIPS FOR THE GOALS

The Ramsar Convention works in partnership with other MEAs to support governments in achieving the SDGs.

SDG 16 – PEACE, JUSTICE & STRONG INSTITUTIONS

Effective management of transboundary wetlands contributes to peace and security.

SDG 15 – LIFE ON LAND

40% of all the world's species live and breed in wetlands.

SDG 14 – LIFE BELOW WATER

Healthy and productive oceans rely on well functioning coastal and marine wetlands.

SDG 13 – CLIMATE ACTION

Peatlands cover only 3% of global land but store twice as much carbon as the entire world's forest biomass.

SDG 12 – RESPONSIBLE CONSUMPTION & PRODUCTION

Wetland areas properly managed can sustainably support increased demands for water in all sectors.

SDG 11 – SUSTAINABLE CITIES & COMMUNITIES

Urban wetlands play a vital role in making cities safe, resilient and sustainable.

SDG 10 – REDUCED INEQUALITY

Healthy wetlands mitigate the risk to an estimated 5 billion people living with poor access to water by 2050.

SDG 9 – INDUSTRY, INNOVATION & INFRASTRUCTURE

Healthy wetlands form a natural buffer against the increasing number of natural disasters.

SDG 1 – NO POVERTY

More than a billion people depend on wetlands for a living.

SDG 2 – ZERO HUNGER

Rice, grown in wetland paddies, is the staple diet of 3.5 billion people.

SDG 3 – GOOD HEALTH & WELL BEING

Half of international tourists seek relaxation in wetland areas, especially coastal zones.

SDG 4 – QUALITY EDUCATION

Safe water access enhances educational opportunities, especially for girls.

SDG 5 – GENDER EQUALITY

Women play a central role in the provision, management and safeguarding of water.

SDG 6 – CLEAN WATER & SANITATION

Almost all of the world's consumption of freshwater is drawn either directly or indirectly from wetlands.

SDG 7 – AFFORDABLE & CLEAN ENERGY

Sustainable upstream water management can provide affordable and clean energy.

SDG 8 – DECENT WORK & ECONOMIC GROWTH

Wetlands sustain 266 million jobs in wetland tourism and travel.



From IUCN-UK-Peatlands.org

Annex 3

Overview of Stakeholder Engagement Response

Assessment of the Questionnaire Responses

The following graphs illustrate some of the most important findings from respondents to a questionnaire There 47 respondents.

The respondents, of which almost 85% were either a national government representative (35.6%), from a research institution (31.1%), national government (8.9%) or represented ASEAN in some capacity (8.9%) (See Figure 1-a).

22% of respondents are policy makers, 39% are scientists and approximately 20% work in the public sector, including social work. The vast majority of respondents have direct peat-land expertise of which approximately 33% are, or have been, researchers, ca. 28% work in conservation and ca. 26% in Policy-making.

It can be concluded that the majority of respondents have significant peat-land expertise, work closely with the government sector and/or are researchers. Only a few represented the private sector. The information gleaned from the responses drew attention to and added focus on several matters such as, the importance of integrated management and cross-sectoral approaches, issues involving local communities, fire management biodiversity and also climate change.

General Respondent Info

Figure 1-a: Stakeholder occupancies

Stakeholder type that you represent
45 responses

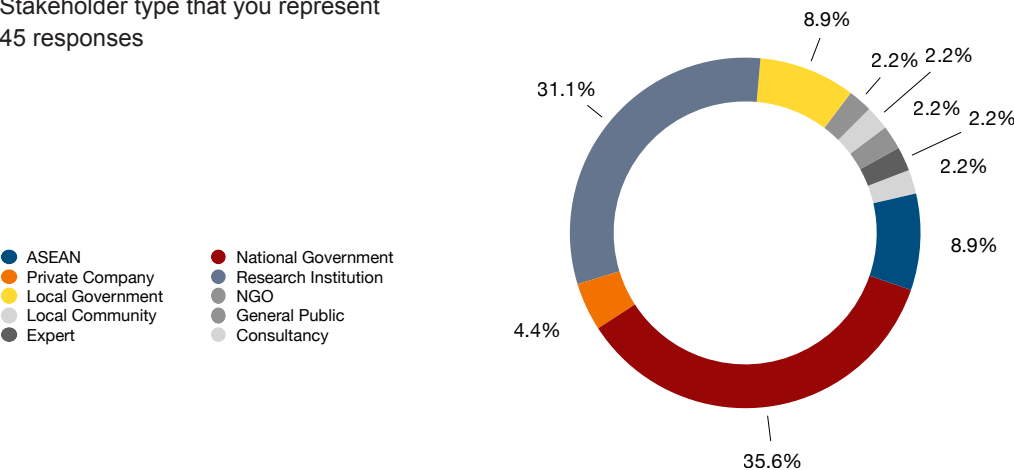
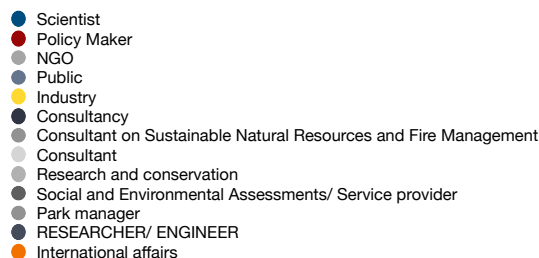
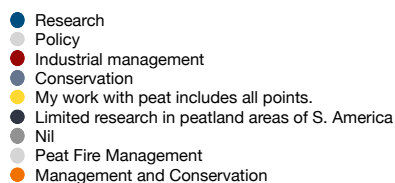


Figure 1-b: Stakeholder occupations

Kind of job
46 responses

**Figure 1-c: Stakeholder expertise**

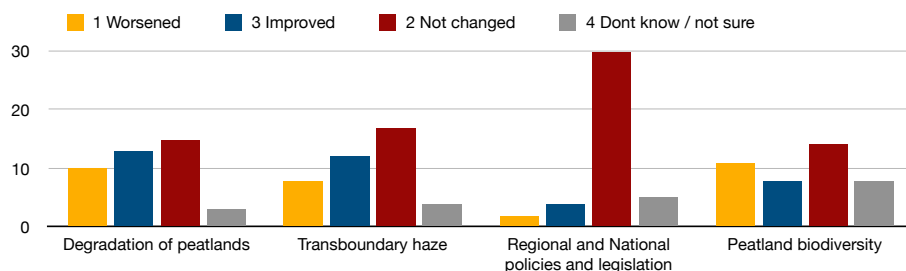
Peatland expertise (if any)
43 responses

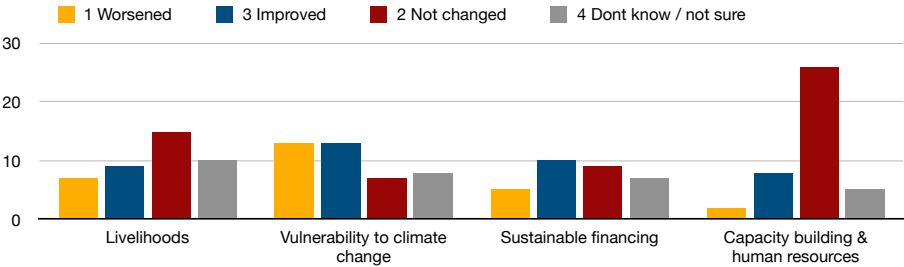


Questions regarding Focal Areas

Figure 1-d: Stakeholder responses related to the new Focal Areas of the previous APMS

To what degree have the eight Focal Areas identified in the previous APMS (2006-2020) been improved/ not changed/improved since 2006?



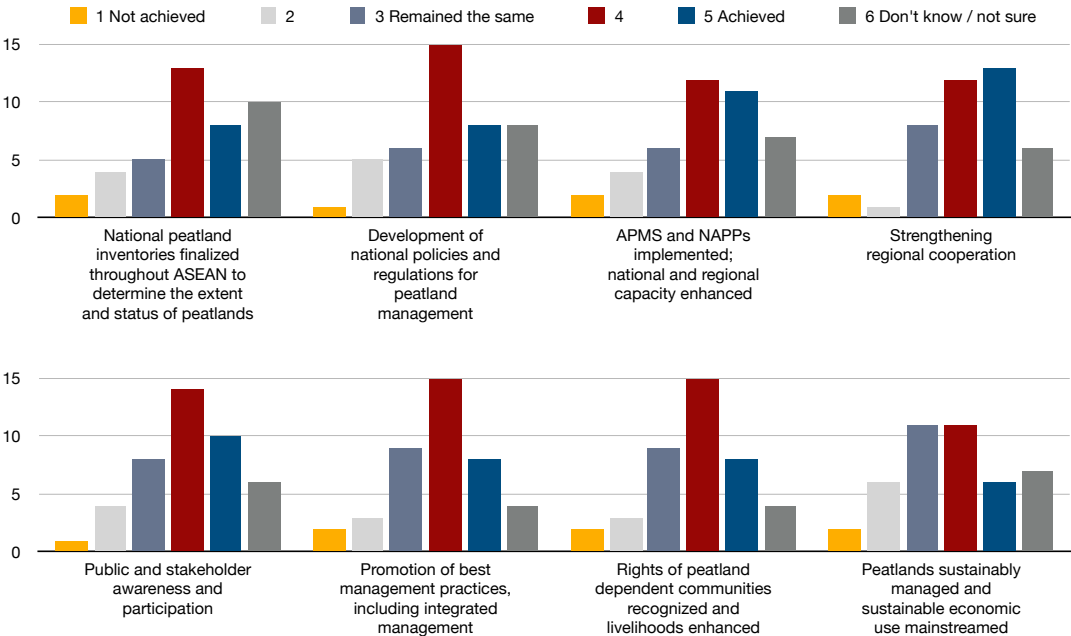


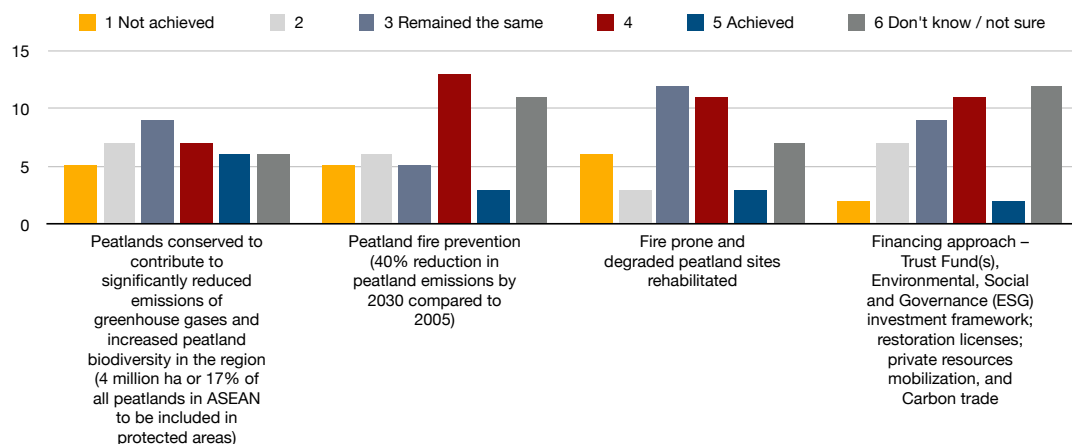
Overall, there are slightly more stakeholders who respond that things have improved, in particular Policies and Legislation and also Capacity building has improved. However many stakeholders also feel that nothing has changed or things have got worse, in particular regarding Climate Change.

To what extent has ASEAN achieved the 13 focal areas in the previous APMS (2006-2020)?

Figure 1-e: Stakeholder responses related to the old focal areas of the previous APMS

To what extent has ASEAN achieved the 13 focal areas in the previous APMS (2006-2020)?

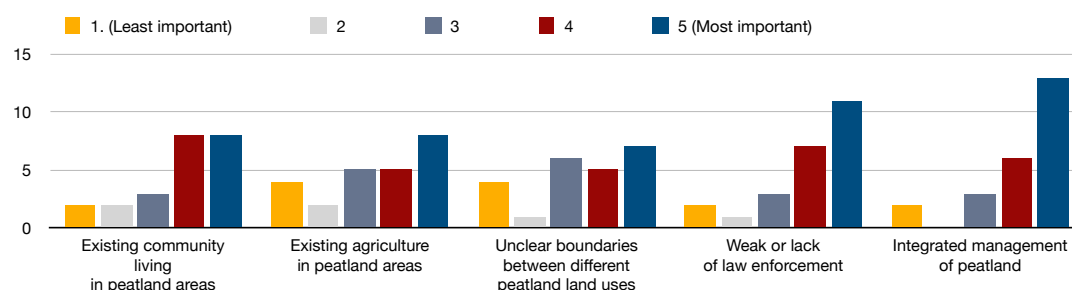




Peatland Management, Climate Change & Sustainable Financing

Figure 1-f: stakeholder responses related to efforts in reducing peatland degradation

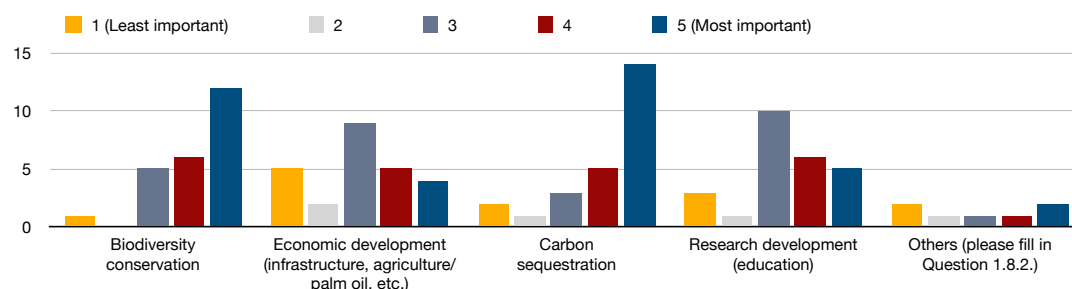
How important are the following to reduce peatland degradation in ASEAN?



Integrated management was highlighted as particularly important to reduce peatland degradation followed by strengthening law enforcement. Respondents found local communities and existing agriculture to be of moderate importance.

Figure 1-g: stakeholder responses related to function of peatlands

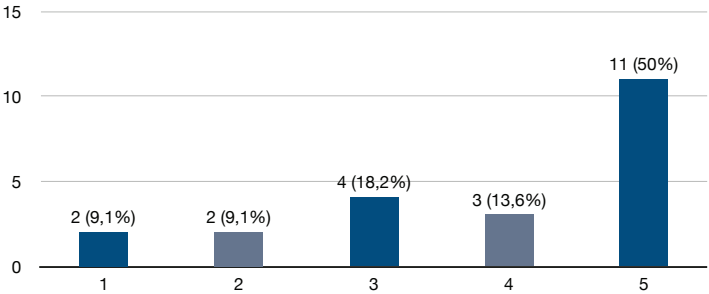
ASEAN peatlands host endangered species, provide livelihoods and store large amounts of carbon. Balancing these issues is challenging. Please rate the importance of each of the following to overall ASEAN peatland management.]



The graphic illustrates that the majority of respondents feel that in particular, carbon sequestration, but also biodiversity conservation are the most important aspects of peatland management. This is followed by Research and Education and economic development.

Figure 1-h: stakeholder responses related to finance mechanism

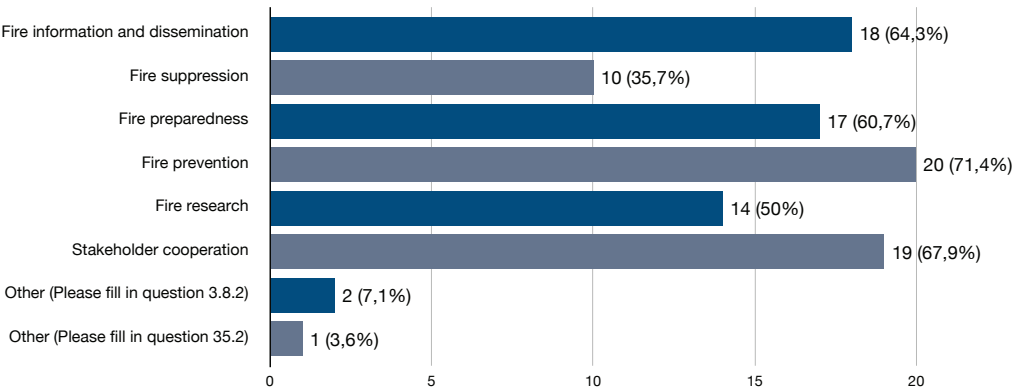
How likely will finance through carbon markets result in long term GHG emission reduction sequestration or conservation of peatlands?



Out of the 22 who responded to this question, 64% were of the opinion that carbon market development will likely or very likely improve conservation options for peatlands and in the long term, reduce GHG emissions. This indicates that, in particular South ASEAN, could use conservation and rehabilitation of peatlands to pressure the development of a sustainable carbon market.

Figure 1-i: stakeholder responses related to fire management on peatlands

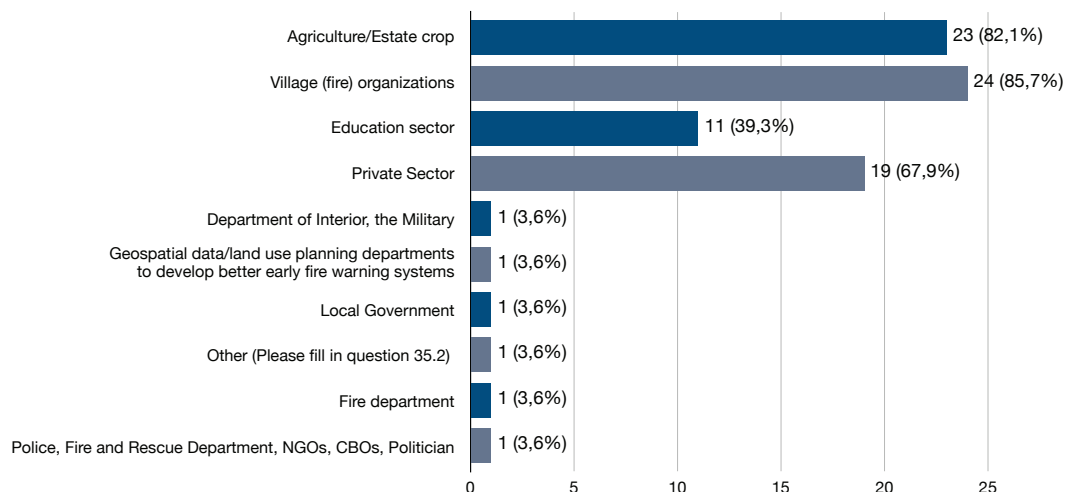
In ASEAN there has been a heavy focus on fire suppression in the last three decades. However, haze events still occur. In which field of integrated fire management (IFM) should ASEAN member states improve its efforts, and how?



For this question, respondents had the option to tick several boxes. Less than 36% of respondents believed that suppression is the most effective for haze control. The vast majority responded that preventive work (that includes awareness and stakeholder engagement), is more efficient and effective.

Figure 1-j: stakeholder responses related to stakeholder's involvement on fire management

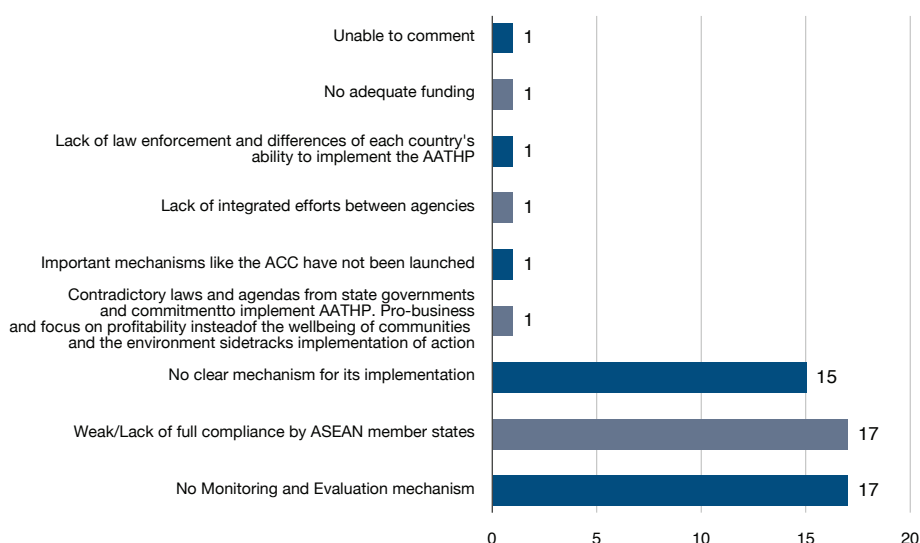
In the past fire management/suppression has been traditionally handled by the forestry departments. Which other stakeholders need to be included and part of an integrated fire management system?



For this question, respondents had the option to tick several boxes. The majority noted that local communities and commercial estates should be more involved – indicating more responsibility to users of peatlands. It supports stakeholder cooperation and looks beyond forestry and is further indicative of the importance of Integrated Management, engaging several sectors. Check all that apply x

Figure 1-k: stakeholder responses related to AATHP status and implementation

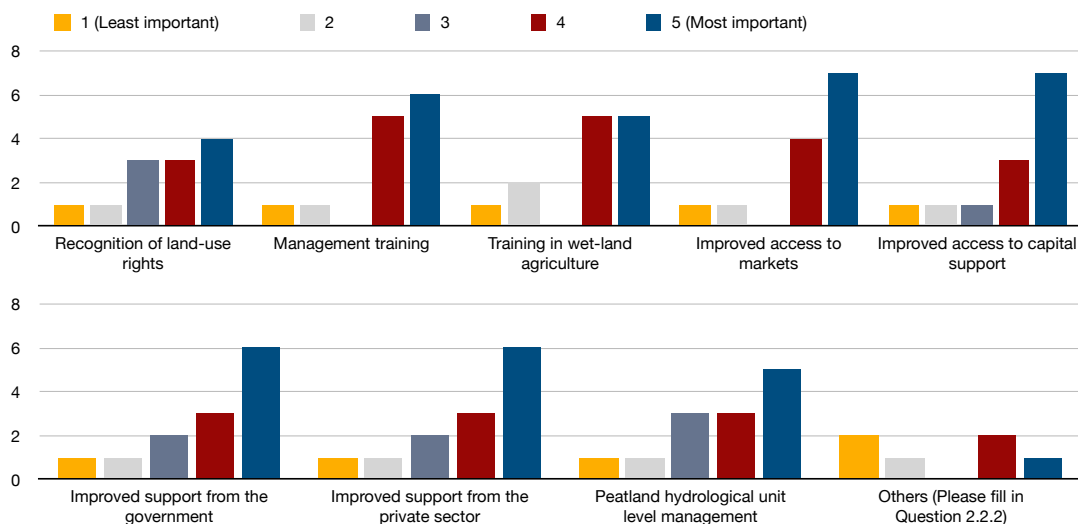
The ASEAN Agreement on Transboundary Haze Pollution (AATHP) was established in 2002 and has been ratified by ASEAN member states in 2014. However, fire still occurs occasionally in some ASEAN member states during the dry season indicating that challenges still exist for implementing the AATHP effectively. What are the challenges to effectively implement the AATHP at national level (individual ASEAN member states)?



Local Communities and Biodiversity

Figure 1-l: stakeholder responses related to peatland function for local community and biodiversity conservation

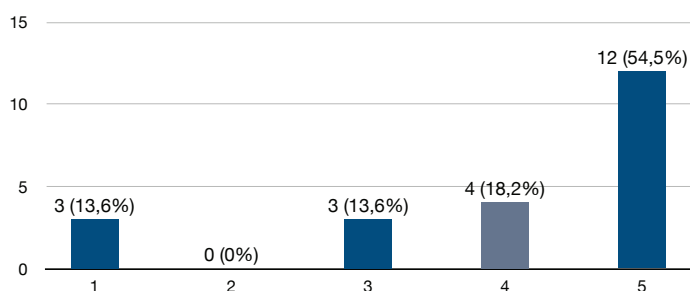
How important are the following to improving the welfare of people living on peatlands?



In inquiring re local community development on peatlands, access to markets and capital support was highlighted as the most important followed by training (capacity building) and improved support from both government and private sectors. Respondents felt that management at the PHU level and landuse rights were of moderate importance – with respect to local community welfare.

Figure 1-m: stakeholder responses related to agriculture techniques on peatlands

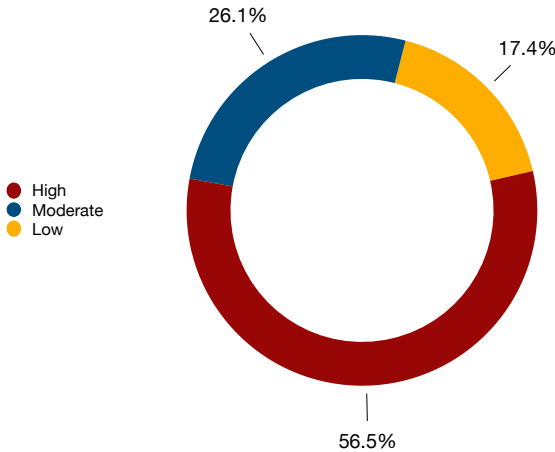
How important is the development of non-drainage based agriculture techniques on peatlands?



73% of respondents replied that the development of non-drainage based agriculture is most important (54%) to very important (18.2%). Only <14% felt that this was less important. This strongly supports the conversion of dry-land agriculture on drained peat-land to re-wetting and rehabilitation. Underlying this is the need for capacity building in wet-agriculture/silviculture and more research on paludiculture. This is also supported by the previous graph.

Figure 1-o: stakeholder responses related to traditional knowledge of local community related to biodiversity in peatlands

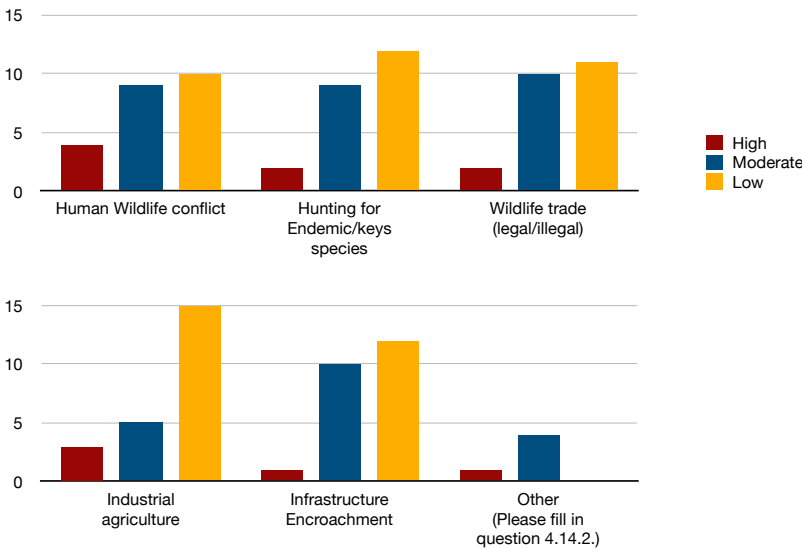
What is the role of local communities through traditional knowledge in efforts to preserve the Biodiversity of peatlands? Please give a brief explanation or examples in 4.11.2



The response to this question shows there is a clear division among respondents as to the importance of engaging local communities in preserving biodiversity, where only slightly more than half felt it was very important and ca. 44% felt it was of low or moderate importance. One of the main responses given was improved law enforcement being more important (not shown).

Figure 1-p: stakeholder responses related to threat to peatland biodiversity

In your opinion, to what extent do the following pressures have an impact on conservation of peatland biodiversity.



The graph shows that industrial agriculture followed by infrastructure and encroachment has the highest impact on conservation of peatland biodiversity. This supports integrated management, involving several sectors as the being the best practice. Other main issues include wildlife conflicts, hunting, and the illegal wildlife trade - which supports the need for improved law enforcement. Not surprising, the overwhelming majority of respondents (87%) felt that protection is the best method of conserving biodiversity (separate question, not shown).

Annex 4

Table of Multilateral Environmental Agreements of Relevance

No	Title/Date	Objective / ENV Chef de file	Date of Signature EU	Date of Council Decision on Conclu- sion	Date of entry into force EU	Link to convention	Countries that ratified
1	International Tropical Timber Agreement (ITTA) Geneva, 26.1.1994	To promote and apply comparable and appropriate guidelines and criteria for the management, conservation and sustainable devel- opment of all types of timber produc- ing forests.	13/05/1996	29/03/1996	01/01/1997	http://www.itto.int/itta/ <i>Council Decision on Conclusion: OJ L 294/1 of 12.11.2011</i>	See list: www.itto.int/ direct/topics/ topics_pdf_ download/ topics_ id=2133&- no=0
2	Framework Convention on Climate Change (UNFCCC) New-York, 9.5.1992	To achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sus- tainable manner.	13/06/1992	15/12/1993	21/03/1994	http://unfccc.int/key_documents/the_convention/items/2853.php <i>Council Decision on Conclusion: Official Jour- nal L 033 , 07/02/1994 p. 0011 - 0012</i>	See list: http://unfccc.int/essential_ background/ convention/ status_of_ ratification/ items/2631. php

No	Title/Date	Objective / ENV Chef de file	Date of Signature EU	Date of Council Decision on Conclu- sion	Date of entry into force EU	Link to convention	Countries that ratified
3	Protocol to the United Nations Framework Convention on Climate Change (The Kyoto Protocol) Kyoto, 11.12.1997	To ensure that the aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A to the Protocol do not exceed the assigned amounts, with a view to reducing overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012.	29/04/1998	25/04/2002	16/02/2005	http://unfccc.int/resource/docs/convkp/kpeng.pdf <i>Council Decision on Conclusion: Official Journal L 130 , 15/05/2002 P. 0001 - 0003</i>	See list: http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php
4	Paris Agreement Paris, 12.12.2015	The Paris Agreement builds upon the Convention and – for the first time – brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort.	22/04/2016		04/11/2016	http://unfccc.int/paris_agreement/items/9485.php	See list: http://unfccc.int/paris_agreement/items/9444.php
5	Convention on Biological Diversity (UN) (CBD) Rio, 5.6.1992	To conserve the biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, taking into account all rights over those resources and to technologies, and by appropriate funding.	13/06/1992	25/10/1993	21/03/1994	https://www.cbd.int/convention/text/ <i>Council Decision on Conclusion: Official Journal L 309 , 13/12/1993 P. 0001 - 00020</i>	See list: http://www.cbd.int/convention/parties/list/

No	Title/Date	Objective / ENV Chef de file	Date of Signature EU	Date of Council Decision on Conclu- sion	Date of entry into force EU	Link to convention	Countries that ratified
6	Protocol on Biosafety to the Biodi- versity Con- vention (The Cartagena Protocol) Montreal, 29.1.2000	To ensure an adequate level of protection in the field of the safe transfer, handling and use of living modified organ- isms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focus- ing on transbound- ary movements.	26/05/2000	25/06/2002	11/09/2003	http://bch.cbd.int/protocol/text/ <i>Council Decision on Conclusion: Official Jour- nal L 201 , 31/07/2002 P. 0048 - 0049</i>	See list: http://bch.cbd.int/protocol/parties/
7	Protocol on Liability and Redress to the Cartage- na Protocol on Biosafety (The Na- goya – Kuala Lumpur Sup- plementary Protocol) Nagoya, 16.10.2010	To contribute to the conservation and sustainable use of biological diversity, taking also into account risks to human health, by providing interna- tional rules and procedures in the field of liability and redress relating to living modified organisms.	11/05/2011			http://bch.cbd.int/protocol/NKL_text.shtml	See list: http://bch.cbd.int/protocol/parties/

No	Title/Date	Objective / ENV Chef de file	Date of Signature EU	Date of Council Decision on Conclu- sion	Date of entry into force EU	Link to convention	Countries that ratified
8	Protocol on Access to Genetic Re- sources and the Fair and Equitable Sharing of the Benefits Arising from their Utiliza- tion to the Convention on Biological Diversity (The Nagoya Protocol) Nagoya, 29.10.2010	To share the ben- efits arising from the utilization of genetic resourc- es in a fair and equitable way, including by ap- propriate access to genetic resources and by appropriate transfer of relevant technologies, tak- ing into account all rights over those resources and to technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustain- able use of its components.	23/06/2011	14/04/2014	12/10/2014	http://www.cbd.int/abs/text/ <i>Council Decision on Conclusion: Official Journal L 150/231, 20.5.2014</i>	See list: http://www.cbd.int/abs/nagoya-protocol/signatories/
9	Convention on the Con- servation of MigratoryS Species of Wild Ani- mals (CMS) (UNEP) Bonn, 23.6.1979	To conserve mi- gratory species and take action to this end, paying special attention to migratory species the conservation status of which is unfavourable, and taking individually or in co-operation appropriate and necessary steps to conserve such species and their habitat.		24/06/1982	01/11/1983	http://www.cms.int/en/convention-text <i>Council Decision on Conclusion: Official Jour- nal L 210 , 19/07/1982 p. 0010 - 0022</i>	See list: http://www.cms.int/en/parties-range-states
10	Convention on Interna- tional Trade in Endan- gered Spe- cies of Wild Fauna and Flora (CITES Convention) Washington, 03.03. 1973	To ensure that in- ternational trade in specimens of wild animals and plants does not threaten their survival.	09/04/2015	06/03/2015	08/07/2015	https://cites.org/eng/disc/text.php <i>Council Decision on conclusion, Official Journal L 75, 19/03/2015, p. 1–3</i>	See list: https://cites.org/eng/disc/parties/chronolo.php

Other relevant instruments

Title/Date	Objective / ENV Chef de file	Link to convention	Countries that ratified
Convention on Wetlands of International Importance, called (Ramsar Convention) Ramsar, 02/02/1971	For the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value.	http://www.ramsar.org/document/copy-of-the-convention-copy-certified-by-unesco	See list: http://www.ramsar.org/country-profiles

Annex 5

Ramsar Convention's definition of Peatlands



13th Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands

“Wetlands for a Sustainable Urban Future”
Dubai, United Arab Emirates, 21-29 October 2018

Resolution XIII.12

Guidance on identifying peatlands as Wetlands of International Importance (Ramsar Sites) for global climate change regulation as an additional argument to existing Ramsar criteria

1. RECALLING that Article 2.1 of the Convention requires the designation of Wetlands of International Importance (Ramsar Sites);
2. RECALLING ALSO the Vision for the Ramsar List and the criteria for designation of Ramsar Sites in Annex 2 to Resolution XI.8 on *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Ramsar, Iran, 1971) – 2012 revision*;
3. FURTHER RECALLING Resolution XII.11 on *Peatlands, climate change, and wise use: Implications for the Ramsar Convention*, which requests the Scientific and Technical Review Panel to develop guidelines for the further application, as regards peatlands, of Criterion 1 for the selection of Wetlands of International Importance, and in particular paragraph 121 of Annex 2 to Resolution XI.8, which encourages Contracting Parties to designate at least one peatland Ramsar Site as appropriate, that is suitable for communication, education, and raising of awareness of the conservation, restoration and wise use of peatlands and their role in climate change mitigation and adaptation, and summarizes the significance of peatland conservation and management in the context of climate change;
4. RECOGNIZING that, through their sequestration of atmospheric carbon, wisely managed peatlands are an international asset with a value for global climate-change mitigation independent of their location;
5. NOTING that peatlands provide space-effective terrestrial stores of carbon, and that peatland conservation, including as a cost-effective measure to maintain terrestrial carbon stores (emission avoidance), and restoration (emission reduction) are among the measures for long-term climate-change mitigation;
6. RECALLING that the United Nations Framework Convention on Climate Change is the primary multilateral forum for addressing climate change issues and that the Intergovernmental Panel on Climate Change (IPCC) is the international body for assessing the science related to climate change, providing policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation; and NOTING

that some countries are currently testing the methodology in the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*;

7. AWARE that peatlands store large quantities of carbon and that protection and restoration of peatlands contribute to climate change mitigation and adaptation, whereas the drainage of peatlands causes net emissions of greenhouse gases;
8. NOTING that designation of even small peatlands as Ramsar Sites can be valuable for education and for raising public awareness of the nature of peatlands and their role in providing ecosystem services, including long-term carbon storage, and that the larger and thicker the peatland, the greater the sequestration capacity and the carbon stock, and the more the peatland contributes to climate change mitigation;
9. ALSO RECOGNIZING that permafrost loss and overgrazing may act as significant factors in peatland degradation;
10. NOTING the Ramsar Briefing Note on *Best practice guidelines for conducting tropical peatland inventories to facilitate their designation as Ramsar Sites*;
11. RECOMMENDING that Parties with appropriate peatland sites consider the identification of potential peatland Ramsar Sites as an essential element of national wetland inventories, with due attention being paid to different types of peatlands and their condition; and
12. RECOGNIZING that most of the peatlands in semi-arid regions are dependent on sustained groundwater and/or hillslope intermediate flows and therefore their designation should consider catchments and related landscapes as part of the strategy to conserve these peatlands;

THE CONFERENCE OF THE CONTRACTING PARTIES

13. ADOPTS the *Revised guidelines for identifying and designating peatlands* related to the designation of peatlands as wetlands of international importance, found in Annex 1 to the present Resolution, which replaces and supersedes Appendix E2 of the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Ramsar, Iran, 1971) – 2012 revision*;
14. URGES Contracting Parties to use the Revised guidelines in their consideration of potential peatland Ramsar Sites as appropriate;
15. ENCOURAGES Contracting Parties to use all available methods, including remote sensing, to help identify sites as appropriate; and
16. NOTES the case study included in Annex 2 to the present Resolution, related to the designation of a Wetland of International Importance that has contributed to better public awareness of the role of its peatland resource in relation to climate-change avoidance and mitigation; and RECOGNIZES that there are many other examples of designated Wetlands of International Importance that make the same or similar contributions.

Annex 1

Revised guidelines for identifying and designating peatlands

(Replacing and superseding Appendix E2 of the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Ramsar, Iran, 1971) – 2012 revision*, as adopted by Resolution XI.8)

E2. Peatlands

Geographic distribution and extent

1. Peatlands are ecosystems with a peat soil. Peat consists of at least 30% dead, partially decomposed plant remains that have accumulated *in situ* under waterlogged and often acidic conditions. Peatlands cover over 400 million hectares worldwide and occur from the high mountains to the sea, and from high to low latitudes.
2. Commonly, many habitats with peat soil are not recognized as “peatlands” even if their peat layer is thick enough. However, some peatland examples include polygonal tundra, salt marshes and mangroves, paludified forests and cloud forests, high-mountain paramos, and dambos and vleis. Peat may be formed by various kinds of vegetation: a) bryophytes, mainly *Sphagnum* mosses and associated herbaceous and dwarf shrub species; b) herbaceous plants such as sedges and grasses; and c) trees such as in alder *Alnus* spp. forests in the temperate zone and in peat swamp forests in the tropics.

Ecological functions, ecosystem services/benefits, and societal values

3. Two main types of peatland are distinguished: bogs, which are rainwater fed and therefore acid and nutrient poor, and fens, which are additionally groundwater fed and thus generally less acidic and more nutrient-rich than bogs. In this guidance the term “peatland” includes both peatland with active peat accumulation (“mire”) and peatland that is no longer forming peat and may have lost peat forming vegetation and is degrading naturally or as a result of human intervention. Whereas the presence of peat is the defining characteristic of a peatland, vegetation and hydrology are key defining aspects of the peatland type.
4. Peatlands are important for the ecosystem functions and services they contribute to human well-being and to nature. The Common International Classification for Ecosystem Services (CICES)¹, accepted by most Parties as being one relevant non-exclusive source for peatland evaluation for reporting in the Ramsar Information Sheet, distinguishes three main categories of ecosystem services:
 - a. Provisioning and supporting functions and services: for example, materials and energy, such as biodiversity, wild foods, drinking water and non-fossil and renewable biomass-based energy resources, as well as commercial development for food production;
 - b. Regulating functions and services: these relate to the maintenance of ecological conditions, such as climate regulation through carbon storage and sequestration, water regulation,

¹ See: <https://cices.eu/cices-structure>.

maintenance of water quality through removal of pollutants and nutrients, prevention of saline water intrusion, and protection from disasters; and

- c. Cultural values: provision of non-material benefits, such as opportunities for recreation and education, culture and heritage, spiritual and aesthetic experiences, and information and knowledge, e.g. from biogeochemical and palaeo-environmental archives.

Peatland degradation

5. The main factors causing peatland degradation locally and globally include: a) drainage; b) vegetation removal or disturbance; c) infrastructure development; d) peat extraction; e) eutrophication and pollution; f) acid rain; g) water abstraction and/or diversion, and h) fire. These factors, which can occur in the peatlands or in their zones of influence, have various consequences, which need to be taken into consideration when defining the boundaries of peatland Ramsar Sites and determining their management:
 - a. The main drivers of peatland drainage are agriculture and forestry both on peatlands and related catchments. Peatland hydrology may be influenced by hydrological changes (e.g. drainage, erosion and groundwater abstraction) in adjacent land. Peatland drainage leads to increased greenhouse gas (GHG) emissions (carbon dioxide from peat oxidation, methane from drainage ditches, nitrous oxide from nitrification), subsidence (reduction in peat thickness by oxidation and compaction) and increased fire risk. Drainage affects water regulation capacity, and therefore water security of downstream human communities and ecosystems. Many peatlands are located close to sea or river level and subsidence may result in increased and prolonged flooding and salt water intrusion, thereby affecting the ecological character of the peatland. If the peatland is located on acidic sulphate soils, drainage may result in very acidic runoff, rich in metals, that contaminates the waters downstream;
 - b. Vegetation removal or disturbance (e.g. by land use change) directly reduces biodiversity (flora, fauna, their distribution patterns and population resilience). It exposes the peat to direct solar radiation and wind, water and frost erosion, resulting in changes in micro-climate and desiccation of the surface peat and flooding risk in the surrounding areas;
 - c. Construction of infrastructure (e.g. roads, pipelines, buildings) on peat causes compaction by overburden and vehicles and requires drainage (often resulting in erosion and exacerbating draining in drier climates). This results in habitat and species loss, change in drainage patterns and compaction flooding in wet periods and increased fire risk in dry ones. Construction in permafrost areas may result in ice thawing, thermokarst, flooding and increased GHG emissions, especially of methane;
 - d. Peat extraction involves drainage and removal of peat (and vegetation), which reduces carbon storage and increases GHG emissions. There may also be local effects on water quality and regulation, and biodiversity, as well as aesthetic impacts potentially affecting the recreational potential;
 - e. Eutrophication (input of nutrients) is caused by direct on-site fertilization and atmospheric deposition, or (in fens) by input of nutrients in ground or surface water derived from the fertilizer added to surrounding landscape;
 - f. Acid rain deposition from industrial sources can severely affect wildlife;

- g. Peatland fires have led to considerable damage of peatlands around the world, especially in drained and, thereby, dry peatlands, affecting vegetation and emitting in some cases large amounts of GHGs. Peatland fires and related haze have major economic impacts (for example, on transport, tourism, agriculture and forestry) and public health impacts;
- h. Specific quantitative and qualitative criteria for classifying peatlands as degraded are to be determined by Contracting Parties based on scientific, legislative and national policy considerations.

Peatland restoration

- 6. Rewetting of peatlands means restoring the water table or hydrological regime towards a condition where the new ground water level is close to the surface of the peatland, with the aim of partial or total reversal of the effects of drainage. (Subsidence may have made original conditions impossible.)
- 7. Rewetting of drained peatland restores some ecosystem functions but full recovery may be difficult and a long-term objective. Rehabilitation of fauna and flora, for example, can take a long time, if it is achieved at all, and depends on the peatland type and species available. Some degraded peatlands can still provide ecosystem functions, for example fens that are used for traditional hay making, and former peat extraction fields that have been rewetted and are used for paludiculture. These peatlands may be degraded but can be included in a Ramsar Site designation if they form part of a mosaic that includes pristine peatlands.
- 8. In addition to peatland rewetting, active restoration techniques that reintroduce peatland plant species are important to restore the vegetation layer.

Position within Ramsar's classification system

- 9. Since peatlands are characterized by the presence of peat, whereas the Ramsar Classification System is based on vegetation, peatlands occur in most Ramsar Wetland Type categories, especially:
 - a. Marine/coastal wetland, mainly under categories H (intertidal marshes), I (intertidal forested wetlands), J (coastal brackish/saline lagoons), and K (coastal freshwater lagoons);
 - b. Inland wetland, under categories U (non-forested peatlands) and Xp (forested peatlands); and
 - c. All other Inland wetland categories except Tp (permanent freshwater marshes/pools on inorganic soils), Ts (seasonal/intermittent freshwater marshes/pools – inorganic soils), W (shrub-dominated wetlands – inorganic soils), Xf (wooded swamps on inorganic soils) and Zk (b) (subterranean karst systems).

Applying the Ramsar Criteria

- 10. Peatlands considered for designation under Criterion 1 include pristine, peat-forming peatlands, some human-modified and naturally degrading peatlands that are no longer forming peat, and restored or rehabilitated peatlands that meet the criteria. They may consist of a mosaic of different peatland types with various levels of human impact.

11. Designation of peatlands as Ramsar Sites should pay special attention to peatland areas with at least some of the following attributes:
 - a. Intact hydrology and peat-forming vegetation;
 - b. Characteristic biodiversity;
 - c. Large carbon store and active carbon sequestration;
 - d. Well-developed and conserved historical archives of past environmental and human change;
 - e. Unique macro- and/or micro-morphological features, such as complexes of peatland habitats or diverse micro-topography (e.g. hummocks and hollows); and/or
 - f. Peatlands with high potential as “nature-based solutions” to reduce the risks of impacts related to climate change including climate change effects.
12. Special attention should be paid to the designation of vulnerable peatlands (for example, where minor impacts could lead to major degradation), to degraded peatlands with high potential for restoration and to peatlands that reduce the vulnerability of nearby human populations in the face of climate change. Criterion 2, which refers to vulnerable, endangered, or critically endangered species or threatened ecological communities, may be considered in this regard.

Application of Criterion 1 of the Application Guidelines with respect to carbon storage

13. As acknowledged in Resolutions XII.11 on *Peatlands, climate change and wise use: Implications for the Ramsar Convention* [and XIII.13 on *Restoration of degraded peatlands to mitigate and adapt to climate change and enhance biodiversity and disaster risk reduction*], peatlands are important carbon stores, for carbon sequestration and, in the case of restoration of degraded peatland, in reducing GHG emissions. Peatlands provide opportunities for awareness raising, communication and education. They can be used to demonstrate best practices for wise use and restoration. Peatlands for which the relevance of climate-change adaptation and mitigation is considered in the process of their designation as demonstration sites with respect to Criterion 1 would feature (some of) the following attributes:
 - a. Large peat volume that can be preserved, always in proportion to the area of the territory of the Contracting Party, which makes the request/proposal;
 - b. Information on the area’s history, land use, hydrology, and peat volume, to enable assessment of the effects of restoration, as appropriate, on carbon store capacity and GHG fluxes to be used for communication and awareness raising; and
 - c. Accessibility to provide site facilities that enable awareness-raising and education activities to be carried out on site.

Boundaries and size

14. Large peatlands should generally have higher priority for designation than small areas, because their hydrology, carbon stock and historical archives are easier to protect and because they

incorporate macro-landscapes (see also Section 5.6 of the *Strategic Framework* on “Site delineation and boundary definition”).

15. Safeguarding the hydrological integrity of peatlands designated as Ramsar Sites is critical to their long-term persistence. Site boundaries must be drawn in such a way as to prevent and eliminate as far as possible the impact of off-site hydrological changes on peatland hydrology.
16. Small peatlands can also be important for biodiversity, raising public awareness and providing education on the role of peatlands (see also paragraph 78 of the *Strategic Framework*).
17. Individual peatlands and complexes incorporating several peatland types (also with various levels of human impact) may qualify for designation (see also paragraph 91 of the *Strategic Framework* concerning site clusters).

The importance of peatland inventories

18. A peatland inventory should elaborate and/or collate key information for a wide range of conservation purposes including the designation of Ramsar Sites. A comprehensive overview of the extent, location and distribution of peatlands is necessary for each peatland inventory.
19. Ramsar guidance on wetland inventory (see Ramsar Handbooks 15 *Wetland Inventory* and 13 *Inventory, assessment and monitoring*) also applies to peatlands. According to this guidance, an inventory for the designation of peatlands as Ramsar Sites should use a hierarchy of four mapping scales in GIS format (multi-scale approach):
 - a. The identification of peatland regions (at a scale from 1:500,000 to 1:1,000,000) using national and international information on bioclimatic and biogeographical ecoregions and landscape types (such as, for Europe, Moen *et al.* 2017²);
 - b. Within the identified peatland regions, the assessment of location and rough extent of confirmed and probable peatlands (1:250,000 to 1:500,000);
 - c. The validation of these data and the collection of supplementary field and literature data to characterize hydrology and vegetation (1:100,000 to 1:250,000) to determine representativeness, rareness, or uniqueness of peatlands under Criterion 1; and
 - d. The mapping of habitats and management issues (1:10,000 to 1:50,000).
20. At all levels of analysis, the usefulness of the information must be assessed to determine if further data collection is necessary.
21. Parallel to this inventory, draft descriptions of specific peatlands in relation to Ramsar Criterion 2 should be prepared through evaluation of information on vulnerable, endangered, or critically endangered species or threatened ecological communities.

Further sources of information on peatlands

² Joosten, H., Tanneberger, F. & Moen, A. (eds.) (2017) *Mires and Peatlands of Europe: Status, Distribution and Conservation*. Schweizerbart Science Publishers, Stuttgart.

22. Much information on peatlands is available on the Internet. For successful information gathering, the use of appropriate search terms is important. Search terms should include any local term related to organic soil or peatland, combined with the country name (be aware of former country names which are no longer in use).
23. Soil data (including in manuscript form) might be available from soil institutions and other authorities. Since organic soils are subject to various kinds of land use, relevant information might be held by various national and regional authorities, including those responsible for geology, land development, environment, agriculture, forestry, resource extraction or energy. The information available from these authorities is sometimes of high resolution, often not available online, and must often be purchased.
24. Maps from digital archives (see below) are generally freely accessible and provide valuable information if geographic information system (GIS) data of appropriate resolution and accuracy are unavailable. Most maps are available as high-resolution images, which can be downloaded, geo-referenced and incorporated in GIS software. A large number of maps of the World Soil Survey Archive, the Sphaera library, and the Laboratory of Soil Science at Ghent University are not digitally available, but can be consulted at the archive sites themselves.
25. Spatially explicit soil information of various spatial resolutions is available in the open access online archives listed below at Table 1.

Table 1: Open access soil information archives

Source	Website
International Soil Reference and Information Centre (ISRIC World Soil Information)	http://www.isric.org/
European Union Joint Research Centre	https://ec.europa.eu/jrc/en
FAO Corporate Document Repository	http://www.fao.org/documents/search/en/
Institute de Recherche pour le Développement : Base de données Sphaera du service Cartographie	http://www.cartographie.ird.fr/sphaera
World Soil Survey Archive and Catalogue (WOSSAC)	http://www.wossac.com
Perry-Castañeda Library Map Collection, University of Texas at Austin	http://www.lib.utexas.edu/maps/topo/
Ghent University Laboratory of Soil Science	http://www.labsoilscience.ugent.be/Congo
Commonwealth Scientific and Industrial Research Organization: Land Research Surveys	http://www.publish.csiro.au/nid/289/aid/16088
International Peatland Society: Publications	www.peatlands.org
International Mire Conservation Group: Publications	www.imcg.net/pages/publications/papers.php
Greifswald Mire Centre	http://greifswaldmoor.de/about-us.html
Wetlands International: Peatland Treasures	https://www.wetlands.org/our-approach/peatland-treasures/
Ramsar Recommendation 7.1: A global action plan for the wise use and management of peatlands	https://www.ramsar.org/document/recommendation-71-a-global-action-plan-for-the-wise-use-and-management-of-peatlands
Directory of Soil Institutions and soil experts in Africa	http://www.apipnm.org/swlwpnr/reports/y_sf/sf/tb221.htm

Source	Website
Canadian Peatland Inventory	http://ftp.geogratia.gc.ca/pub/nrcan_rncan/archi ve/vector/geology/Peatland/

26. More empirical supplementary data can be obtained from a wide range of sources, including publications and grey literature on: research and protection of wetlands, peatlands and organic soil; paleo-ecological, pedological, geological, hydrological and botanical research; expedition reports; technical reports by companies and environmental organizations; and incidental descriptions.
27. To locate data (including proxy data) on the occurrence of peatland and organic soil, relevant research institutes, ministries or agencies may be contacted. Data on organic soil are generally elaborated by and stored at various authorities, reflecting the multiple land uses applied on them. Relevant national authorities may include those for agriculture, forestry, resource extraction, geology, hydrology or environment. Considering the often very local terms for peatlands and organic soils, it is important to become familiar with local terms and concepts before contacting local authorities and researchers.

Annex 2

Case Study Example: Designation of a peatland as a Ramsar Site using climate mitigation relevance as an additional argument (Lille Vildmose, Denmark)

1. Lille Vildmose is a Ramsar Site, a peatland complex with one of the largest areas of active raised bog in lowland Northwest Europe. The bog was until about 2,500 years ago part of a strait connected to the sea of Kattegat. The landscape elevated due to post-glacial uplifting and eventually the strait was blocked with a brackish lagoon that was covered by nutrient-poor reed swamp. The reed swamp and subsequent development of forest bog were followed by treeless bog of *Sphagnum* mosses. The sphagnum eventually lost contact with the ground water creating the raised bog that exists at present in Lille Vildmose.
2. The bog is currently subject to a large-scale ecological restoration project. Even though the approximately 24 square kilometres (km²) of raised bog is the largest remaining in lowland Northwestern Europe, it is only 40% of its original size. Originally, four lakes covering 400 hectares (ha) were situated in the raised bog: Tofte Sø, Birkesø, Lillesø and Møllesø. These were surrounded by peat habitat having a natural outlet to the sea at Strebæk south of Mulbjerg. Between 1760 and 1769, these lakes were drained and the lake bottoms used for agriculture.
3. At that time, handmade channels were excavated over several years, including a channel of about 7 metres deep and 2 km long leading the drainage water to the sea. Two of the lakes (Lille Sø and Tofte Sø) have been restored (one in 1927 and one in 1973) and a third (Birkesø - 130 ha) is in the process of restoration. In contrast to the acid bog, the freshwater lakes in the area have a neutral pH, as they are fed by groundwater springs connected to calcium-rich soil.
4. From 1937 to 1939, the Danish government acquired 2,300 ha in the central part of the peatland with the objective of creating farmland for small-scale farmers. Digging 200 km of ditches improved the drainage and cultivation begun along the eastern border, including for marling, a friable earthy deposit consisting of clay and calcium carbonate used especially as a fertilizer for soils deficient in lime. Lack of fuel during Second World War hampered this project and the northwestern part was sold for peat-extraction and fuel for the local cement-industry. After the war, the cultivated land was found to be rather unattractive. Of 80 planned peatland areas for smallholders, only 36 were sold. Much of the area was turned into grassland and used for summer grazing by domestic animals. The government also started to lease land for peat-extraction. Initially this was mainly for fuel, but later it developed into a highly industrialized extraction of *Sphagnum* for private and market gardening. Peat extraction stopped in 2011 and today the central part of the Ramsar Site is a mixture of farmland, extensive grassland and recently abandoned open peat-mines in the process of being restored in the sense that the water level has been raised.

Management

5. In contrast, the southern part of the Ramsar Site is in a near natural condition as it was fenced, from 1906 to 1907, and set aside as traditional hunting ground for a major estate. A 25-km fence encircled 20 km² of active raised bog and the adjacent forest of Tofte Skov. Drainage of farmland including dredging of the local stream Haslevgaarde River outside the Ramsar Site has disturbed the fringe of this active bog giving it a drier surface. This in turn has allowed some colonization of birch *Betula sp.* and conifers adding further to increased evaporation and the

creation of shade not otherwise found on the active bog. In addition, this process of scrub development has been stimulated by airborne deposit of nutrients (N) to the oligotrophic bog.

6. In the northern part of the Ramsar Site there are two other important areas of raised bogs – both partly degraded. Together with a neighbouring forest (Høstemark Skov), one of these has been another private hunting ground, which was fenced (13 km) from 1933 to 1934. Both forests in the area are predominately lying on moist low-lying land and have significant sectors of fairly old, broadleaf forest.
7. After a vision-based planning process, a number of restoration activities have been initiated focusing on the re-establishment of a more natural hydrology, where possible, and facilitation of natural connectivity between the various habitats – forests, lakes, bogs and other open habitats. The restoration activities are funded by both public and private funds. An EU LIFE+ Nature project (2011 to 2018) is partly funding on-going activities.
8. Key elements of restoration on the bogs include recreation of the natural water system by ditch blocking and elimination of Birch and other trees over an area of 200 ha. In former peat extraction areas, work to restore the possibility of new bog-formation has involved damming in the drainage-system in order to retain water and/or reduce outflow. Significant areas have been flooded (770 ha). In the forests, the establishment of a natural hydrology has occurred with elimination of conifer plantations (common spruce *Picea abies*, dwarf pine *Pinus mugo*, and Sitka spruce *Picea sitchensis*).
9. Parallel to the physical restoration activities, is a large scale on-going grazing project. A third fence around the central area allows trials with free ranging red deer *Cervus elaphus* and moose *Alces alces* – the latter a re-introduction to Lille Vildmose and Denmark in 2016. The vision is to combine all three fences allowing free movement of all large herbivores, for example allowing the populations within the southern fence (red deer and wild boar *Sus scrofa*) and the northern fence (red deer) to merge. The purpose is to use these herbivores as a measure to establish a more natural grazing pressure in the area and thereby keep the area open by limiting the overgrowth of bog vegetation with trees and scrub.
10. The Ramsar Site is covered by the largest nature conservation order in Denmark to date to protect its natural, cultural and landscape characteristics and includes 7,513 ha. Furthermore, the area is protected as an EU Natura 2000 site and a management plan has been developed for the entire area with the main aim to restore the raised bog habitat including habitats for endangered and vulnerable species and threatened ecological species communities.

Climate mitigation

11. As well as 2,022 ha of active raised bog, the area contains 252 ha of degraded raised bogs still capable of natural regeneration, 1,246 ha of degraded peatland under restoration, 400 ha of bog woodland and 1,000 ha of old natural forest of high biodiversity value on mineral soil. Peat extraction up to 2011 has reduced the area of active raised bog from an original extent of 5,500 ha to its current extent of 2,022 ha.
12. Calculations, using the IPCC (2014) default values, arrived at net GHG emissions of 17,780 CO₂-eq. yr⁻¹ before the major restoration activities started in 2011 and expect 7,294 CO₂-eq. yr⁻¹ after finalizing restoration activities including rewetting of the central and drained parts of Lille Vildmose in 2018.

13. The calculated emissions from Lille Vildmose represent c. 1% of the total emissions from peatlands in Denmark and c. 0.02% of the total net human emissions of Denmark (in 2012). It has been estimated that the estimated carbon content in the total peat area of Lille Vildmose is “estimated to be approximately 10% of the total peat carbon volume of 73.6 Mton” in the country (Joosten 2009). Based on these estimates, Lille Vildmose is and will continue to be a net GHG emitting ecosystem, although with smaller fluxes due to rewetting, despite the carbon sequestration taking place (as shown in Table 1).

Table 1. Indicative GHG in Lille Vildmose before and after project implementation (emission factors according to IPCC 2014 including the sum of CO₂, CH₄ and N₂O). After Barthelmes et al. 2015.

Land type	Extent (ha)	Emission Factor (ton CO ₂ -eq ha ⁻¹ yr ⁻¹) <u>before</u> project start	Total emissions (ton CO ₂ -eq yr ⁻¹) <u>before</u> project start	Emission Factor (ton CO ₂ -eq ha ⁻¹ yr ⁻¹) <u>after</u> project	Total emissions (ton CO ₂ -eq yr ⁻¹) <u>after</u> project
Active raised bog	2,022	0	0	0	0
Degraded raised bog capable of regeneration	252	10	2,520	3	756
Degraded peatland under restoration	1,246	10	12,460	3	3,738
Bog woodland	400	7	2,800	7	2,800
			Total 17,780		Total 7,294

14. Climate change mitigation potential is greatest in heavily degraded sites, such as peatlands that have been profoundly drained and used as cropland. In those cases, rewetting can achieve the largest GHG emissions reductions. These areas may not be as appealing from a biodiversity perspective, as a result, which could hamper their designation as Ramsar Sites. However, it is suggested that when using climate change mitigation as an additional argument to Ramsar Criterion 1, the following considerations are taken into account, which were followed in the case of Lille Vildmose, to designate complexes where:

- major parts qualify for designation for non-climate related reasons;
- there are significant areas where restoration will support and strengthen the conservation of adjacent good parts or lead to a substantial emission reductions; and/or
- where national significant peat carbon stocks are present.

Communication and awareness

15. “Lille Vildmose is one of the most advanced Danish nature areas in terms of nature communication and visitor facilities.” A large tourist and visitor centre is centrally situated in the area where wildlife exhibition, films and information activities are showcased. There are guided tours to the peatlands and special education programmes for schools during the summer.
16. Several boardwalks have been placed at Portlandmosen and Tofte Mose, as well as a number of information boards and watch towers for bird and animal watching. Information boards were placed in eight areas of special interest to the restoration project between 2012 and 2015.

17. In 2013, the site was designated as a Ramsar Site using the additional argument for climate regulation for the first time in Ramsar history. The designation was based on two Ramsar Criteria: 1) that the peatland sequesters and stores carbon, and 2) that the bog contains large areas of threatened plant communities that have severely declined in distribution and extent in the relevant biogeographic region, because of large-scale extraction of peat and agricultural land use. Moreover, habitats for vulnerable animal species are present including the golden eagle *Aquila chrysaetos*, white-tailed sea-eagle *Haliaeetus albicilla*, common crane *Grus grus* and Eurasian otter *Lutra lutra*. Communication and awareness materials have been developed to raise awareness about these assets.
18. The area is greatly visited, including by foreign tourists, especially in the summer. A total of 50,000 local visitors, as well as national and international tourists visited the centre in 2014. Since then, and up to 2016, the number increased to 75,000 visitors. It is estimated that twice as many tourists visit the Lille Vildmose Ramsar and Natura 2000 Site annually.
19. Although the contribution of Lille Vildmose to global climate regulation may appear small, it plays simultaneously a valuable and active role as an information centre to thousands of people, in Europe and beyond.

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Figure 1. Map of Lille Vildmose with the Ramsar site boundary in yellow (designated in 2013). Restoration areas are demarcated in red primarily by reestablishing a natural high water table. Most areas in brown are raised bog vegetation including some restored areas.



Annex 6

Timetable

The 1st Task Force Meeting for the development of new APMS was organised on 7 February 2022 and the first draft of APMS was distributed to ASEC and member states for comment on 6 May 2022. This was followed by a public webinar on 16 May 2022 attended by 120 stakeholders, where the FAs and action plan matrix were presented to a wider stakeholder audience along with focused discussions. The Action Plan matrix was shared and discussed in working groups with participants. All feedbacks were used to update the 1st draft APMS¹. A compilation of on-going and relevant agreements within ASEAN and beyond was also done (Annex 4). The relevance of peatlands to international agreements, e.g. the UN Sustainable Development Goals (SDGs), the Convention on Biological Diversity (CBD), Aichi targets and the Ramsar Convention, was also considered and integrated.

On 22 June 2022 the 2nd draft was distributed to the Member States and externally to various Partners, for peer review and a revised 2nd draft was presented at the 2nd Task Force meeting on 6 July 2022 for discussion and inputs. Based on the inputs and guidance, the 3rd draft was shared and discussed with selected Member States on 12 October 2022. Following the inputs of the selected Member States, the Focal Areas were revised. The 4th Draft was distributed on 26 March 2023 and the draft was reviewed by the 3rd Task Force meeting on 27 March 2023. Further inputs from Malaysia and Philippines were received on 14 April 2023 and the final Draft was circulated on 17 July 2023 for consideration at the 8th ATFP meeting.

Process timeline of the APMS 2022 -2030 Development

Date	Topic	Comments
17.11.21	Inception report, General structure, Table of Contents	Presentation of draft ToC of the APMS and new Focal Areas
17.11.21 – 18.01.22	ASEC Comments	ASEC comments incorporated.
01.03.22 – 18.03.22	Distribution of questionnaire	
07.02.22	1 st Task Force meeting	Structure of the APMS and Focal Areas approved
01.11.21 – 31.06.22	Literature review	
06.05.22	Distribution of 1 st Draft APMS	
13.05.22	Stakeholder Webinar with working groups	Comments and input from webinar and Member States incorporated
22.06.22	Distribution of 2 nd Draft APMS	
22.06.22 – 27.06.22	ASEC Comments	ASEC comments incorporated.

Date	Topic	Comments
06.07.22	2 nd Task Force meeting	
05.08.22 – 15.10.22	Written comments from Task Force and AMS Partners	Comments and input from Member States and Partners incorporated
12.10.22	Sharing the 4 th Draft and Meeting with Philippines and Indonesia	At the specific request from Indonesia and the Philippines, the FAs were revised
26.03.23	Distribution of 4 th Draft APMS	
27.03.23	3 rd Task Force meeting	
14.04.23	Feedback from AMS (Malaysia and Philippines)	Final comments and input from Member States incorporated
17.07.23	Distribution of Final Draft APMS	
20.07.23	Review by the 8 th ATFP	Further comments by 31.07.23 (Indonesia, Malaysia, Philippines)
23.08.23	Adoption by COM/COP-18	



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