



THE SECOND ROADMAP FOR ASEAN COOPERATION ON TRANSBOUNDARY HAZE POLLUTION CONTROL WITH MEANS OF IMPLEMENTATION



one vision
one identity
one community



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The ASEAN Secretariat
Jakarta

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Cover Photo : Ricky Martin/CIFOR-ICRAF | International Tropical Peatlands Center (ITPC) field visit

Catalogue-in-Publication Data

The Second Roadmap for ASEAN Cooperation on Transboundary Haze Pollution Control with Means of Implementation

Jakarta, ASEAN Secretariat, September 2024

ASEAN: A Community of Opportunities for All

363.7392

1. ASEAN – Environment – Haze
2. AATHP – Air Pollution – Policy

This Publication is supported by the Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia (MAHFSA) Programme, funded by International Fund for Agricultural Development (IFAD).

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General information on ASEAN appears online at the ASEAN Website:

www.asean.org

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Contents

Abbreviations and Acronyms	vi
Foreword	vii
Acknowledgment	ix
1 Introduction	1
1.1 Vision	4
1.2 Goal	4
1.3 Targets/Indicators	4
2 Strategies	5
2.1 Strategy 1: Enhance Implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), including Capabilities of the ASEAN Coordinating Centre for Transboundary Haze Pollution Control (ACC THPC)	6
2.2 Strategy 2: Developing and Implementing Sub-regional Strategies	7
2.3 Strategy 3: Sustainable Management of Agricultural Land and Forests to Prevent Large-Scale Land and/or Forest Fires	8
2.4 Strategy 4: Sustainable Management of Peatlands for Peatlands Fire Prevention, in accordance with the ASEAN Peatland Management Strategy (2023- 2030)	9
2.5 Strategy 5: Securing Adequate Resources from Multi-Stakeholders for Transboundary Haze Prevention	10
2.6 Strategy 6: Strengthening Relevant National Policies, Laws, Regulations, and Their Implementation (including Follow-Up and Review/Enforcement)	10
2.7 Strategy 7: Enhancing Cross-Sectoral and Multi-Level Cooperation to Protect the Global Environment	11
2.8 Strategy 8: Enhancing Public Awareness and Stakeholder Participation	12
2.9 Strategy 9: Evaluate and Mitigate the Impacts of Haze on Health, Economy, Society, and the Environment	12

3 Means of Implementation	14
3.1 Institutional Framework	14
3.2 Cross-Sectoral Coordination	15
3.3 Collaborative Partnerships	15
3.4 Resource Mobilisation	16
3.5 Communication Strategy	17
4 Reporting, Monitoring, and Evaluation	18
5 Logframe for Actions under the Strategies	19
Annex Guidance on Monitoring and Evaluation Framework	31

Abbreviations and Acronyms

AATHP	ASEAN Agreement on Transboundary Haze Pollution
ACC THPC	ASEAN Coordinating Centre for Transboundary Haze Pollution Control
AEC	ASEAN Economic Community
AMME	ASEAN Ministerial Meeting on the Environment
AIF-HFSLM	ASEAN Investment Framework for Haze-Free Sustainable Land Management
APMS	ASEAN Peatland Management Strategy
APSC	ASEAN Political-Security Community
ASCC	ASEAN Socio-Cultural Community
ASEAN	Association of Southeast Asian Nations
ASOEN	ASEAN Senior Officials on the Environment
ASOF	ASEAN Senior Officials on Forestry
ASEC	ASEAN Secretariat
ASMC	ASEAN Specialised Meteorological Centre
ATFP	ASEAN Task Force on Peatlands
COM	Committee under the Conference of the Parties to the ASEAN Agreement on Transboundary Haze Pollution
COP	Conference of the Parties to the ASEAN Agreement on Transboundary Haze Pollution
MSC	Sub-Regional Ministerial Steering Committee on Transboundary Haze Pollution
NAPP	National Action Plans on Peatlands
NGO	Non-Governmental Organization
NMC	National Monitoring Centre
SOM-AMAF	Senior Officials of ASEAN Ministers on Agriculture and Forestry
SOMHD	ASEAN Senior Official's Meeting on Health Development
SOP MAJER	Standard Operating Procedure for Monitoring, Assessment, and Joint Emergency Response
TWG	Technical Working Group on Transboundary Haze Pollution

Foreword



Southeast Asia, endowed with rich tropical forests that serve as the source of life for our peoples, is facing critical environmental challenges. The region's lush landscapes, once thriving and vital, are increasingly jeopardized by human activities such as deforestation and land clearing. These actions have precipitated a persistent and severe air pollution phenomenon known as transboundary haze. Originating primarily from land clearing, forest and peatland fires, the haze has, at times, cast a shadow over large swathes of the region, escalating into sub-regional and regional concerns, and precipitating severe environmental degradation, health risks, and socio-economic disruptions.

In response to this persistent issue, the ASEAN Member States (AMS) demonstrated their collective resolve through the *ASEAN Agreement on Transboundary Haze Pollution* (AATHP) and the *Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control with Means of Implementation (2016-2020)*, known as the First Roadmap. These initiatives laid an important groundwork for a more coordinated and effective regional approach to haze pollution.

In 2021, a review of the First Roadmap highlighted the need for an updated strategy that reflects ASEAN's latest priorities and at the same time incorporates integrated solutions. Consequently, the Second Roadmap was developed through intensive consultations with AMS, partners, and other stakeholders. The *Second ASEAN Haze-Free Roadmap* hence represents a pivotal milestone in advancing regional cooperation to address transboundary haze pollution. By effectively implementing collective action at the regional, sub-regional, national, and local levels, we can better prevent and control open burning from agriculture, forests, and peatland fires, thus protecting the ecological integrity and public health within ASEAN.

At the core of this Roadmap lie nine mutually reinforcing strategies, designed to address the multifaceted dimensions of haze pollution. These strategies underscore ASEAN's steadfast commitment to tackle this pressing issue with comprehensive and sustainable solutions, from enhancing cross-

sectoral and institutional frameworks to adopting targeted approaches for peatland management.

Moving forward, the success of the *Second ASEAN Haze-Free Roadmap* hinges upon achieving a significant and sustained reduction in the number of haze pollution episodes in the region as well as realizing individual national PM2.5 air quality targets by 2030. This ambitious goal necessitates concerted efforts, robust partnerships, and unwavering dedication from all AMS and other relevant stakeholders.

As we embark on the journey as outlined in this Second Roadmap, let us remain resolute in our commitment to mobilize resources, strengthen legal and policy frameworks at all levels, enhance cross-sectoral cooperation and coordination, and increase public awareness and engagement. Together, we will overcome the challenges posed by transboundary haze and forge a future where clean air and sustainable development prevail for the well-being of the peoples of ASEAN. We must work together to restore and heal nature so as to heal ourselves.

I am therefore pleased to present the Second Haze-Free Roadmap 2023-2030. It is my sincere hope that the strategies and means of implementation found in this publication will serve as a valuable guide towards realizing a Transboundary Haze-Free ASEAN by 2030.



DR. KAO KIM HOURN
Secretary-General of ASEAN

Acknowledgment

This document was endorsed by the 18th Meeting of the Committee under the Conference of the Parties to ASEAN Agreement on Transboundary Haze Pollution (COM-18) on 22 August 2023 and adopted by the 18th Meeting of the Conference of the Parties to ASEAN Agreement on Transboundary Haze Pollution (COP-18) on 23 August 2023 in Vientiane, Lao PDR.

The Institute for Global Environmental Strategies (IGES) team co-led by Dr. Eric Zusman and the late Dr. Peter King, in collaboration with Dr. Supat Wangwongwatana of Thammasat University of Thailand, facilitated its development with the support of the Measurable Action for Haze-Free Sustainable Land Management in ASEAN (MAHFSA) Programme, funded by the International Fund for Agricultural Development (IFAD).

The expertise and insights provided by the Task Force Members for the Development of the new ASEAN Haze-Free Roadmap, the Committee under the Conference of Parties to the ASEAN Agreement on Transboundary Haze Pollution (COM) National Focal Points representatives, and the Environment Division of the ASEAN Secretariat, were invaluable and significantly contributed in creating a haze-free ASEAN.

1 Introduction

Transboundary haze pollution is a recurring problem for the Association of Southeast Asian Nations (ASEAN), ASEAN Member States (AMS), and the region. Haze-related issues have created significant consequences for sustainable development in ASEAN, affecting several areas:

- Agriculture. Haze-related obstructions of solar radiation have led to a reduced rate of photosynthesis and a subsequent drop in crop productivity.
- Ecology. Haze-related issues have contributed to increased production of acid rain and greenhouse gases, including ozone.
- Economic. Haze-related issues have contributed to declines in tourism, increased costs to business, and slower growth in trade and investment.
- Health. There has been an increased incidence of short-term haze-related illnesses, including acute respiratory conditions (e.g., breathing difficulties and decreased lung function), allergies, asthma, eye irritations, and skin ailments. Haze has also been linked to an increased incidence of cardiovascular disease and premature death.
- Social: Severe haze problems have led to extended school closures, as well as reductions in the work force and productivity.

Accordingly, AMS adopted the ASEAN Agreement on Transboundary Haze Pollution (AATHP), to prevent and monitor transboundary haze pollution from land or forest fires through intensified international, national, and regional cooperation. The AATHP was signed by AMS in 2002, and entered into force in 2003 after its ratification by six AMS.

By January 2015, all 10 AMS had ratified the AATHP. ASEAN's commitment to implement the Agreement was strengthened in October 2015, when the 11th Meeting of the Conference of the Parties to the AATHP (COP), in Hanoi, Viet Nam, agreed to develop a Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control with Means of Implementation.

Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control

In March 2016 in Chiang Mai, Thailand, a task force met for a three day-workshop to develop the Roadmap. The task force was comprised of senior officials and experts from individual AMS responsible for fire management and transboundary haze pollution, as well as invited experts and partners.

The Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control with Means of Implementation (2016-2020) was adopted by the 12th Meeting of the Conference of the Parties (COP-12) to the ASEAN Agreement on Transboundary Haze Pollution (AATHP), held on 11 August 2016 in Kuala Lumpur, Malaysia. The Roadmap offered a strategic framework to implement collaborative action to control transboundary haze pollution in ASEAN.

Between 2016 and 2023, the Roadmap offered a strategic framework for the implementation of collaborative actions to control transboundary haze pollution in the ASEAN region. It guided ASEAN's action through its *Vision of a Transboundary Haze-Free ASEAN by 2020* and its Goal to eliminate *regional transboundary haze through intensifying collection action*, with three indicators to measure progress and eight strategies for concrete and collective action at the national and regional levels.

In 2019, Parties to the AATHP agreed to review of the Roadmap to evaluate progress in efforts to achieve the Vision of a Transboundary Haze-Free ASEAN by 2020 and make recommendations. The Review was carried out between 2020 and 2021 through surveys and interviews, and by collecting feedback and reflections from AMS representatives on their experiences in implementing the Roadmap. The Review proposed development of a new revised Roadmap through an inclusive, open, and participatory process to ensure that the Second Roadmap would reflect ASEAN's latest priorities and implement integrated solutions.

In November 2021, the Parties to the AATHP noted the Review's findings and agreed to develop a Second Roadmap. A task force comprising senior officials from AMS and supported by ASEAN's Development Partners was established and met four times between 2022 and 2023 to finalise the Second Roadmap.

The Second Roadmap for ASEAN Cooperation on Transboundary Haze Pollution Control with Means of Implementation

The gaps and improvements that the Second Roadmap aims to address, based on the Review findings, are as follows:

- a. Broadening the Roadmap's vision to reflect the growing complexities revolving around the regional versus national and land versus forest distinction to address transboundary haze pollution;
- b. Greater emphasis on fire prevention and suppression measures;
- c. Implementing a results-based strategy framework that includes aligned actions, as well as quantifiable indicators and measures of progress;
- d. Incorporating alternatives to zero-burning policy for community livelihoods;
- e. Complementing regulatory instruments with economic instruments;
- f. Recognising unique sub-regional needs, as well as the value of adopting sub-regional strategies to address the situation on the ground;
- g. Implementing more innovative, inter-sectoral/cross-pillar/multi-stakeholder, sustainable and inclusive approaches; and
- h. Better aligning with the Sustainable Development Goals of the United Nations 2030 Agenda for Sustainable Development and the objectives of the ASEAN Socio-Cultural Community (ASSC) Blueprint.

The Second Roadmap will consist of updates to the Vision, Goal, Targets and Indicators, Strategies, Means of Implementation, and a Logframe to track progress.

Building on ASEAN's experience, the Second Roadmap will adopt multi-disciplinary and science-based approaches, reflecting its deeper understanding of the causes and consequences of haze, as well as multi-stakeholder approaches, unique sub-regional needs, and the value of adopting diverse policy instruments.

1.1 Vision

The shared vision of ASEAN Member States in the Second Roadmap is as follows:

A Transboundary Haze-Free ASEAN by 2030

1.2 Goal

In pursuit of our shared vision, ASEAN Member States commit to the following goal:

Regional transboundary haze pollution is eliminated through the effective implementation of collective actions at the regional, subregional, national, and local levels to prevent and control open burning from agriculture, land and/or forest fires, including peatland fires.

1.3 Targets/Indicators

The success of the Second Roadmap will be determined by achieving the following targets by 2030:

- i. **A significant and sustained reduction in the number of haze pollution episodes in ASEAN**
- ii. **Achieving national PM_{2.5}¹ air quality targets with a view toward achieving the World Health Organisation's annual and 24-hour Interim Targets 3 for PM_{2.5}**

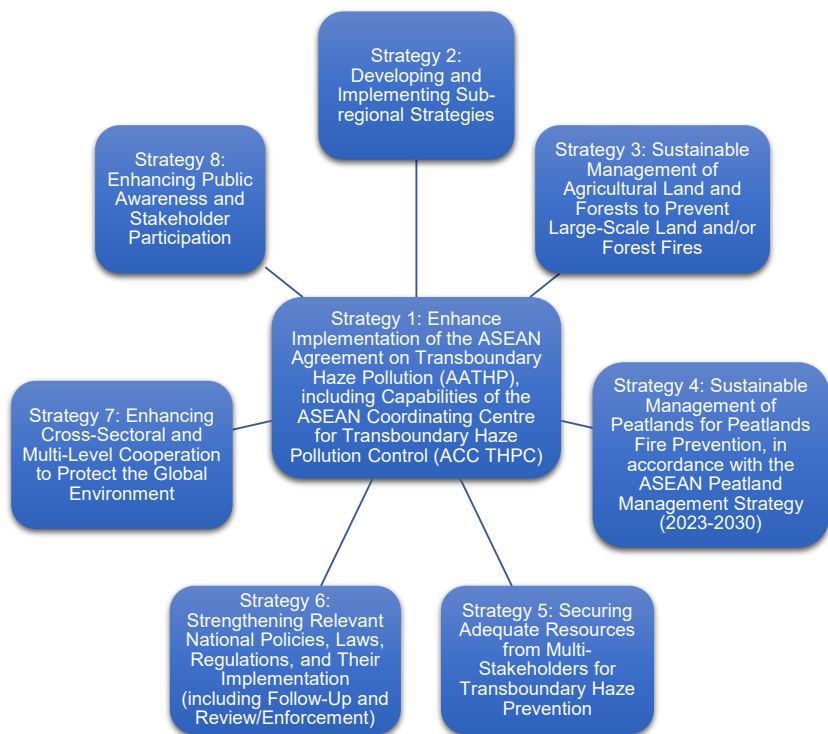
1 Fine particulate matter or particles less than 2.5 micrometers in diameter

2 Strategies

The Second Roadmap consists of nine mutually reinforcing strategies. Operationalizing each strategy involves taking actions that collectively enhance implementation of the AATHP. These strategies include:

1. effective AATHP implementation through cross-sectoral and institutional enhancements,
2. adopting targeted approaches for peatlands (as distinct from agricultural lands),
3. addressing sub-regional needs,
4. adopting a differentiated and targeted approach towards peatlands versus agricultural lands,
5. mobilising resources,
6. strengthening legal and policy frameworks,
7. improving cross-sectoral and multi-level cooperation,
8. increasing public awareness and engagement, and
9. evaluating and mitigating haze-related impacts.

Actions under each strategy may be inter-related and mutually reinforcing, and subject to capacities, priorities and circumstances of the respective AMS. However, Strategy 1: Enhance the Implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), including the Capabilities of the ASEAN Coordinating Centre for Transboundary Haze Pollution Control (ACC THPC) remains at the core as the Second Roadmap is inextricably linked to the legally-binding obligations of Parties of the AATHP.



2.1 Strategy 1:

Enhance Implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), including Capabilities of the ASEAN Coordinating Centre for Transboundary Haze Pollution Control (ACC THPC)

Actions:

- i. Strengthen the operation and capability of ACC THPC
- ii. Enhance the Standard Operating Procedure for Monitoring, Assessment, and Joint Emergency Response (SOP MAJER) to

- include an after-action review, where necessary
- iii. Strengthen cooperation between ACC THPC and other relevant ASEAN centres
- iv. Strengthen the capacities of National Monitoring Centres (NMC), competent authorities, and other agencies that share information related to the AATHP, pursuant to national laws and regulations
- v. Mobilise the Panel of ASEAN Experts on Fire and Haze Assessment and Coordination for responses to haze emergencies, as necessary
- vi. Review, as necessary, the arrangements to ensure the full and effective implementation of the AATHP and other haze-related frameworks and initiatives

2.2 Strategy 2:

Developing and Implementing Sub-regional Strategies

Actions:

- i. Develop mitigation and response measures taking into account the differences and variations in the incidence and impacts of haze in ASEAN sub-regions
- ii. Strengthen institutional mechanisms, including ASEAN centres, to support sub-regional capacity building, including meteorological and air-quality monitoring
- iii. Strengthen ASEAN network of stakeholders for sub-regional action
- iv. Draw upon the Strategic Review of Sub-Regional Ministerial Steering Committee Programmes and Activities and the Chiang Rai 2017 Plan of Action to guide sub-regional efforts
- v. Align sub-regional indicators with ASEAN Peatland Management Strategy (APMS) to improve monitoring
- vi. Extend and improve the Chiang Rai 2017 Plan of Action for the northern ASEAN sub-region to 2030 to ensure alignment with the Second Roadmap
- vii. Enhance cooperation between the sub-regions, including through contributions to implement and expand sub-regional initiatives such as the Clear Sky Strategy in the Mekong sub-region as appropriate

2.3 Strategy 3:

Sustainable Management of Agricultural Land and Forests to Prevent Large-Scale Land and/or Forest Fires

Actions:

- i. Strengthen sustainable agricultural land and forest management, and explore the development of an ASEAN forest and agricultural management strategy
- ii. Continue to prevent agricultural land and forest fires through, among others, intermittent reduction of accumulated biomass, utilization of biomass, preparation and establishment of fire breaks, and the conduct of forest patrols
- iii. Develop new and/or improve existing early warning capacities and fire detection systems to address agricultural land and forest fires
- iv. Share lessons learned and experience gained by leveraging technology to implement the Roadmap and other ASEAN haze initiatives, such as the Fire Danger Rating System (FDRS) or warning systems
- v. Develop strategy and guidelines for fire management for agricultural land and forests
- vi. Share, promote, and scale up implementation of sustainable/best practices on management and controlled burning, including use of traditional and/or innovative methods, taking into account the ASEAN Guidelines for the Implementation of Controlled Burning Practices
- vii. Promote sustainable fuel/waste management and encourage development of new business models and products/value chains from agricultural waste
- viii. Enforce a zero-burning policy in commodity supply chains, taking into account the ASEAN Guidelines for the Implementation of the ASEAN Policy on Zero Burning
- ix. Improve the effectiveness of fire prevention and suppression through active engagement of local communities, private sector, and other stakeholders

2.4 Strategy 4:

Sustainable Management of Peatlands for Peatlands Fire Prevention, in accordance with the ASEAN Peatland Management Strategy (2023-2030)

Actions:

- i. Establish an inventory of all ASEAN peatlands, including all fire-prone peatlands, and identify priority peatlands to expand the network of protected peatlands and areas where sustainable use may be permitted
- ii. Develop and implement National Action Plans for Sustainable Management of Peatlands.
- iii. Continue to strengthen national and regional prevention, preparedness, mitigation, suppression, monitoring and early warning capacities and rapid deployment of resources
- iv. Establish a national coordinating agency for sustainable peatland management policies in ASEAN Member States, as appropriate
- v. Strengthen national and regional cross-pillar and cross-sectoral linkages for peatland management
- vi. Develop fire prevention and control plans for all fire-prone peatlands in ASEAN, monitor groundwater levels and scale up peatland rewetting, as necessary, strengthen early suppression of peatland fires, and rehabilitate degraded peatlands
- vii. Continue to promote integrated water resource management for peatlands, including using a peatland hydrological unit (PHU) approach
- viii. Enforce zero burning² on peatlands in accordance with the ASEAN Guidelines on Peatland Fire Management
- ix. Strengthen and promote action on sustainable management of peatlands for fire prevention at the local level, by actively engaging local communities, private sector, and other key stakeholders

² According to the AATHP, “Zero burning policy” means “a policy that prohibits open burning, but may allow some forms of controlled burning.”

2.5 Strategy 5:

Securing Adequate Resources from Multi-Stakeholders for Transboundary Haze Prevention

Actions:

- i. Mobilise adequate financial, human, and technological (including monitoring, fire suppression equipment) resources at all levels
- ii. Strengthen mechanisms that transfer financial and other resources from national to sub-national level for haze prevention
- iii. Integrate haze prevention and haze-free sustainable land management into national development and financing mechanisms
- iv. Leverage on the ASEAN Investment Framework for Haze-Free Sustainable Land Management for resource mobilisation
- v. Engage the Banking and Investment Sectors to generate additional resources for haze-free sustainable land management
- vi. Enhance the long-term sustainability of the ASEAN Transboundary Haze Pollution Control Fund to among others support the efforts of ASEAN Member States in addressing haze and the operations of ACC THPC

2.6 Strategy 6:

Strengthening Relevant National Policies, Laws, Regulations, and Their Implementation (including Follow-Up and Review/Enforcement)

Actions:

- i. Promote capacity building to strengthen national policies, laws, regulations, and their implementation and enforcement
- ii. Promote shared learning and good practices on monitoring/evaluation and policies on compliance/enforcement, with a view to strengthening capabilities in these areas
- iii. Strengthen coordination among relevant enforcement agencies, including through deployment of innovative technologies
- iv. Link monitoring and reporting of national actions and the Roadmap indicators
- v. Build public-private partnerships to incentivize private sector compliance and enforcement

- vi. Adopt and implement national policies including polluter-pays principle and economic instruments (i.e., tax abatements and concessions) to prevent haze and encourage behavioural change
- vii. Further develop economic instruments and Environmental, Social and Governance (ESG) frameworks to discourage, and reduce haze pollution as well as support enforcement and compliance, as appropriate
- viii. Further develop information, education, and communication (IEC) tools, such as hotlines/websites for fire reporting or reward schemes for private sector regulatory compliance
- ix. Revise relevant national laws, regulations and policies to close implementation gaps and facilitate compliance/enforcement including through stakeholder engagement

2.7 Strategy 7:

Enhancing Cross-Sectoral and Multi-Level Cooperation to Protect the Global Environment

Actions:

- i. Continue to strengthen regional coordination mechanism within the haze sector and its linkages to relevant ASEAN sectors (i.e., Agriculture, Forestry, and Health)
- ii. Strengthen links between the Roadmap and the implementation of other Multilateral Environmental Agreements (MEAs)
- iii. Strengthen links between the Roadmap, the Sustainable Development Goals (SDGs), and other ASEAN Socio-Cultural Community strategies and plans, including links that help identify impacts on the global environment and health
- iv. Strengthen and institutionalise cross-sectoral and multi-level coordination between relevant government agencies and stakeholders including, through dialogues and forums
- v. Continue to encourage proactive involvement of local communities to prevent forest and/or land fires, including through implementation of community-based forest and fire management
- vi. Enhance implementation of local, national, and regional cooperation projects to strengthen capacity on fire prevention and preparedness

2.8 Strategy 8:

Enhancing Public Awareness and Stakeholder Participation

Actions:

- vii. Conduct and expand public awareness campaigns, especially to engage remote communities
- viii. Continue and intensify awareness raising and information dissemination activities
- ix. Empower communities and the general public to actively engage in activities to address root causes of haze
- x. Promote increased awareness and ownership of local actions
- xi. Promote in and out-of-school curriculum to prevent fires and haze, including through professional training, agricultural extension and climate field schools
- xii. Develop and disseminate guidelines and procedures for the public, particularly vulnerable groups, to mitigate the health impact of haze pollution
- xiii. Encourage and provide incentives, as necessary, to implement corporate social responsibility (CSR) and socially sustainable community development (SSCD) activities that contribute to haze prevention
- xiv. Strengthen alternative livelihood options and incentives as part of community-based forest management (CBFM)

2.9 Strategy 9:

Evaluate and Mitigate the Impacts of Haze on Health, Economy, Society, and the Environment

Actions:

- i. Enhance and support scientific and technical research on the root causes and impacts of transboundary haze pollution
- ii. Conduct research and assess the economic, environmental impacts of haze, including on productivity losses and interactions with climate change
- iii. Establish databases on the of haze on the health, the environment, and the economy

- iv. Raise the profile of haze as a public health issue and heighten public awareness of the health threats posed by haze
- v. Provide additional reduction measures and health risk guidelines to ensure public well-being, with special attention to vulnerable groups

3 Means of Implementation

3.1 Institutional Framework

The Second Roadmap will employ the institutional framework that was used to implement the ASEAN Agreement on Transboundary Haze Pollution (AATHP).

The Conference of the Parties (COP) to the AATHP was established in 2003, consisting of the ASEAN Ministers responsible for environment. The Committee (COM) under the Conference of the Parties to the AATHP was established to assist the COP in the implementation of the Agreement. The COM meets back-to-back and prior to the COP meetings. COP and COM meet back-to-back at least once a year.

In view of different periods of traditional dry season in the northern (Mekong) and southern ASEAN region, two sub-regional ministerial steering committees on transboundary haze pollution were established to address specific haze-related issues occurring in the respective regions: the Sub-regional Ministerial Steering Committee on Transboundary Haze Pollution (MSC), comprising Brunei Darussalam, Indonesia, Malaysia, Singapore and Thailand; and the Sub-regional Ministerial Steering Committee on Transboundary Haze Pollution in the Mekong Sub-region (MSC Mekong) comprising Cambodia, Lao PDR, Myanmar, Thailand, and Viet Nam. Both MSC and MSC-Mekong have met separately on an annual basis. Each MSC and MSC Mekong is supported by a technical working group (TWG and TWG Mekong).

The ASEAN Task Force on Peatlands (ATFP) was established in 2013 to assist the COM in monitoring and supporting the implementation of APMS and other relevant programs/projects, facilitating cooperation with relevant partners, and to report to the COM progress in implementing the APMS.

3.2 Cross-Sectoral Coordination

Since environmental issues are cross-sectoral, the Second Roadmap calls for strengthening coordination between relevant agencies at the local and national levels, as well as between regional Sectoral bodies.

The Second Roadmap also encourages stronger coordination between subsidiary bodies of the ASEAN Senior Officials on Environment (ASOEN) and other Sectors under the ASEAN Economic Community (AEC), the ASEAN Political-Security Community (APSC), and the ASEAN Socio-Cultural Community (ASCC). Work is also needed to improve coordination with ASEAN's Agriculture, Forestry, and Plantation Sectors, given their prominent role in preventing fires. Formal cross-sectoral coordination mechanisms should be established as needed, based on consultations with ASOEN, COM/COP, and relevant Sectoral bodies.

3.3 Collaborative Partnerships

Implementation of the Second Roadmap shall be driven by AMS, with support from the ACC THPC, ASEAN Secretariat (ASEC), and relevant ASEAN Centres.

Existing and potential partners include ASEAN's Dialogue and Development Partners, as well as academia, civil society, international organisations, local governments, media, and the private sector. Multi-stakeholder partnerships shall be encouraged to implement the Second Roadmap to increase inclusivity and effectiveness.

ASEAN Environment Day, to be held regularly with ASEAN Ministerial Meeting on the Environment (AMME)/COP, could be a platform for multi-stakeholder dialogues on environmental and transboundary haze pollution, and offer an opportunity to explore joint initiatives.

Proposed initiatives by external partners shall be in line with the Roadmap's priorities, subject to COM review and approval.

3.4 Resource Mobilisation

AMS and the ACC THPC, supported by the ASEC as needed, should allocate resources and mobilise support to implement the Second Roadmap.

The ASEAN Investment Framework for Haze-Free Sustainable Land Management (AIF-HFSLM) will serve as a key mechanism to achieve this by facilitating the generation and coordination of resources to support the implementation of the Second Roadmap and other related frameworks, including the APMS. AMS should leverage AIF-HFSLM to implement supporting projects. The need should be considered for resource mobilisation strategies at the national, regional, or sub-regional levels. Annual donor forums or partnership conferences could be organised on an annual basis to provide a platform for partners and stakeholders to plan collaborations.

Given the significant differences in the characteristics, origins, and timing of fires and transboundary haze in ASEAN's northern and southern sub-regions, creating separate sub-regional resource mobilisation plans should be considered. A rolling programme to track progress in operationalising the AIF-HFSLM in support of the Second Roadmap should be maintained and regular reports created.

Private sector engagement should be enhanced, focusing on the Commodity and Land Management Sectors, as well as the Finance and Banking Sectors.

Incentives to encourage haze-free sustainable land management and the circular economy for use of agricultural residuals should be complimented by government regulations and incentives to stop burning biomass and agricultural residuals. Government policies promoting green bonds, green procurement, and other innovative financing schemes to prevent haze should be encouraged.

Increasing contributions to the ASEAN Haze Fund from external sources, including non-traditional sources such as the private sector, should

be explored. Progress on resource mobilisation should be reported to relevant ASEAN meetings. Provision of interim staff support (while waiting for the ACC THPC's full operationalisation) shall be considered as part of resource mobilisation strategies.

3.5 Communication Strategy

The Second Roadmap calls for developing a strategy to communicate the importance of fire and haze control and the role of ASEAN in promoting a haze-free ASEAN. As appropriate, AMS should make the Second Roadmap accessible in vernacular to enhance outreach to local communities.

A communication strategy must be developed that includes tools and initiatives to manage a haze crisis in ASEAN, such as using existing official national/regional stakeholder forums, creating email networking groups and websites, and developing a media plan.

The strategy should draw upon existing communication strategies with partners, including the Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia (MAHFSA) and the Sustainable Use of Peatlands and Haze Mitigation in ASEAN (SUPA).

4 Reporting, Monitoring, and Evaluation

ACC THPC will be responsible for reporting, monitoring, and evaluating the Second Roadmap as follows:

- Reporting:
 - ACC THPC and the ASEAN Secretariat will prepare annual progress reports for the Committee and Conference of Parties.
 - TWG/MSC and TWG/MSK Mekong will be given annual updates on relevant strategies and actions as per the Second Roadmap.
- Monitoring and Evaluation
 - Roadmap indicators shall be developed to support the ASSC Blueprint 2025 Results Framework that is under development as part of the ASSC Blueprint 2025 Monitoring and Evaluation System.
 - As appropriate, a results-based monitoring and evaluation plan shall be developed as per the Vision, Goal, and Indicators in Section 1, as well as the ASSC Blueprint 2025 Monitoring and Evaluation System. The M&E plan should include a fire-prone area index, a fire-weather index, an evaluation of fuel loads, an analysis of the frequency of patrols, a record of the number of zero-burning villages, and water levels. To assess progress, a systematic approach should be considered to gather baseline data, such as rolling averages.

COM/COP shall review overall implementation of the Second Roadmap in 2028. Guidance on Monitoring and Evaluation Framework is provided in **Annex**.

5 Logframe for Actions under the Strategies

This section presents a logframe for the actions listed under the nine strategies. The logframe includes: actions, responsible parties, target areas, resources, and progress measures.

No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
Strategy 1: Enhance Implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), including Capabilities of the ASEAN Coordinating Centre for Transboundary Haze Pollution Control (ACC THPC)					
1	Strengthen operations and capabilities of ACC THPC.	COM/COP, Ministry of Finance, Indonesia (for budget allocation), ASEAN Task Force and Technical Team.	Functional ACC THPC based in Indonesia.	Budget allocation by Indonesia to establish ACC THPC, ASEAN Transboundary Haze Pollution Control Fund. Staffing ACC THPC, Task Force. Technical Team operational costs.	Establishment of ACC THPC in Indonesia.
2	Enhance the Standard Operating Procedure for Monitoring, Assessment, and Joint Emergency Response (SOP MAJER) to include after-action review, where necessary.	COM/COP, Ministry of Finance, Indonesia (for budget allocation), ASEAN Task Force and Technical Team.	Relevant AMS.	Relevant AMS, ASEC.	ACC THPC enhancements, including fire response capabilities.
3	Strengthen cooperation between ACC THPC and relevant ASEAN Centres.	COM/COP, ASEC, ACC THPC, relevant ASEAN Centres.	Implementation of arrangements for Second Roadmap.	Proposals outlining/updating institutional framework for Second Roadmap.	Agreement by COM/COP on institutional arrangements to implement Roadmap.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
4	Strengthen capacities of National Monitoring Centres (NMC), competent authorities, and relevant agencies that share information related to AATHP, pursuant to national laws and regulations.	ACC THPC, with assistance from relevant ASEAN Centres and NMCs.	AMS facing haze emergencies.	Funding extension to create roster of experts who can contribute to Panel of ASEAN Experts on Fire and Haze Assessment	Functional roster of experts, with a wide range of expertise.
5	Mobilise Panel of ASEAN Experts on Fire and Haze Assessment and Coordination to respond to haze emergencies, as necessary.	ACC THPC.	Inclusion of standard procedure for after-action review to SOP MAJER.	Proposed amendments to SOP MAJER or other relevant decisions.	Endorsement by COM/COP.
6	Review, as necessary, arrangements to ensure full and effective implementation of AATHP and other haze-related frameworks and initiatives.	COM/COP, ASEC, ACC THPC, relevant ASEAN Centres.	Relevant AMS.	Relevant AMS, ACC THPC, and ASEC.	Regular review of AATHP.

Strategy 2: Developing and Implementing Sub-regional Strategies

1	Develop mitigation and response measures taking into account differences and variations in incidence and impacts of haze in ASEAN's sub-regions.	ACC THPC, TWG/ MSC and TWG/ MSC Mekong, ASMC, ATFP, COM/COP.	Identification of differences between land and forest fires in ASEAN's north and south sub-regions.	Consultant to document sub-regional differences.	Consultant report.
2	Strengthen institutional mechanisms, including ASEAN centres, to support sub-regional capacity building, including for meteorological and air quality monitoring.	ACC THPC, TWG/ MSC and TWG/ MSC Mekong, ASMC, ATFP, COM/COP.	Enhancement of existing sub-regional mechanisms for haze prevention and monitoring.	Workshops to create sub-regional mechanisms for haze prevention and monitoring.	Workshop report.
3	Strengthen network of stakeholders for sub-regional action.	ACC THPC, TWG/ MSC and TWG/ MSC Mekong, ASMC, ATFP, COM/COP.	Creation of a sub-regional multi-stakeholder engagement platform.	Consultant to create platform.	Establishment of platform.
4	Draw on Strategic Review of Sub-Regional Ministerial Steering Committee Programmes and Activities and Chiang Rai 2017 Plan of Action to guide sub-regional efforts.	ACC THPC, TWG/ MSC and TWG/ MSC Mekong, ASMC, ATFP, COM/COP.	Adoption of ASEAN guidance for sub-regional institutional mechanisms	Additional funding to support sub-regional institutional mechanisms.	Budget allocations for sub-regional institutions.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
5	Align indicators at the sub-regional level with APMS to improve monitoring at sub-regional level.	ACC THPC, TWG/ MSC, ASMC, ATFP, COM/COP.	APMS aligned with sub-regional approaches to the Second Roadmap.	AMS workshops to align the APMS with Roadmap for northern and southern ASEAN.	Workshop reports.
6	Extend and improve the Chiang Rai 2017 Plan of Action for northern ASEAN sub-region to 2030 to ensure alignment with Second Roadmap.	ACC THPC, TWG/ MSC, ASMC, ATFP, COM/COP.	Chiang Rai Action Plan extended to 2030 and aligned with Second Roadmap Mid-Term Review.	Funding for Chiang Rai Action Plan.	Annual reports from Chiang Rai Action Plan.

Strategy 3: Sustainable Management of Agricultural Land and Forests to Prevent Large-Scale Land and/or Forest Fires

1	Strengthen sustainable agricultural land and forest management, including exploring development of ASEAN forest and agricultural management strategy.	Ministries/ Department of Forestry, Ministries/ Department of Agriculture, SOM AMAF, ASOF, forest product companies, and other relevant agencies.	All fire-prone areas and forest areas in AMS.	Individual AMS budget allocations and staff levels for sustainable forest management.	Increased funds for sustainable forest management. Documented increase in sustainably managed forest areas.
2	Continue to prevent agricultural land and forest fires through intermittent reduction of accumulated biomass, use of biomass, preparation and establishment of fire breaks, and conduct of forest patrols.	Ministries/ Departments of Forestry, Ministries/ Department of Agriculture and other relevant agencies, forest product companies.	All fire-prone areas and forest areas in AMS.	Individual AMS budget allocations and staff levels for sustainable forest management.	Monitoring reports by forest agencies on reduction of accumulated biomass, use of biomass, preparation of fire breaks, frequency of forest patrols. Reduction in forest and agricultural land burned.
3	Develop or improve early warning capacities and fire detection systems.	ACC THPC, satellite imagery agencies, Meteorological Departments (where relevant, National Monitoring Centres, ASMC).	All fire-prone forest and agricultural areas in AMS (recognizing different nations and agencies have varying access to user-friendly data to track progress).	Workshops to share information on fires and work to address national agricultural and forest fires.	Scale up ASEAN-wide collaboration on information sharing to refine early fire detection systems (recognizing differences in data and information sharing across countries).

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
4	Share lessons learned by leveraging technology to implement Roadmap and other ASEAN haze initiatives, such as the Fire Danger Rating System (FDRS) or warning systems.	All AMS, ACC THPC, ASEC.	Implement ASEAN-wide forest and agricultural land management strategy 2024-2030.	External consultant to develop forest and agricultural land management strategy.	COM/COP endorsement in 2024 of ASEAN-wide forest and agricultural land management strategy for 2024-2030.
5	Develop strategy and guidelines for fire management in agricultural land and forests.	Ministries/ Departments of Forestry and other relevant agencies, forest products companies, local authorities and communities.	All fire-prone areas and forest areas in AMS.	Extend funding for community participation campaigns in fire-prone forest areas.	More community groups contributing to local fire suppression actions.
6	Share, promote, and scale up implementation of sustainable/best practices on management and controlled burning, including use of traditional or innovative methods, taking into account ASEAN Guidelines for Implementation of Controlled Burning Practices.	Ministries/ Departments of Forestry, Ministries/ Department Agriculture and other relevant agencies, forest products companies, local authorities and communities.	All fire-prone areas and forest areas in AMS.	External funding to pilot new technologies for controlled, managed, and scheduled burning (according to ASEAN's controlled burning guidelines).	Increase in total area covered by the pilot, and scaling of sustainable/ best practices and new approaches.
7	Promote sustainable fuel/ waste management and encourage development of new business models and products/value chains from agricultural waste.	Ministries/ Departments of Forestry, Ministries/ Department of Agriculture and other relevant agencies, forest products companies, agricultural companies.	All fire-prone areas and forest areas in AMS.	Seed funding for new products from agricultural and forest biomass residue.	Increased amount of utilized agricultural residues. Increases in amount and value of new products from agricultural and forest biomass residue.
8	Enforce a zero-burning policy in commodity supply chains, taking into account the ASEAN Guidelines for the Implementation of the ASEAN Policy on Zero Burning	Ministries/ Departments of Forestry, Ministries/ Department of Agriculture and other relevant agencies, forest products companies, agricultural companies.	All fire-prone areas and forest areas in AMS.	Individual AMS budget allocation and staff levels to enforce zero burning.	Monitoring reports by forest and relevant agencies on supply chain commodities.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
9	Improve the effectiveness of fire prevention and suppression through active engagement of local communities, private sector, and other stakeholders.	Local communities, private sector, other stakeholders in AMS.	Local communities in AMS.	Individual AMS budget allocation and staff levels for sustainable forest management.	Increased number of examples of fire prevention and suppression from local communities, private sector, and other stakeholders.
10	Strengthen sustainable agricultural land and forest management, including exploring development of ASEAN forest and agricultural management strategy.	Ministries/ Department of Forestry, Ministries/ Department of Agriculture, SOM AMAF, ASOF, forest product companies, and other relevant agencies.	All fire-prone areas and forest areas in AMS.	Individual AMS budget allocations and staff levels for sustainable forest management.	Increased funds for sustainable forest management. Documented increase in sustainably managed forest areas.

Strategy 4: Sustainable Management of Peatlands for Peatlands Fire Prevention, in accordance with the ASEAN Peatland Management Strategy (2023-2030)

1	Establish inventory of all peatlands in ASEAN, including fire-prone areas, and identify priority peatlands to expand the network of protected peatlands and areas where sustainable use may be permitted.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Allocation of local and national budgets for peatland fire management.	Inventory report of peatland areas.
2	Develop and implement National Action Plans for Sustainable Management of Peatlands.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Targets APMS/ NAPPs.	Targets APMS/ NAPPs.
3	Continue to strengthen national and regional prevention, preparedness, mitigation, suppression, monitoring and early warning capacities and rapid deployment of resources.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Budget allocation for early warning, mitigation, monitoring, prevention, and suppression of peatland fires.	Reduced incidence of peatland fires.
4	Establish a national coordinating agency for sustainable peatland management policies in AMS, as appropriate.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	AMS with significant peatlands.	Budget allocation and staff resources for national coordinating agencies.	Established national coordinating agencies with clear links to ACC THPC.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
5	Strengthen regional and national, cross-pillar and cross-sectoral linkages for peatland management.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Allocation of national and local budgets for peatland fire management.	NAPPs and other relevant policies that reflect cross-pillar and cross-sectoral links.
6	Develop fire prevention and control plans for all fire-prone peatlands in ASEAN, monitor groundwater levels and scale up peatland rewetting as necessary, strengthen early suppression of peatland fires, and rehabilitate degraded peatlands.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	AMS.	Development of fire prevention and control plans.
7	Continue to promote integrated water resources management for peatlands, including using a peatland hydrological unit (PHU) approach.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Allocation of national and local water management budgets to support peatland fire management.	Integrated water resources management reflected in NAPPs and other policies.
8	Enforce zero burning on peatlands as per ASEAN Guidelines on Peatland Fire Management.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Allocation of national and local budgets for peatland fire management.	Evidence of efforts to achieve zero burning, noting potential continuation of some controlled burning.
9	Strengthen and promote action on sustainable management of peatlands for fire prevention at local level, by actively engaging local communities, private sector, and other key stakeholders.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Allocation of national and local budgets for peatland fire management.	Increased incidence of fire prevention and suppression from local communities, private sector, and other stakeholders.
10	Establish inventory of all peatlands in ASEAN, including fire-prone areas, and identify priority peatlands to expand the network of protected peatlands and areas where sustainable use may be permitted.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Allocation of local and national budgets for peatland fire management.	Inventory report of peatland areas.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
Strategy 5: Securing Adequate Resources from Multi-Stakeholders for Transboundary Haze Prevention					
1	Mobilise adequate financial, human, and technological (including monitoring, fire suppression equipment) resources at all levels.	Ministry of Finance, Ministry of Forestry, Ministry of Agriculture, SOMHD, Development Partners, private sector, other relevant agencies.	Identify and mobilise resources for monitoring, fire suppression equipment, etc.	Funding allocation from national budgets.	Identification and mobilisation of resources for monitoring, fire suppression equipment, etc.
2	Strengthen mechanisms that transfer financial and other resources from national to subnational levels for haze prevention.	Ministry of Finance, Ministry of Forestry, Development Partners, private sector, other relevant agencies.	All AMS.	Funding allocation from national budgets.	Mechanisms to transfer resources from the national to local level in AMS.
3	Integrate haze prevention and haze-free sustainable land management into national development and financing mechanisms.	Ministry of Environment, Ministry of Finance, Ministry of Forestry, Development Partners, private sector, other relevant agencies.	Enhance vertical coordination from Finance Ministries to local governments.	Increased resource allocation from AMS national budgets to local governments.	Enhanced vertical coordination from AMS finance ministries to local governments.
4	Leverage ASEAN Investment Framework for Haze-Free Sustainable Land Management for resource mobilisation.	Ministry of Finance, Ministry of Forestry, Development Partners, private sector, other relevant agencies.	Expand engagement to multiple Sectors and stakeholders to contribute to AIF-HFSLM.	Increased number of projects, programmes, and resources from multiple partners linked to AIF-HFSLM.	Annual report on resources leveraged through AIF-HFSLM.
5	Engage Banking and Investment sectors to generate additional resources for haze-free sustainable land management.	Ministry of Finance, Ministry of Forestry, Private, private sector, relevant agencies.	Expand existing innovative financing schemes to prevent haze, and land and forest fires.	Banking and Investment Sectors.	Increased resources allocated from Banking and Investment Sectors.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
6	Enhance long-term sustainability of the ASEAN Transboundary Haze Pollution Control Fund to support AMS efforts in addressing haze and ACC THPC operations.	AMS finance and forestry ministries, Development Partners, private sector, relevant agencies.	Agree to a formula for AMS contributions to ASEAN Transboundary Haze Pollution Control Fund and voluntary contributions from Development Partners.	Contributions to and allocation of funds from the ASEAN Transboundary Haze Pollution Control Fund.	Agreement on formula for AMS contributions to ASEAN Transboundary Haze Pollution Control Fund and voluntary contributions from Development Partners.

Strategy 6: Strengthening Relevant National Policies, Laws, Regulations, and Their Implementation (Including Follow-Up and Review/Enforcement)

1	Promote capacity building to strengthen national policies, laws, regulations, and their implementation and enforcement.	AMS environment ministries, ACC THPC, training institutions, relevant agencies.	Polymakers and enforcement officials associated with Agriculture, Environment, and Forestry, Ministries, all AMS.	Budget allocation to deliver short training programmes and on-the-job mentoring of key officials.	Number of officials trained.
2	Promote shared learning and good practices on monitoring/evaluation and policies on compliance/enforcement, to strengthen capabilities.	All AMS, ACC THPC, ASEC.	Government officials and stakeholders involved in compliance, enforcement, and monitoring and evaluation.	Budget allocation to establish online platform for good practices related to compliance, enforcement, and monitoring and evaluation.	Number of good practices listed on online platform.
3	Strengthen coordination between relevant enforcement agencies, including through deployment of innovative technologies.	All relevant AMS ministries and agencies.	All AMS.	All AMS.	Number of coordination meetings.
4	Link monitoring and reporting of national actions and Roadmap indicators.	All AMS, ACC THPC.	MRV systems developed by responsible government agencies linked to ACC THPC's overarching review.	Budget allocation for MRV systems development and subsequent data collection.	MRV indicators and reports submitted to ACC THPC.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
5	Adopt and implement national policies, including polluter-pays principle and economic instruments (e.g., tax abatements and concessions) to prevent haze and encourage behavioural change.	AMS finance and forestry ministries, private sector, relevant agencies.	Adopt national policies that use the polluter-pays principle or introduces appropriate economic instruments.	Fines or fees received from companies responsible for uncontrolled land or forest fires.	Level of funding recouped from companies responsible for uncontrolled land or forest fires.
6	Further develop economic instruments and Environmental Social Governance (ESG) frameworks to discourage, reduce haze pollution, and support enforcement and compliance.	AMS energy, environment, and finance ministries, forestry departments, local governments, relevant agencies.	AMS agriculture, energy, environment, forestry, and finance ministries, all AMS	External consultant to formulate ESG frameworks and means of implementation.	Number of new or enhanced ESG frameworks.
7	Further develop information, education and communication (IEC) tools, such as hotlines/ websites for fire reporting or reward schemes for private sector regulatory compliance.	AMS environment and forestry ministries, AMS public relations departments, ACC THPC.	Enhanced approaches, hotlines/websites for fire reporting. Reward schemes and other incentives for private sector compliance.	Establishment of hotlines for fire reporting, implementation of taxes or similar incentives for regulatory compliance.	Number of reports on the hotline and trends, use of tax or other incentives by private sector to improve compliance.
8	Revise relevant national laws, regulations and policies to close implementation gaps and facilitate compliance/ enforcement including through stakeholder engagement.	AMS environment ministries, private sector, relevant agencies.	Ministers and senior management of AMS environment ministries, related enforcement agencies, all AMS.	All AMS.	Number of new or enhanced laws, regulations, and policies to close compliance gaps.

Strategy 7: Enhancing Cross-Sectoral and Multi-level Cooperation to Protect Global Environment

1	Continue to strengthen regional coordination mechanism within haze sector and its links to relevant ASEAN sectors (Agriculture, Forestry, Health).	All AMS, ACC THPC, ASEC, COM/COP, relevant agencies.	Coordinate with other ASEAN Sectoral working groups and centres of excellence.	Budget allocation for regular meetings of ACC THPC with Sectoral organisations.	Meeting minutes.
2	Strengthen links between the Roadmap and implementation of other Multilateral Environmental Agreements (MEAs).	All AMS, ACC THPC, ASEC, relevant agencies.	Promote integration of Second Roadmap with MEAs and other relevant air pollution initiatives.	Budget allocation for joint workshops, as needed.	Workshop reports.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
3	Strengthen links between Roadmap and the Sustainable Development Goals (SDGs) and ASSC strategies and plans, including links identify impacts on the global environment and health.	COM/COP, relevant agencies, AMS planning, environment, and health ministries, national sustainable development councils.	Strengthen links between sustainable development plans and regional strategies relevant to haze prevention and the avoidance of health impacts.	Workshops to link sustainable development plans to regional strategies.	Workshop reports.
4	Strengthen and institutionalise cross-sectoral and multi-level coordination between relevant government agencies and stakeholders, via dialogues and forums.	All AMS, ACC THPC, COM/COP, local governments and communities, civil society, NGOs, relevant agencies.	Regular cross-sectoral and multi-stakeholder dialogue and cooperation.	Funding extension for convening Sectoral- and multi-stakeholder workshops and roundtables.	Number of cross-sectoral and multi-stakeholder workshops and roundtables held annually.
5	Continue to encourage proactive involvement of local communities to prevent forest or land fires, by implementing community-based forest and fire management.	Local governments, AMS forestry ministries, private sector companies, NGOs, relevant agencies	Local communities living close to or with livelihoods depending on forests or agriculture.	Budget allocation for community-based forest and fire management.	Number of local communities engaged in community-based forest and fire management.
6	Enhance implementation of regional, national, and local cooperation projects to strengthen capacity on fire prevention and preparedness.	AMS environment and agriculture ministries, AMS fire and rescue departments, AMS natural resources ministries, ACC THPC, local governments, private sector companies, universities, communities, relevant agencies.	Local, national, and regional cooperation projects to strengthen capacity on fire prevention and preparedness (scope and location contingent on budget).	Budget allocation for fire prevention and preparedness projects, funded externally and domestically.	Annual expenditure on fire prevention and preparedness projects.

Strategy 8: Enhancing Public Awareness and Stakeholder Participation

1	Conduct and expand public awareness campaigns, especially to engage remote communities.	All AMS, ACC THPC, ASEC, media, relevant agencies.	ACC THPC engages with media on multiple public awareness campaigns.	Funding allocation for public awareness campaigns.	Number of public awareness events held each year.
2	Continue and intensify awareness raising and information dissemination activities.	All AMS, ACC THPC, ASEC, media, relevant agencies.	All AMS promote awareness raising.	Funding allocation for public awareness campaigns.	Number of awareness raising events held each year.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
3	Empower communities and the general public to actively engage in activities to address root causes of haze.	Local communities and governments, civil society actors, NGOs, relevant agencies.	Engage community groups to address haze root causes.	Funding extension for community groups to address r haze root causes.	Annual Budget allocation for communities to engage in activities to address haze root causes.
4	Promote increased awareness and ownership of local actions.	Ministry or Department of Forestry, civil society, local governments and communities. NGOs, relevant agencies.	Engage local communities and governments to identify actions.	Funding extension for local communities and governments to identify actions.	Annual Budget allocation for local communities and governments.
5	Promote in and out-of-school curriculum to prevent fires and haze, including through professional training, agricultural extension and climate field schools.	Ministry of Education, Ministry of Agriculture, Ministry of Science, Universities, academia, and other relevant agencies.	Develop curricula on fire and haze prevention. Distribute to primary and secondary schools, academia, and agricultural extension services.	Funding allocation for external consultant to prepare fire and haze prevention curricula.	Completed educational modules for academia, agricultural extension services, and primary and secondary schools.
6	Develop and disseminate guidelines and procedures for the public, particularly vulnerable groups, to mitigate the health impact of haze pollution.	All AMS, ACC THPC.	All AMS develop and disseminate guidelines and procedures, emphasizing vulnerable groups.	Allocate funds to develop and disseminate guidelines and procedures.	Development of guidelines and procedures.
7	Encourage and provide incentives, as necessary, to implement corporate social responsibility (CSR) and socially sustainable community development (SSCD) activities to contribute to haze prevention	All AMS, private sector, relevant agencies.	Engaging with private sector companies to incorporate CSR and SSCD in their business model.	Private sector investment in CSR and SSCD related to fire and haze prevention.	Number of companies that have adopted CSR and SSCD as part of their business model.
8	Strengthen alternative livelihood options and incentives as part of community-based forest management (CBFM).	Ministry / Department of Forestry, Ministry of Agriculture, relevant agencies.	Identifying livelihood opportunities associated with CBFM.	Consultant to identify and promote CBFM-related livelihood opportunities.	Number of livelihood opportunities identified and promoted.

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No.	Action	Responsible Parties	Target Areas	Resources	Progress Measures
Strategy 9: Evaluate and Mitigate the Impacts of Haze on Health, Economy, Society, and the Environment					
1	Enhance and support scientific and technical research on root causes and impacts of transboundary haze pollution.	Ministry of Environment, Ministry of Science, Ministry of Education, academia, relevant agencies.	Research related to root causes and consequences of transboundary haze in AMS.	Research funding, domestic and external.	Annual expenditure on research related to transboundary haze pollution.
2	Conduct research and assess health, economic, social, and environmental impacts of haze, including productivity losses and climate change interactions.	Ministry of Health, Ministry of Environment, ASEAN Development Partners, academia.	Research and monitoring on the health, economic, social, and environmental impacts of haze	Funding allocated for research on the health, economic, social, and environmental impacts of haze.	Research findings and monitoring results on the economic, environmental, health, and social impacts of haze.
3	Establish databases on impacts of haze on health, environment, and the economy.	Ministry of Health, Ministry of Forestry, Ministry of Agriculture, SOMHD.	Establishing databases tracking impact of haze on the economy, the environment, and public health.	Funding extension to treat patients affected by smoke and haze.	Decreased number of patients with respiratory or other health problems related to smoke and haze.
4	Raise profile of haze as a public health issue and heighten public awareness of haze-related health threats.	Ministry of Health, media.	Identifying and promoting health risk reduction measures.	Consultant to identify haze-related health risk reduction measures.	Implement health risk reduction measures, develop indicators relating health problems to haze concentrations.
5	Provide additional reduction measures and health risk guidelines to ensure public well-being, paying special attention to vulnerable groups	Ministry of Health, local health centres.	Identification and promotion of health risk reduction measures, emphasizing vulnerable groups.	Consultant to identify haze-related health risk reduction measures.	Implement health risk reduction measures, develop indicators relating health problems to haze concentrations.

Annex Guidance on Monitoring and Evaluation Framework

The purpose of this guidance is to provide recommendations to the AMS and ASEC on a monitoring and evaluation framework (M&E framework) for the Second ASEAN Haze-Free Roadmap (Roadmap). The guidance is intended to offer AMS and ASEC guidance on how to systematically assess progress for achieving the overall vision of a Transboundary Haze- Free ASEAN by 2030.

In order to reach that overarching vision, this guidance suggests that AMS and ASEC should construct an M&E framework consisting of two levels of indicators/targets with reporting and tracking functions assigned to different actors at the respective levels. It further recommends that the proposed indicators should be specific, measurable, achievable, realistic, and time-related (SMART).

The two levels of proposed indicators/targets are outlined as follows:

1. The first level of indicators and reporting functions should focus on reporting and sharing of data at the regional level; this should concentrate chiefly on further specifying how to operationalize the two headline targets/indicators for the Roadmap.
2. The second level of indicators and reporting functions should focus chiefly on the national level; this should concentrate on offering AMS a simple reporting template (as well as an updated Standard Operating Procedure for Monitoring, Assessment, and Joint Emergency Response (SOP MAJER)) that can be used at the Committee/Conference of the Parties (COM/COP) meetings.

Figure 1 helps to visualize how the M&E framework would work in practice. The remainder of this guidance provides additional details on key elements and possible options for consideration in the framework, starting with the regional and then moving to the national level.

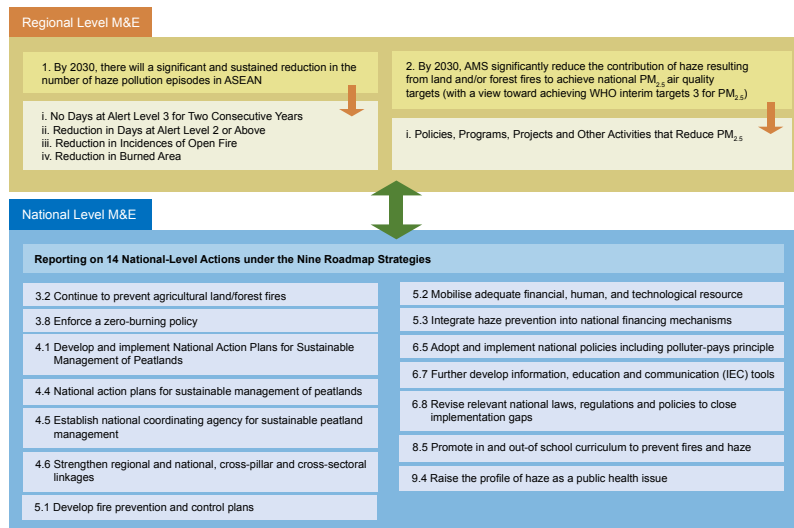


Figure 1. Monitoring and Evaluation Framework for the Second ASEAN Haze-Free Roadmap

Note: The first level of indicators and reporting functions should focus on the regional level; this should concentrate on further specifying how to operationalize the two headline targets/indicators for the Roadmap:

- By 2030, there will a significant and sustained reduction in the number of haze pollution episodes in ASEAN, measured by the following sub-indicators
 - No Days at Alert Level 3 for Two Consecutive Years
 - Reduction in Days at Alert Level 2 or Above
 - Reduction in Burned Area (for further consultation with AMS, ASMC and ACC THPC)
 - Reduction in the Number of Hotspots
- By 2030, AMS significantly reduce the contribution of haze resulting from land and/or forest fires to achieve national $PM_{2.5}$

air quality targets (with a view toward achieving WHO interim targets 3 for PM_{2.5}), measured by the following sub-indicators

- Policies, Programs, Projects and Other Activities that Reduce PM_{2.5}

The second level of indicators and reporting functions should focus chiefly on the national level; this should concentrate on offering AMS a simple reporting template on 14 national level actions to be reviewed at the COM/COP meetings.

Regional Level M&E Framework

The Roadmap currently consists of two headline targets/indicators.

1. By 2030, there will a significant and sustained reduction in the number of haze pollution episodes in ASEAN
2. By 2030, AMS significantly reduce the contribution of haze resulting from land and/or forest fires to achieve national PM_{2.5} air quality targets (with a view toward achieving WHO interim targets 3 for PM_{2.5})^a

These two headline targets/indicators have the merit of being broadly agreeable and relatively comprehensive. This is clear in that the two targets/indicators refer to a reduction in haze episodes/fires and improved air quality in line with PM_{2.5} targets. At the same time, they may lack the measurability and concreteness needed to assess progress over time toward reaching the Roadmap's vision of a Haze-Free ASEAN by 2030. It is also not apparent in the current Roadmap how progress toward reaching these targets/indicators will be reported. To further clarify these details, the concept note suggests AMS and ASEC should consider the following options for the two headline targets/indicators.

^a The currently recommended WHO annual interim target 3 for PM_{2.5} is 14 µg/m³.

Headline Target 1

For target/indicator 1 (*By 2030, there will a significant and sustained reduction in the number of haze pollution episodes in ASEAN*), it is suggested that AMS and ASEC request ASMC in cooperation with the ACC THPC to provide an annual report on the following set of four sub-targets/indicators.

i. No Days at Alert Level 3 for Two Consecutive Years:

By 2030, ASEAN experiences at least two consecutive years of “transboundary haze-free” conditions. Haze-free conditions will be measured using “no days at Alert Level 3”.

This sub-indicator/target suggests that there has been a sustained two-year period without a major haze episode. It is also feasible to acquire data on this indicator as the ASMC supports early warning of transboundary haze by notifying ASEC (and likely the AAC THPC in the future) when the conditions for Alert Levels 0-3 are met for the northern and southern ASEAN subregions. In addition, alert levels offer insights into not only the number of hotspots but also associated dense smoke plumes, hotspot density, and location, and prevailing meteorological conditions (see Figure 2).

Alert level 0	Alert level 1	Alert level 2	Alert level 3
Northern ASEAN 210 days (58%)	30 days (8%)	50 days (14%)	75 days (21%)
Southern ASEAN 224 days (61%)	78 days (21%)	39 days (11%)	24 days (7%)

Figure 2. Days at Alert Levels 0-3 in 2019

Source of data: <https://asmc.asean.org/asmc-alerts/>

ii. **Reduction in Days at Alert Level 2 or Above:** Based on the ASEAN Standard Operating Procedures, ASEAN reduces the number of days at Alert Level 2 or above by at least 5% annually (using a rolling average over the last 3 years to account for changes in climate conditions) through 2030 (using an appropriate rolling average number of days at Alert Level 2 as a baseline). The above target/indicator will offer insights into broader trends associated with reducing moderately serious episodes over a longer time period than the two years for the above sub-indicators/targets. In addition, in order to make the sub-targets/indicators workable, it is suggested that length of the period for the rolling average for the baseline could be a *4 to 5 year rolling average*. This timeline is feasible for the ASMC as it is currently using data obtained from a new sensor (Visible Infrared Imaging Radiometer Suite, VIIRS) and 750-meter resolution from a different satellite (NOAA-20) with higher resolution since 2019.

iii. **Reduction in Burned Area:** ASEAN reduces the burned area at the regional level by 10% at the end of each dry season annually, compared to a 2019-2023 average annual baseline.

Another way of assessing progress in achieving a sustained reduction in haze episodes is to look at trends in burned area at the regional level. At present, the ASMC does not provide data on burned areas; it nonetheless could provide satellite data (NOAA-20/Suomi NPP/MODIS)^b that would allow for this assessment. Burned area estimates would need Landsat or Sentinel data and would require national agencies' assessments and verification. It is also possible to train/evaluate a deep learning model for image detection, segmentation, and classification tasks related to burned area mapping. As it may take effort at the regional and national levels to provide the 2019- 2023 baseline, it may be more realistic to report this sub-indicator/target in 2025 or 2026. The decision on how and when to use this indicator should be further developed, including its methodology, in consultation with the AMS, ASMC, and ACC THPC.

^b National Oceanic and Atmospheric Administration - 20 (NOAA-20); Suomi National Polar-orbiting Partnership (Suomi NPP); Moderate Resolution Imaging Spectroradiometer (MODIS)

iv. Reduction in the Number of Hotspots: ASEAN reduces number of hotspots by at least 5% annually (using a rolling average of hotspot data over 3 years to account for changes in climate conditions) through 2030 (using a rolling average number of hotspots from 2019-2023 as the baseline).

An additional measure of progress are trends in hotspots. This sub-indicator/target can help evaluate whether there is an increase or decrease in both land and agricultural fires. With advances in analytical capacities, it may be possible to differentiate between and report separately on land and agricultural fires.

To help operationalize this part of the M&E framework, it is proposed that the ASMC works with the ACC THPC (or the ASEC acting on its behalf) to develop simple set of diagrams and charts that outlines trends based on the sub-indicators/targets. The division of labour between the ASMC and the ACC THPC can be discussed internally and may be adjusted as the ACC THPC opens and becomes operational.

Headline Target 2

For target/indicator 2 (*By 2030, AMS significantly reduce the contribution of haze resulting from land and/or forest fires to achieve national PM_{2.5} air quality targets (with a view toward achieving WHO interim targets 3 for PM_{2.5})*), it is suggested that ACC THPC [or ASEC as the Interim ACC THPC] works with the ASMC to gather information from AMS provide an annual report on “Actions on to Reduce PM_{2.5}.” Further, given that PM_{2.5} can be attributed to many sources (including but not limited to forest fires) AMS will have the flexibility to share information or data on one or more of the below set of four possible sub-indicators/targets.

- The first set of possible sub-indicators/targets are any actions AMS have taken to achieve PM_{2.5} standards
- The second set of possible indicators/targets are national level PM_{2.5} standards
- The third set of sub-indicators/targets is the annual average PM_{2.5} at the national level. Reporting on PM_{2.5} concentrations could be based on the past decade or another agreeable interval

Table 1. Air Quality Standards in AMS (µg/m3)

	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM
PM _{2.5} 24-hr	37.5	-	65	-	35	25	50	37.5	37.5	50
PM _{2.5} Annual	-	50 (proposed)	14	-	14	10	25	12	14	25

Note: AMS = Ambient Monitoring Station

Source: ASEAN, Sixth ASEAN State of the Environment Report, 2024.

National Level M&E Framework

In addition to the proposed regional level M&E Framework, it will also be important to track and steadily improve performance on national actions underlying the nine strategies in the Roadmap. At present, there are 59 actions listed under the nine strategies. The Roadmap also has a log-frame that can be used to assess progress on each of those actions. However, effectively assessing progress on each of those actions on an annual basis may be too administratively difficult at present. It may also require additional assistance from the ACC THPC once it is formally established.

To make the task more manageable in the near term, it is suggested that much of the effort concentrate on self-reporting from AMS on 14 actions in the Roadmap (see Table 4 for a listing of that reporting). These 14 actions are selected because they have a clear and relatively well-defined national focus.

At the same time, it is important to offer some flexibility in reporting on these 14 actions and three categories. For instance, some AMS may lack budgetary data that is aligned with the Roadmap actions and log-frame. It may be helpful to collaborate with other funding agencies to support investment in areas where there are clear gaps across AMS.

Other Considerations

The proposed M&E Framework does not focus much on the remaining actions outside the identified 14 actions. It is suggested that these additional actions be reported upon and tracked once the ACC THPC is fully staffed and operational. In addition, it may be possible to monitor and report on many of these actions over longer time intervals. For instance, a review of these additional actions along with the headline targets/indicators and the core 14 national level actions could potentially come during a mid-term review of the Roadmap that would also involve a review and updating on the M&E framework.

The Roadmap also refers to using other input indicators to assess progress on its implementation including, water levels, fire-prone index, fire-weather index, fuel loads, number of zero-burning villages, and frequency of patrolling. It is recommended that, while these indicators are important, annual reporting in these areas should be optional in the near term. Following the above mid-term review, the list of indicators for these inputs could be added to the existing 14 actions

Selected 14 actions with clear and well-defined national level M&E Framework

No	Relevant Action	Responsible Parties	Target Areas	Budgetary Resources	Measure of Progress
Strategy 3: Sustainable Management of Agricultural Land and Forests to Prevent Large-Scale Land and/or Forest Fires					
1	Continue to prevent agricultural land and forest fires through intermittent reduction of accumulated biomass, use of biomass, preparation and establishment of fire breaks, and conduct of forest patrols.	Ministries/ Departments of Forestry, Ministries/ Department of Agriculture and other relevant agencies, forest product companies.	All fire-prone areas and forest areas in AMS.	Individual AMS budget allocations and staff levels for sustainable forest management.	Monitoring reports by forest agencies on reduction of accumulated biomass, use of biomass, preparation of fire breaks, frequency of forest patrols. Reduction in forest and agricultural land burned.

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No	Relevant Action	Responsible Parties	Target Areas	Budgetary Resources	Measure of Progress
2	Enforce a zero-burning policy in commodity supply chains, taking into account the ASEAN Guidelines for the Implementation of the ASEAN Policy on Zero Burning	Ministries/ Departments of Forestry, Ministries/ Department of Agriculture and other relevant agencies, forest products companies, agricultural companies.	All fire-prone areas and forest areas in AMS.	Individual AMS budget allocation and staff levels to enforce zero burning.	Monitoring reports by forest and relevant agencies on supply chain commodities.

Strategy 4: Sustainable Management of Peatlands for Peatlands Fire Prevention, in accordance with the ASEAN Peatland Management Strategy (2023-2030)

3	Develop and implement National Action Plans for Sustainable Management of Peatlands.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Targets APMS/ NAPPs.	Targets APMS/ NAPPs.
4	Establish a national coordinating agency for sustainable peatland management policies in AMS, as appropriate.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	AMS with significant peatlands.	Budget allocation and staff resources for national coordinating agencies.	Established national coordinating agencies with clear links to ACC THPC.
5	Strengthen regional and national, cross-pillar, and cross-sectoral linkages for peatland management.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	Allocation of national and local budgets for peatland fire management.	NAPPs and other relevant policies that reflect cross-pillar and cross-sectoral links.
6	Develop fire prevention and control plans for all fire-prone peatlands in ASEAN, monitor groundwater levels and scale up peatland rewetting as necessary, strengthen early suppression of peatland fires, and rehabilitate degraded peatlands.	Ministries of Forestry/ Environment/ Agriculture or other relevant agencies.	All ASEAN peatland areas.	AMS.	Development of fire prevention and control plans.

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No	Relevant Action	Responsible Parties	Target Areas	Budgetary Resources	Measure of Progress
Strategy 5: Securing Adequate Resources from Multi-Stakeholders for Transboundary Haze Prevention					
7	Identify and mobilise resources for monitoring, fire suppression equipment, etc.	Ministry of Finance, Ministry of Forestry, Ministry of Agriculture, SOMHD, Development Partners, private sector, other relevant agencies.	Identify and mobilise resources for monitoring, fire suppression equipment, etc.	Funding allocation from national budgets.	Identification and mobilisation of resources for monitoring, fire suppression equipment, etc.
8	Strengthen mechanisms that transfer financial and other resources from national to subnational levels for haze prevention.	Ministry of Finance, Ministry of Forestry, Development Partners, private sector, other relevant agencies.	All AMS.	Funding allocation from national budgets.	Mechanisms to transfer resources from the national to local level in AMS.
9	Integrate haze prevention and haze-free sustainable land management into national development and financing mechanisms.	Ministry of Environment, Ministry of Finance, Ministry of Forestry, Development Partners, private sector, other relevant agencies.	Enhance vertical coordination from Finance Ministries to local governments.	Increased resource allocation from AMS national budgets to local governments.	Enhanced vertical coordination from AMS finance ministries to local governments.
Strategy 6: Strengthening Relevant National Policies, Laws, Regulations, and Their Implementation (including Follow-Up and Review/Enforcement)					
10	Adopt and implement national policies, including polluter-pays principle and economic instruments (e.g., tax abatements and concessions) to prevent haze and encourage behavioural change.	AMS finance and forestry ministries, private sector, relevant agencies.	Adopt national policies that use the polluter-pays principle or introduces appropriate economic instruments.	Fines or fees received from companies responsible for uncontrolled land or forest fires.	Level of funding recouped from companies responsible for uncontrolled land or forest fires.

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No	Relevant Action	Responsible Parties	Target Areas	Budgetary Resources	Measure of Progress
11	Further develop economic instruments and Environmental Social Governance (ESG) frameworks to discourage, reduce haze pollution, and support enforcement and compliance.	AMS energy, environment, and finance ministries, forestry departments, local governments, relevant agencies.	AMS agriculture, energy, environment, forestry, and finance ministries, all AMS	External consultant to formulate ESG frameworks and means of implementation.	Number of new or enhanced ESG frameworks.
12	Revise relevant national laws, regulations and policies to close implementation gaps and facilitate compliance/enforcement including through stakeholder engagement.	AMS environment ministries, private sector, relevant agencies.	Ministers and senior management of AMS environment ministries, related enforcement agencies, all AMS.	All AMS.	Number of new or enhanced laws, regulations, and policies to close compliance gaps.

Strategy 8: Enhancing Public Awareness and Stakeholder Participation

13	Promote in and out-of-school curriculum to prevent fires and haze, including through professional training, agricultural extension and climate field schools.	Ministry of Education, Ministry of Agriculture, Ministry of Science, Universities, academia, and other relevant agencies.	Develop curricula on fire and haze prevention. Distribute to primary and secondary schools, academia, and agricultural extension services.	Funding allocation for external consultant to prepare fire and haze prevention curricula.	Completed educational modules for academia, agricultural extension services, and primary and secondary schools.
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Strategy 9: Evaluate and Mitigate the Impacts of Haze on Health, Economy, Society, and the Environment

14	Raise profile of haze as a public health issue and heighten public awareness of haze-related health threats.	Ministry of Health, media.	Identifying and promoting health risk reduction measures.	Consultant to identify haze-related health risk reduction measures.	Implement health risk reduction measures, develop indicators relating health problems to haze concentrations
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