ASEAN Capital Markets Forum

Phase 1 White Paper on Key Principles and Methodological Approaches

For the development of the mitigation co-benefit and Adaptation for Resilience (mARs) Guide in support of the ASEAN Taxonomy for Sustainable Finance

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Authors

- Craig Davies (Cadlas)
- Feng Hu (UNEP FI)

Reviewers

- UNEP FI: Laura Canas da Costa, Emily Dahl
- Cadlas: Aiesha Joseph, Noah Wescombe, Chi Xiang Wong
- Sustainable Finance Institute Asia (SFIA): Eugene Wong, Najwa Abu Bakar, Jeannie Luz Young
- Securities Commission Malaysia (SC): Khairul Ridzwan Abdul Kuddus, Fariza Alia Mohamad Nasir
- Securities and Exchange Commission (SEC) Philippines: Dohn Alfred E. Aquilizan

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Technical Expert Advisory Group[1]

- Mozaharul Alam (UNEP)
- Sara Traerup (UNEP Copenhagen Climate Centre)
- Paul Smith (UNEP FI)
- Himanshu Sharma (UNEP Economic and Trade Policy Unit)
- Vishwas Vidyaranya (Ambire Global)
- Alper Aras (UNDRR)
- Aditi Mukherji (CGIAR)
- Theresa Wong (IPCC / Singapore Management University)
- Siti Kholifatul Rizkiah (WWF)
- Timothy Colyer (Oliver Wyman)
- Thomas Leonard (DNV)
- Ornsaran Pomme Manuamorn (World Bank)

IAP Working Group on Adaptation[2]

- Mizuho Financial Group, Inc. (Chair)
- Asia Investor Group on Climate Change
- Marsh LLC
- PT Sarana Multi Infrastruktur
- Bank for Agriculture and Agricultural Cooperatives
- Maybank Investment Bank
- Boston Consulting Group
- ATR Asset Management Group
- Standard Chartered
- Japan International Cooperation Agency
- Royal Group Securities Plc (Observer)

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[1] Note: organisation names are for identification purpose only
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ACRONYMS

AC	Adaptation Committee
ACMF	ASEAN Capital Markets Forum
ADB	Asian Development Bank
AFMGM	ASEAN Finance Ministers' and Central Bank Governors' Meeting
AIIB	Asian Infrastructure Investment Bank
AMS	ASEAN Member States
APAC	Asia-Pacific
AR6	Sixth Assessment Report (of the Intergovernmental Panel on Climate Change)
ASEAN	The Association of Southeast Asian Nations
ATB	ASEAN Taxonomy Board
CCPT	Climate Change and Principle-based Taxonomy
CGT	Common Ground Taxonomy
CORDEX	Coordinated Regional Climate Downscaling Experiment
CRVA	Climate Risk and Vulnerability Assessment
DFI	Development financial institution
EbA	Ecosystem-based adaptation
EO	Environmental Objective
ESCAP	Economic and Social Commission for Asia and the Pacific
FF	Foundation Framework
FIs	Financial institutions
GGA	Global Goal on Adaptation
GHG	Greenhouse gas
IAP	Industry Advisory Panel
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
IPSF	International Platform on Sustainable Finance
ISIC	International Standard Industrial Classification
mARs	Mitigation co-benefit and Adaptation for Resilience
M-CGT	Multi-Jurisdiction Common Ground Taxonomy
MDB	Multilateral development bank
NAP	National adaptation plan
NbS	Nature-based solutions
NGFS	Network for Greening the Financial System
OECD	Organization for Economic Co-operation and Development
OJK	Otoritas Jasa Keuangan
PS	Plus Standard
SFIA	Sustainable Finance Institute Asia
SRI	Sustainable and Responsible Investment
TEAG	Technical Expert Advisory Group
TSC	Technical Screening Criteria
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNFCCC	United Nations Framework Convention on Climate Change
WC-CMD	ASEAN Working Committee on Capital Market Development
WCRP	World Climate Research Programme

FOREWORD

It is my privilege to present the Phase 1 White Paper on Key Principles and Methodological Approaches for the Development of the mitigation co-benefit and Adaptation for Resilience (mARs) Guide in support of the ASEAN Taxonomy for Sustainable Finance. This critical work crystallises ASEAN's collective ambition to advance climate adaptation finance in the region.

The ASEAN region, with its abundant natural resources and diverse communities, is highly vulnerable to the intensifying effects of climate change – from coastal erosion, extreme weather events, to shifting rainfall patterns and disruptions to food, water, and energy systems. While continued focus on transition is crucial, a topic that warrants greater attention is adaptation. Floods, droughts, and extreme heat are already testing our water supplies, food systems, and public health. These challenges are not hypothetical future scenarios; they are happening right now.

The potential for innovative and scalable solutions for climate adaptation is vast. However, it is an area that has long been underfinanced, inherently complex, and viewed as less commercially attractive. Financing projects and infrastructure that help us adapt to these climate risks and build resilience in our industries, is key.

mARs is one such initiative that can promote financing towards vital infrastructure for climate adaptation, but may not necessarily be easily commercially funded without some form of intervention. This is where policymakers should come in.

Over the past eight years, the ASEAN Capital Markets Forum (ACMF) has made strides championing sustainable finance, with the ASEAN Green, Social, Sustainability and Sustainability-Linked Bond Standards and the ASEAN Sustainable and Responsible Fund Standards, among others.

The ACMF, together with our fellow ASEAN sectoral bodies in banking, capital market development and insurance, are part of the ASEAN Taxonomy Board which oversees the ASEAN Taxonomy. The Taxonomy serves as a tool for defining sustainable activities based on environmental objectives (EOs) - enhancing their prospects for financing.

It is within this context that the mARs Guide is envisioned. To serve as a practical compass for market participants, regulators, investors, and project developers to gain more clarity on activities and technologies that can help us adapt to climate change, and achieve the Taxonomy's EO2 - Climate Change Adaptation.

The Guide is a three-year initiative, with the Phase 1 White Paper outlining the underlying developmental approach. This involves mapping existing ASEAN Member States' (AMS) national adaptation plans (NAPs) as well as related strategies and processes. It also references international green and sustainable finance taxonomies and frameworks to identify common principles and methodologies for region-wide use. The White Paper also proposes a set of key principles for the mARs Guide, designed to complement the existing five core ASEAN Taxonomy principles and related EO2 Guiding Principles.

This project has brought together a diverse group of regulators, technical experts and financiers – united in a shared mission to find solutions for the region's climate risks.

I would like to express my appreciation to our collaborator, the United Nations Environment Programme Finance Initiative, for their invaluable support and technical assistance. My thanks also to Cadlas, our technical consultant to the mARs Guide project, and the Sustainable Finance Institute Asia, for their advice and guidance to ACMF's Sustainable Finance Working Group.

Lastly, I must acknowledge the contributions of ACMF Members, the ASEAN Taxonomy Board, the Technical Expert Advisory Group and the Industry Advisory Panel (IAP) Working Group on Adaptation in shaping the White Paper.

Mohammad Faiz Azmi

Chair, ASEAN Capital Markets Forum 2025

Climate adaptation has emerged as one of the defining priorities of our time. Nowhere is this challenge more acute than in the ASEAN region, where climate-related risks—rising sea levels, floods, droughts, and extreme heat—threaten the foundations of economic stability, livelihoods, and ecosystems. Addressing these risks requires mobilizing enormous levels of finance – both public and private - and ensuring that investments are aligned with resilience outcomes.

Recognizing this, the ASEAN Capital Markets Forum (ACMF) has invited the United Nations Environment Programme Finance Initiative (UNEP FI) to support the development of the mitigation co-benefit and Adaptation for Resilience (mARs) Guide as a companion to the ASEAN Taxonomy for Sustainable Finance (ASEAN Taxonomy). This White Paper marks the first phase of that collaboration. It lays the methodological foundation for identifying the key principles, and sectoral priorities that can enhance the usability of the ASEAN Taxonomy for adaptation finance.

By mapping national adaptation priorities and approaches and by developing a shared set of guiding principles, this first phase sets the stage for the mARs Guide to become an essential regional reference for identifying, assessing situational effectiveness, and financing adaptation-aligned activities. The next phases of work—carrying through 2026 and 2027—will build on these principles and develop operational guidance and a practical tool that can help regulators, financial institutions, and issuers embed climate resilience in financial decision-making.

Financial institutions and market participants from across ASEAN have contributed valuable feedback throughout the process, helping to ensure that the mARs Guide reflects both climate science and practical considerations. This multi-stakeholder exchange underscores the importance of dialogue between the public and private sectors in advancing a coherent, proportionate and credible policy enabling environment for adaptation finance.

UNEP FI is honoured to work under the mandate of the ACMF and in partnership with the Sustainable Finance Institute Asia (SFIA), the ASEAN Taxonomy Board, and a broad community of technical experts and financial institutions. We are grateful to the European Union's Sustainable Finance Advisory Hub (SFAH) for its financial support to this project. Together, we aim to help ASEAN harness the full potential of its sustainable finance architecture to protect people, nature, and economies from the growing impacts of climate change.

Eric Usher

Head, United Nations Environment Programme Finance Initiative

EXECUTIVE SUMMARY

The growing need for finance to increase climate adaptation and resilience capacity across ASEAN

Southeast Asia is already experiencing the effects of climate change, with more frequent and intense weather events, rising sea levels, and increasing temperature extremes—threatening livelihoods, food security and public health. These climate threats are compounded by high population densities, economic reliance on climate-sensitive sectors such as agriculture and fisheries, and widespread coastal and urban vulnerabilities, making ASEAN one of the most at-risk regions globally.[3] Combined, these factors underscore the increasingly central role of adaptation to climate change in managing climate risk, both globally and within the ASEAN context.

Climate finance needs in the ASEAN region are estimated at approximately USD 422 billion per year by 2030, of which USD 129 billion per year is specifically needed for climate adaptation.[4] Despite growing recognition of the importance of adaptation, financing remains limited and predominantly sourced from public funds and multilateral development banks, with significant challenges remaining for mobilizing finance from private finance, with particular barriers posed by uncertainties around the bankability of adaptation investments.[5]

> **To meet the increasing demand for adaptation and resilience finance, the ASEAN region needs to leverage its Sustainable Finance Taxonomy to enhance its usability and functionality for adaptation-specific purposes, which in turn can catalyze investments. A new partnership led by the ASEAN Capital Markets Forum (ACMF) with the United Nations Environment Programme Finance Initiative (UNEP FI) and the Sustainable Finance Institute Asia (SFIA) are undertaking a project to achieve this goal.[6]**

The analysis in this White Paper highlights how current adaptation financing flows in the ASEAN region fall significantly short of estimated adaptation investment needs—as well as how the rapid developments related to sustainable finance taxonomies in the region provide an important opportunity to create new means of mobilizing finance for adaptation.

Leveraging the ASEAN Taxonomy to catalyze climate adaptation and resilience finance

Sustainable finance taxonomies are an important climate finance tool, providing transparent and consistent classification of sustainable economic activities. Taxonomies can aid countries and investors in identifying opportunities that support sustainability goals and, in turn, can help channel capital towards aligned activities, including adaptation-related activities.

In the ASEAN region, there have been significant developments in both regional and national taxonomies. The ASEAN Green Bond Standards, launched in 2017 and revised in 2018, references climate change adaptation among the environmental objectives and eligible green projects categories for green and labelled bond issuances. The ASEAN Taxonomy for Sustainable Finance (ASEAN Taxonomy) provides a more comprehensive classification system and a common language for defining sustainable economic

[3] UNFCCC and ASEAN Secretariat, Climate Finance Access and Mobilization Strategy for the Member States of the Association of Southeast Asian Nations (2024-2030), December 2024
[4] UNFCCC and ASEAN Secretariat, Climate Finance Access and Mobilization Strategy for the Member States of The Association of Southeast Asian Nations (2024-2030), 2024.
[5] UNEP, Adaptation Gap Report 2024, November 2024
[6] To read the June 2025 announcement of the collaboration, visit https://www.unepfi.org/regions/asia-pacific/unepfi-acmf-sfia-adaptation-finance-collaboration/.

activities in the ASEAN region, which includes Climate Change Adaptation as its Environmental Objective 2 (EO2).

Rationale for a supplementary companion guide on EO2

Enhancing the usability and functionality of the ASEAN Taxonomy for adaptation financing and supporting the coverage and identification of a wide range of activities meeting EO2 will strengthen adaptative capacity and build resilience in the region. To achieve this goal, ACMF, comprising capital market regulators from across Southeast Asia has initiated a project to explore the development of the mitigation co-benefit and Adaptation for Resilience (mARs) Guide (hereafter the **Guide**).

ACMF, chaired by the Securities Commission Malaysia in 2025 (which also co-chairs the ACMF Sustainable Finance Working Group), has invited UNEP FI and SFIA to support the development of the Guide. It is intended to be a **voluntary supplementary guide** to complement and enhance the functionality of the ASEAN Taxonomy in relation to EO2.[7]

Use cases for the mARs Guide

The proposed Guide may be used by a range of organizations including AMS, regulators, financial institutions, providers of capital, and rating agencies – to support the application of the ASEAN Taxonomy in the area of climate adaptation.

It is intended to support users in preparing for EO2 assessments under the ASEAN Taxonomy, under both the Foundation Framework and Plus Standard assessment frameworks in the Taxonomy. It will identify key characteristics of adaptation technologies and solutions under a given activity (e.g., description, role in adaptation, status of the technology, scalability, target beneficiaries, sphere of influence, environmental, social and economic benefits, and paradigm shift potential). This will provide guidance on leveraging relevant information and resources to facilitate activity-level assessments under EO2.

Preparing to develop the mARs Guide: The role of this White Paper

This White Paper details the methodological approach for the development of the Guide. It sets out how the design of the Guide may be informed by mapping existing ASEAN Member States' (AMS) national adaptation plans (NAPs) and other national adaptation strategies and planning processes, as well as international green and sustainable finance taxonomies and frameworks on adaptation-related sectors and activities. This approach helps to identify common principles and suitable approaches that could be used and contextualized for the ASEAN region.

Proposed key principles for the forthcoming mARs Guide

The White Paper proposes for discussion a set of key principles for the mARs Guide, which complement the existing Five Core Principles of the ASEAN Taxonomy[8] and its Guiding Principles for EO2. These are:

1. **Science-based and evidence-led:** Definitions and eligibility criteria shall be grounded in recognized scientific authorities (e.g., IPCC) with transparent data sources, assumptions, and stated uncertainty ranges.
2. **Context-relevant and locally prioritized:** Criteria for assessing eligible adaptation activities shall be capable of reflecting local vulnerabilities, priorities, and governance conditions across ASEAN Member States (AMS) and be practicable under varying data and capacity circumstances.

[7] The EU's Sustainable Finance Advisory Hub (EU SFAH) supports this initiative to further enhance methodological alignment and interoperability of the ASEAN Taxonomy with international frameworks, which will strengthen investor confidence.
[8] See section 3.2

3. **Inclusive across AMS:** Requirements shall be accessible and proportionate for all AMS and market maturities – complementing the ASEAN Taxonomy in facilitating equivalence of and which acts as a regional reference approach towards assessment of climate change adaptation related activities, using clear language and avoiding undue procedural burden for users with differing capabilities.
4. **Maladaptation risk management (uncertainty-aware):** Eligibility shall explicitly consider future uncertainty, model and parameter calibration error, and residual risk. Activities shall avoid lock-in, burden-shifting, and trade-offs that increase climate vulnerability. The identification and tracking of adaptation outcomes (including positive and negative implications) shall enable and facilitate consistent and credible measurement and monitoring. Preference shall be given to robust or no-regrets options. *(This is distinct from DNSH.)*[9]
5. **Interoperable and comparable:** Terminology, data fields, and outcome concepts shall enable straightforward mapping to major partner frameworks (e.g., the EU Taxonomy) to support cross-market use and consistent interpretation.
6. **Usable for finance and the real economy:** The Guide shall be readily applicable by various user groups, including AMS, regulators, financial institutions, providers of capital, and rating agencies – in preparing bankable climate adaptation project proposals—producing decision-useful outputs with minimal reporting burden and clear delineation of desired adaptation outcomes.

[9] See Appendix 4 (Definition of key concepts used in the report) for the definition of these terms as used in this document.

1. Background: About the mitigation co-benefit and Adaptation for Resilience (mARs) Guide

Climate finance needs in the ASEAN region are estimated at around USD 422 billion per year by 2030, of which USD 129 billion per year is specifically required for climate adaptation.[10] However, recent tracking and reporting by ADB shows the region only received USD 3.4 billion of adaptation finance in 2018-2019, representing a significant funding gap.[11] At present, the vast majority of funding for climate adaptation is derived from public sources such as governments, multilateral development banks (MDBs) and development finance institutions (DFIs), with significant challenges remaining for mobilizing finance from private finance, with particular barriers posed by uncertainties around the bankability of adaptation investments.[12]

Sustainable finance taxonomies are an important climate finance tool, providing transparent and consistent classification of sustainable economic activities. Taxonomies can aid countries and investors in identifying opportunities that support sustainability goals and, in turn, can help channel capital towards aligned activities, including adaptation-related activities.

The ASEAN Taxonomy for Sustainable Finance (ASEAN Taxonomy) includes Climate Change Adaptation as its Environmental Objective 2 (EO2). For assessment under its Plus Standard, the ASEAN Taxonomy include six Focus Sectors and three Enabling Sectors, considering their contribution to the region's GHG emissions and gross value-add in terms of contribution to regional economic activity.[13] In light of the significant climate financing needs in the ASEAN region, providing guidance and supporting information vis-à-vis identification, categorization and assessment of activities that are eligible under EO2 of the ASEAN Taxonomy – is therefore critical for enhancing adaptive capacity and building resilience in the region.

To achieve this goal, the ASEAN Capital Markets Forum (ACMF), comprising capital market regulators from across Southeast Asia, has initiated a project to explore the development of the mitigation co-benefit and Adaptation for Resilience (mARs) Guide (hereafter the **Guide**). The purpose of the Guide is to enhance usability and functionality of the ASEAN Taxonomy in the identification and selection of economic activities to be financed or where financing is needed by providing guidance on how technologies and approaches can support the climate adaptation objective (EO2) under the ASEAN Taxonomy.[14] This effort is acknowledged in the recent Joint Statement of the 12th ASEAN Finance Ministers' and Central Bank Governors' Meeting (AFMGM).[15]

> *"24. We also commend the meaningful progress to promote sustainable finance and the region's transition to a low-carbon future through the various sustainable finance key initiatives and collaboration. This includes: […] (v) the efforts to explore the development of the mitigation co-benefit and Adaptation for Resilience (mARs) guide to enhance usability and functionality of the ASEAN Taxonomy, in relation to climate change adaptation […]"*
>
> *- Joint Statement of the 12th ASEAN Finance Ministers' and Central Bank Governors' Meeting*[16]

[10] UNFCCC and ASEAN Secretariat, Climate Finance Access and Mobilization Strategy for the Member States of The Association of Southeast Asian Nations (2024-2031), 2024.
[11] Asian Development Bank, Climate Finance Landscape of Asia and the Pacific, August 2023
[12] UNEP, Adaptation Gap Report 2024, November 2024
[13] Beyond Climate Change Mitigation (EO1) and Climate Change Adaptation (EO2), the ASEAN Taxonomy also covers Protection of Healthy Ecosystems and Biodiversity (EO3) and Resource Resilience and Circular Economy Transitions (EO4).
[14] It is proposed that the mARs Guide will not yet cover the ASEAN Taxonomy Essential Criteria.
[15] ASEAN Secretariat, Joint Statement of the 12th ASEAN Finance Ministers' and Central Bank Governors' Meeting (AFMGM), 10 April 2025
[16] Ibid.

ACMF, chaired by the Securities Commission Malaysia (which also co-chairs the ACMF Sustainable Finance Working Group), has invited the United Nations Environment Programme Finance Initiative (UNEP FI) and the Sustainable Finance Institute Asia (SFIA) to support the development of the Guide. The ACMF Sustainable Finance Working Group (SFWG) project team (represented by the Securities Commission Malaysia and the Securities and Exchange Commission Philippines) and UNEP FI, with the support of SFIA, jointly form the Secretariat of the project. The ACMF and SFIA also closely engage with the ASEAN Taxonomy Board (ATB) to ensure the Guide serves its purpose in relation to the ASEAN Taxonomy.

Like the ASEAN Taxonomy, the Guide may be used by a range of organizations including governments, regulatory bodies, financial institutions, companies, asset managers, and rating agencies to support the application of the ASEAN Taxonomy in the area of climate change adaptation (EO2).

The development of the Guide is to be carried out in phases over the following years. The first phase, completed in 2025, focuses on setting up the governance structure, contextualizing climate adaptation needs in ASEAN, proposing the key principles for the mARs Guide, and designing the methodological approaches for the Guide, informed by both literature review and stakeholder engagement. This White Paper covers the following two main aspects:

1) Common areas and approaches in adaptation needs and finance based on a mapping of AMS existing national adaptation plans, as well as existing green and sustainable finance taxonomies; and
2) The key principles for the development and maintenance of the Guide, balancing the reference to established taxonomies and adaptation plans with the need to contextualize to the needs of AMS.

This White Paper seeks to inform the development of the Guide over the next phase. It will provide guidance, where applicable, on how relevant information and resources can be leveraged to facilitate the assessment of investments that contribute towards the ASEAN Taxonomy's Environmental Objective 2 (EO2) on climate change adaptation. As part of this, the Guide can also help users of the ASEAN Taxonomy to identify and manage maladaptation risks (i.e. where actions intended to reduce vulnerability inadvertently increase it) and provide guidance and references to conduct the Climate Risk and Vulnerability Assessment (CRVA) as part of the ASEAN Taxonomy. This is intended to facilitate the identification, classification, and improved understanding of adaptation measures to help catalyze public and private sector finance to meet adaptation needs that are important for enhancing the resilience of the ASEAN region.

Table 1 below provides a concise overview of what purposes the mARs Guide intends to serve, and the limitations of its scope.

Table 1: The role of the mARs Guide

The mARs Guide is intended to	**The mARs Guide is not intended to**
Serve as a voluntary and non-binding companion Guide to enhance functionality of the ASEAN Taxonomy in relation to its EO2.	Serve as a taxonomy.
Support taxonomy users and work alongside the ASEAN Taxonomy.	Replace or contradict with the ASEAN Taxonomy.

Guide users in preparing for the EO2 assessment (Foundation Framework or Plus Standard) under the ASEAN Taxonomy.	Create a separate set of assessment requirements different from the ASEAN Taxonomy.
Introduce themes to identify relevant adaptation investments but will keep using ISIC as part of the systems to classify activities, wherever possible.	Diverge from the ISIC structure, which is the main system used to classify activities in the ASEAN Taxonomy.
Suggest, in some cases, technologies and/or activities that are not yet covered by the current version of the ASEAN Taxonomy, as part of general background information.	Serve as a decision-maker on including any new activities; that authority lies with the formal process under the ASEAN Taxonomy.
It focuses on developing a principles-based guide as the next step.	It does not seek to set activity-level Technical Screening Criteria (TSC) at this stage.

In addition, the mARs Guide will also propose approaches on how mitigation co-benefits may be considered in investments that are eligible under the ASEAN Taxonomy as contributing towards EO2. This may be relevant for activities that reduce or remove GHG emissions (i.e. EO1: Climate Change Mitigation) while primarily contributing to adaptation objectives by reducing harm from physical climate risks. Examples may include activities that deliver dual adaptation and mitigation benefits such as sustainable land management, waste reduction, or resilient clean energy. A few existing activities in the ASEAN Taxonomy are already clearly identified as contributing to both EO1 and EO2,[17] and may be considered as 'no regrets' activities that contribute towards adaptation (EO2) while being neutral or positive in relation to climate mitigation (EO1). These points will be elaborated further during the development of the mARs Guide.

[17] Examples under the ASEAN Taxonomy include, for instance, "353[020] District heating/cooling distribution", "68[001] Electric vehicle charging stations", "68[002] Energy efficient equipment", "68[004] Renewable Technologies", "492[001] Urban and suburban transport, road passenger transport", "492[002] Transport by motorbikes, passenger cars and light commercial vehicles", and "4912[001] Freight rail transport".

2. Climate adaptation in ASEAN

2.1 Overview and framing of climate adaptation and resilience

Climate change poses significant and escalating risks worldwide. The Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC) concludes that widespread adverse climate impacts are already being felt, including biodiversity loss, damage to infrastructure and settlements, reduced food and water security, and increased heat-related illness and mortality. These risks are projected to intensify with every increment of warming, disproportionately affecting vulnerable populations. Climate change has already caused substantial disruptions to ecosystems and human systems, with observed impacts more widespread and severe than previously assessed.[18]

However, identifying priorities and determining what constitutes effective adaptation is highly context-specific, shaped by local environmental, social, and economic conditions. For this project, global definitions of adaptation and resilience have been aligned, where possible, with ASEAN-specific interpretations. This approach ensures that the priorities and needs of the ASEAN region are reflected, while ensuring conceptual consistency with globally accepted concepts and definitions:

- **Adaptation** is defined by the IPCC[19] as: In *human systems*, the process of adjustment to actual or expected *climate* and its effects, in order to moderate harm or exploit beneficial opportunities. *In natural systems*, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.
- **Resilience** is defined by the IPCC[20] as: The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation.

Understanding climate risk in ASEAN requires linking these definitions to measurable vulnerability and exposure. At the global level, IPCC AR6 introduces an updated framework for understanding climate risk, represented by three interlinked elements: hazard, vulnerability, and exposure. A key innovation in this framework is the emphasis on the role of responses, particularly adaptation and resilience, in shaping each of these risk determinants.[21]

[18] IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp., doi: 10.59327/IPCC/AR6-9789291691647.
[19] IPCC Glossary Search
[20] IPCC Glossary Search
[21] IPCC AR6, 2022: Figure 1.5: "Risk in IPCC assessment through time". In: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 121-196, doi:10.1017/9781009325844.003.

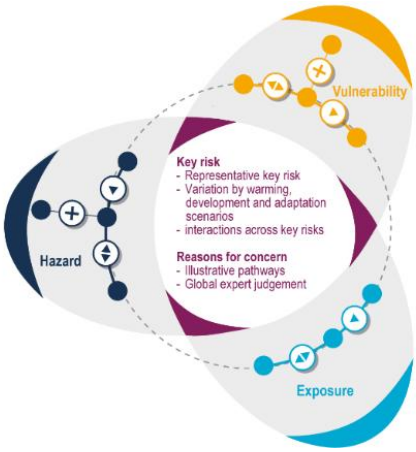

Figure 1: Risk framing used in the IPCC AR6 – AR6 additions: response risk and complexity. Excerpt from Figure 1.5 of AR6: "Risk in IPCC assessment through time".

As shown in Figure 1, these responses act as "wings" that modulate each of these risk determinants. This underscores the importance of proactive adaptation and resilience strategies in reducing climate impacts. Appendix 1 provides a fuller comparison of how adaptation and resilience are defined and applied across key global and ASEAN related frameworks. These shared definitions form a common foundation for assessing and advancing climate adaptation and resilience—both globally and within ASEAN.

Southeast Asia is already experiencing the effects of climate change, with more frequent and intense weather events, rising sea levels, and increasing temperature extremes, threatening livelihoods, food security and public health. These climate threats are compounded by high population densities, economic reliance on climate-sensitive sectors such as agriculture and fisheries, and widespread coastal and urban vulnerabilities, making ASEAN one of the most at-risk regions globally [22] —with Myanmar and the Philippines, for instance, ranked among the top ten countries most affected by extreme weather events in 1993-2022[23].

Adaptation to climate change is therefore increasingly central to managing climate risk, both globally and within the ASEAN context. Figure 2 provides some highlights of the ASEAN region's exposures to physical climate risks and the associated economic costs and financing needs, while Table 2 summarizes the key physical climate risks by AMS, drawing from the analysis of AMS adaptation plans and strategies detailed in Appendix 2.

77.4 million Population in Southeast Asia displaced due to hydro-meteorological disasters between 2008 and 2021[24]	USD 91 billion Total estimated economic losses from natural disasters in ASEAN from 2004 to 2014[25]	USD 210 billion Annual investment needed for climate-resilient infrastructure in Southeast Asia[26]

Figure 2: Highlights of ASEAN-level figures on exposure, costs and finance needs.

[22] UNFCCC and ASEAN Secretariat, Climate Finance Access and Mobilization Strategy for the Member States of the Association of Southeast Asian Nations (2024-2030), December 2024
[23]Germanwatch, Climate Risk Index 2025, 12 February 2025
[24] ASEAN Secretariat, Changing Disaster Risk Landscape due to Climate Change in ASEAN, 2025
[25] ASEAN Secretariat, ASEAN Vision 2050 on Disaster Management, 2021
[26] Asian Development Bank, ADB Southeast Asia Green Finance Hub: Catalyzing Green and Innovative Finance, July 2023

Table 2 provides a high-level overview of main physical climate risks across AMS based on a review of National Adaptation Plans (NAPs) and other relevant national plans and strategies. The table intentionally uses the same wording as the respective AMS plans and strategies to describe physical climate risks, acknowledging that this may result in some overlaps (e.g., "extreme weather events" and "windstorms"). This analysis will inform the identification of priority adaptation themes, economic sectors and activities for the mARs Guide, to be elaborated further in section 4 of this White Paper. While Table 2 offers a useful starting point for understanding key physical climate risks in AMS, it is not exhaustive, as many countries have yet to complete comprehensive risk assessments (see Table 11 for a fuller breakdown of physical climate risks in AMS). Data gaps, varying levels of granularity, and uneven availability across countries further limit completeness. Moreover, several risks are transboundary in nature and may fall outside the scope of national indices.

Table 2: Key physical climate risks in ASEAN Member States

Country	Flooding	Increased sea levels	Extreme weather events	Drought	Increased temperatures	Landslides	Increased rainfall	Coastal erosion and saline intrusion	Windstorms	Heatwaves	Ocean warming and acidification	Urban heat island effect
Brunei Darussalam[27]	■	■	■		■	■	■	■				
Cambodia	■			■				■	■	■		
Indonesia	■	■	■	■	■	■						
Lao PDR	■		■	■	■	■	■					
Malaysia	■	■	■	■	■	■	■	■		■	■	
Myanmar	■	■	■	■	■							
Philippines	■	■	■	■	■	■	■		■			
Singapore	■	■			■		■					■
Thailand	■	■	■	■		■						
Viet Nam	■	■	■	■		■		■				
Total number of ASEAN Member States that identified the respective risk in their national plans	**10**	**8**	**8**	**8**	**7**	**7**	**5**	**4**	**2**	**2**	**1**	**1**

The relative vulnerability of AMS can be understood with reference to several widely used climate risk and vulnerability indices, namely the Climate Risk Index (CRI), the Climate Finance (CliF)Vulnerability Index and the Notre Dame Global Adaptation Initiative (ND-GAIN) Country Index. Each index captures a different aspect of climate risk and vulnerability:

- **CRI** measures historical impacts from climate-related extreme events based on economic losses, fatalities and people affected. A higher score and higher ranking indicate that a country has been severely affected in the past.
- **CliF Vulnerability Index** models vulnerability as a function of climate risk and access to finance under different pessimistic scenarios, highlighting where adaptation finance is most impactful Here, a higher score signals greater climate vulnerability with the most affected countries ranking lowest, since the index presents a more pessimistic picture of their ability to cope without finance.[28]

[27] NB Brunei Darussalam's First Nationally Determined Contribution (2020) also mentions 'ocean warming and acidification' but this is not expected to be included in the updated Second Nationally Determined Contribution which was submitted to the UNFCCC in September 2025 (not yet publicly available as of 16 October 2025).
[28] National Center of Disaster Preparedness at the Columbia Climate School, Climate Finance (CliF) Vulnerability Index

- **ND-GAIN** combines vulnerability to climate change and other global challenges with readiness to improve resilience. A lower score and lower ranking mean that a country is both more vulnerable and less prepared to adapt. In other words, the country that is most vulnerable to climate change and least prepared to adapt to its impacts is ranked lowest, with the lowest score.[29]

While these indices are not directly comparable and may capture overlapping dimensions of climate risk and vulnerability, each shows that most AMS are moderately to highly vulnerable to climate risks, as indicated in Table 3. Singapore, Brunei Darussalam and Malaysia appear to be generally less exposed and better equipped to adapt, while Myanmar, the Philippines, and Cambodia rank among the most affected in terms of historical climate impacts and financial vulnerability.

[29] Notre Dame Global Adaptation Initiative at the University of Notre Dame, ND-GAIN Country Index

Table 3: Climate risk and/or vulnerability assessment of ASEAN Countries

Country	Climate Risk Index (CRI) by Germanwatch (1993-2022)[30]		Climate Finance (CliF) Vulnerability Index by the Columbia Climate School[31]		Notre Dame Global Adaptation Initiative (ND-GAIN) Country Index[32]	
	Ranking	Score	Ranking	Score	Ranking	Score
Brunei Darussalam[33]	No data	No data	12th	21.4/100	43rd	56.6/100
Cambodia	25th	13.53	125th	57.7/100	161st	36.7/100
Indonesia	115th	2.31	57th	40.3/100	98th	45.9/100
Lao PDR	57th	7.74	87th	49.5/100	140th	39.3/100
Malaysia	135th	1.35	31st	30.4/100	50th	55.4/100
Myanmar	4th	28.47	155th	66.3/100	163rd	36.1/100
Philippines	10th	18.75	79th	47.6/100	116th	43.1/100
Singapore	No data	No data	11th	20.4/100	6th	70.8/100
Thailand	30th	12.83	15th	24.9/100	80th	49.9/100
Viet Nam	54th	8.41	35th	34.0/100	96th	46.0/100

These differences highlight significant disparities in climate risk exposure and resilience across the region. Some AMS tend to benefit from stronger institutions and greater financial resources, whereas other members face greater challenges due to higher exposure and limited capacity, as illustrated in Figure 3. This underscores the urgent need for tailored adaptation strategies and increased support to build resilience in the most vulnerable countries.

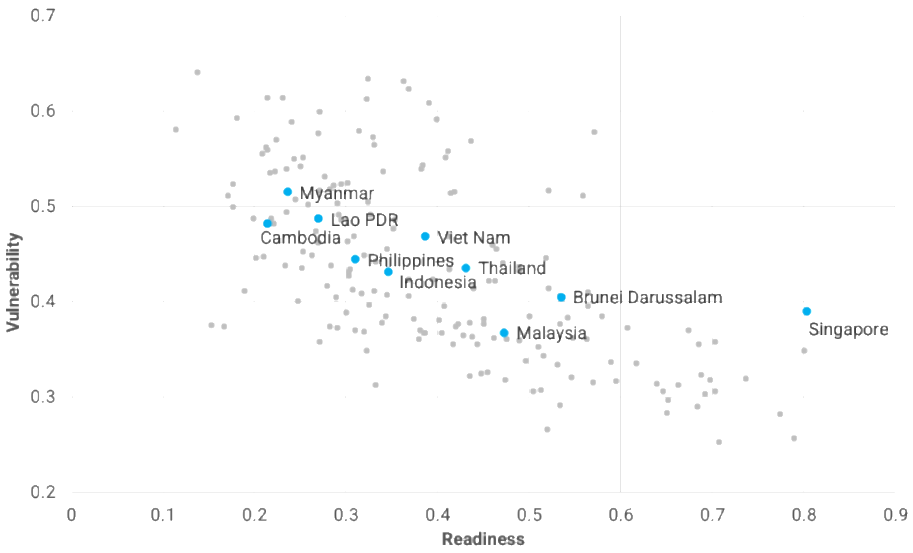

Figure 3: ND-GAIN Matrix 2023 results with AMS highlighted[34]

[30] Germanwatch, Climate Risk Index 2025, 12 February 2025
[31] National Center of Disaster Preparedness at the Columbia Climate School, Climate Finance (CliF) Vulnerability Index
[32] Notre Dame Global Adaptation Initiative at the University of Notre Dame, ND-GAIN Country Index
[33] Based on independent research drawn from publicly available data and their respective methodologies. The accuracy of these data cannot be verified by the relevant local authorities.
[34] Notre Dame Global Adaptation Initiative at the University of Notre Dame, ND-GAIN Country Index

2.2 National adaptation planning and adaptation needs in ASEAN

The National Adaptation Plan (NAP) process was established by the UNFCC Conference of Parties' sixteenth session to help countries set and address their medium- and long-term climate adaptation priorities. Led by governments, it involves assessing climate risks, identifying, and implementing priority measures and tracking progress. Its goal is to integrate adaptation into national planning, budgeting, and decision making through sustained systems and capacities.[35] Appendix 3 provides a fuller analysis of AMS NAPs and other national adaptation planning and strategy processes.

Funding and technical support for NAPs is available through the Green Climate Fund (GCF), the Least Developed Countries Fund (LDCF), and the Special Climate Change Fund (SCCF). Some ASEAN Member States have also received technical assistance from the NAP Global Network and UN agencies, while development partners such as the Asian Development Bank have supported efforts to translate national adaptation priorities into investment plans that can be integrated into countries' medium-term planning and fiscal frameworks through its Climate Adaptation Investment Planning (CAIP) program.[36]

However, progress is uneven. As of September 2025, while 67 developing countries have submitted NAPs globally, only four AMS have finalized theirs, with many still facing challenges with data, institutional capacity, monitoring and accessing finance.[37] Furthermore, in many NAPs, the assessment of adaptation needs and identification of adaptation priorities remains focused on project-based approaches as opposed to addressing systemic adaptation across the economy and society.

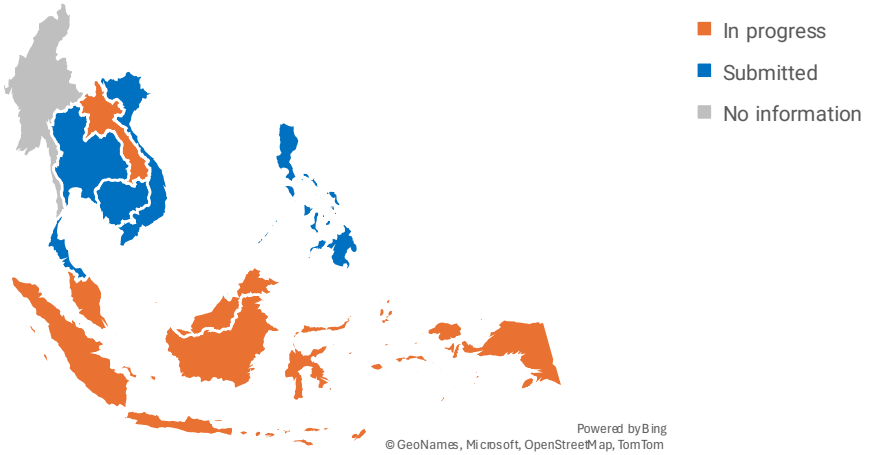

Figure 4: Summary of NAP status across ASEAN
(**Submitted:** Cambodia, the Philippines, Thailand and Viet Nam; **In progress:** Indonesia, Lao PDR, Malaysia, Brunei Darussalam[38] and Singapore[39]; **No information**: Myanmar)

[35] UNFCCC, National Adaptation Plans
[36] Asian Development Bank, Climate Adaptation Investment Planning
[37] Progress in the process to formulate and implement national adaptation plans: *https://unfccc.int/national-adaptation-plans*
[38] UNFCCC's NAP track tool indicates the status of Brunei Darussalam as "draft review" (as of last database refresh on 25 September 2025). As per its National Statement issued during COP29, Brunei Darussalam developed the first draft of its NAP in 2023 and is enhancing its NAP by adopting a sectoral approach in its next iteration.
[39] NB while Singapore does not have a formal NAP submitted, the National Climate Change Secretariat (NCCS) has set out an adaptation strategy in its 'Charting our low-carbon and climate resilient future' document. In addition, as per a press release dated 18 September 2025, issued by the Ministry of Sustainability and the Environment (MSE) of Singapore, MSE will "develop Singapore's inaugural National Adaptation Plan (NAP) that articulates targeted strategies to address physical risks and other impacts of climate change".

Notably, all AMS have submitted their Nationally Determined Contributions (NDCs) and National Communications (NCs), with many also providing Biennial Transparency Reports (BTRs) [40]. These documents offer valuable insights into each country's climate adaptation and mitigation efforts. A fuller analysis of the status of National Adaptation Plan (NAP) submissions and development across the ASEAN region can be found in Appendix 3, highlighting the most recent additional relevant documents that inform country-level strategies on adaptation and resilience.

Summary of adaptation priorities in ASEAN countries

Appendix 2 provides a summary of climate risks, priority sectors, adaptation activities, and indicative finance needs identified across AMS, based on an initial review of a wide range of the most recent national climate strategies including NAPs, NDCs, NCs, BTRs, Biennial Update Reports (BURs)[41], and other official policies.

Table 4 highlights key affected sectors identified in AMS national climate strategies, including agriculture and food, water, public health, energy, and human settlements among others. The sector breakdown used in the table reflects the wording used to describe sectors in the respective AMS strategies and plans, and therefore differs from the more standardized, ISIC-based sector breakdown that is used in the ASEAN taxonomy and other AMS national taxonomies. Key adaptation activities emphasize climate-smart agriculture, resilient water and sanitation systems, disaster prevention and early warning, and ecosystem-based management. AMS climate strategies and plans also highlight the need for climate-resilient urban planning, relocation of vulnerable communities, nature-based solutions, strengthened public health systems, and enhanced community capacity.

Table 4: Key affected sectors as identified in submitted NAPs and other relevant official plans from AMS

Country	Agriculture and food security	Public health	Forestry, biodiversity and land use change	Water	Human settlements, urban planning and infrastructure	Energy	Coastal resources	Transport	Disaster risk reduction	Livelihoods	Industry	Tourism	Fisheries	Cultural heritage, population displacement and migration
Brunei Darussalam	■	■	■	■	■		■		■	■			■	
Cambodia	■	■	■	■	■	■	■	■		■	■	■		
Indonesia	■	■	■	■		■			■					
Lao PDR	■	■	■	■	■			■						
Malaysia	■	■	■	■	■	■	■							
Myanmar	■	■	■		■				■					
Philippines	■	■	■	■	■	■		■		■	■		■	■
Singapore	■	■	■	■	■	■	■	■			■			
Thailand	■	■	■	■	■							■		
Viet Nam	■	■	■	■	■				■			■		
Total	10	10	10	9	9	5	4	4	4	3	3	3	2	1

[40] Parties to the Paris Agreement are required to submit biennial transparency reports (BTR) every two years. BTR include information on national inventory reports (NIR), progress towards NDCs, policies and measures, climate change impacts and adaptation, levels of financial, technology development and transfer and capacity-building support, capacity-building needs and areas of improvement.
[41] Biennial Update Reports (BURs) are reports to be submitted by non-Annex I Parties, containing updates of national Greenhouse Gas (GHG) inventories, including a national inventory report and information on mitigation actions, needs and support received.

2.3 Climate adaptation finance needs in ASEAN

The UNEP 2024 Adaptation Gap Report highlights a significant funding shortfall for climate adaptation in developing countries, with annual needs of USD 215–387 billion by 2030 but current funding at only around USD 21.3 billion,[42] with a particularly critical gap for Southeast Asia.

Despite growing recognition of the importance of adaptation, financing remains limited and predominantly sourced from public funds and multilateral development banks, which constrains both the scale and scope of investments. Moreover, inconsistent reporting practices and differing timelines for submitting climate finance data contribute to considerable variation in estimates of actual finance flows.

According to the ADB, Southeast Asia received approximately USD 27.8 billion in climate finance during 2018–2019, of which approximately 12% was directed towards adaptation.[43] Recent projected annual regional adaptation investment needs from 2023 to 2030 amount to 1.5% as a share of GDP.[44] Another report estimates annual climate finance flows to AMS average between USD 3.2 billion and USD 6 billion when broader development finance projects incorporating climate solutions are included.[45]

Both sources highlight that adaptation finance in Southeast Asia remains relatively low compared to other parts of Asia, with additional challenges stemming from fragmented financing mechanisms and limited data transparency. Moreover, in Southeast Asia, Figure 5 below shows how mitigation finance volumes have been far greater than adaptation finance and dual-benefit finance volumes over 2018-19, with most funding directed toward renewable energy and transport.[46]

While the tracking of adaptation finance in the ASEAN region – like all other regions of the world – continues to be challenging, available sources indicate that tracked adaptation finance was reported to have been allocated to sectors such as land-use change and forestry, natural resource management, and water and wastewater management, as well as institutional strengthening and policymaking.[47] While the main beneficiaries in these sectors are more likely to be public entities such as governments, sub-national authorities and utilities, it should also be noted that private beneficiaries of adaptation finance may be under-reported given the particular challenges associated with tracking private adaptation finance flows.[48]

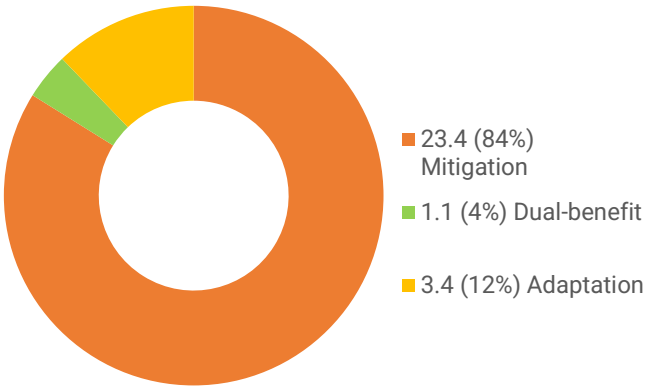

Figure 5: Mitigation, adaptation and dual-benefit finance in Southeast Asia, 2018-19 (USD billion)[49]

[42] UNEP, Adaptation Gap Report 2024, November 2024
[43] Asian Development Bank, Climate Finance Landscape of Asia and the Pacific, 2023
[44] Asian Development Bank, Building Resilience: Adaptation Investment Needs in Asia and the Pacific, 2024.
[45] UNFCCC, Technical Assessment of Climate Finance in South-East Asia: Annex to The South-East Asia Climate Finance Mobilization and Access Strategy, 2021
[46] Asian Development Bank, Climate Finance Landscape of Asia and the Pacific, 2023
[47] Asian Development Bank, Climate Finance Landscape of Asia and the Pacific, 2023
[48] Climate Policy Initiative, Tracking and Mobilizing Private Sector Climate Adaptation Finance, 2024
[49] Asian Development Bank, Climate Finance Landscape of Asia and the Pacific, 2023

As detailed in Section 1 of this White Paper, the ASEAN region's high vulnerability to climate change impacts means that scaling up adaptation finance is critical for safeguarding livelihoods, infrastructure, and economic stability. Figure 6 shows that estimated adaptation finance needs in Southeast Asia are estimated to be at around 1.5% of projected regional GDP by 2030, which is slightly lower than for the Pacific and South Asia sub-regions, but higher than Central Asia or East Asia.

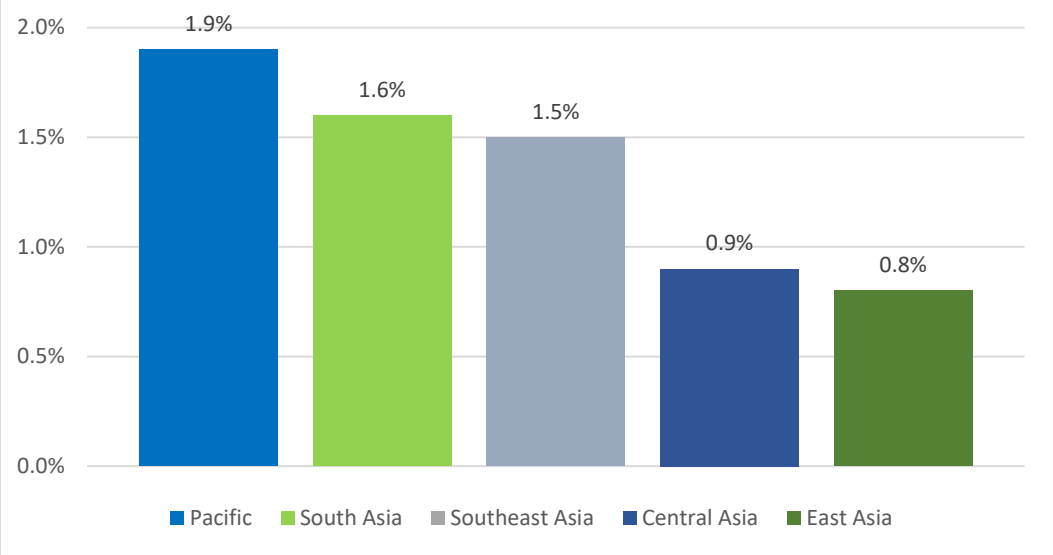

Figure 6: Annual subregional adaptation finance needs, 2023-2030 (as % of projected 2030 gross domestic product) [50]

The adaptation financing needs of the ASEAN region are increasingly urgent, as the 1.5°C goal becomes harder to achieve, climate change impacts become more evident and damaging, while climate technologies take time to develop and to be adopted across regional markets. This creates a need for higher visibility of available technologies for climate adaptation – fostering the demand for scalable, context-specific adaptation strategies that connect pressing climate risks in ASEAN (e.g., flooding, sea-level rise, and agricultural disruption), and for more research into viable, localized adaptation solutions.

At the same time, adaptation projects are currently mostly government-funded, while the financing gap remains large and cannot be borne by governments alone. With signs of a reduction in the availability of public sources of adaptation finance, there is a need to leverage the potential of the ASEAN Taxonomy to unlock and mobilize additional sources of finance including from private sources for urgently needed adaptation investments, not only through sovereign bond issuances but also via private sector participation (including via public-private partnerships and blended finance instruments) in filling the relevant financing gaps in the region. This may include channeling finance for commercially-oriented adaptation investments in key economic sectors, in addition to publicly funded investments.

[50] Asian Development Bank, Building Resilience: Adaptation Investment Needs in Asia and the Pacific, 2024.

2.4 The role of taxonomies in supporting adaptation finance

In the context of sustainable finance, a taxonomy is a classification system that defines which economic activities are environmentally sustainable, providing a common language for policymakers and market actors[51] and playing a critical role in directing capital flows towards sustainable activities. They provide credibility, integrity and transparency to the market, facilitating the identification of environmentally sustainable investment opportunities which, in turn, enable the mobilization of capital linked to the goals of the Paris Agreement and other environmental objectives.[52]

The adoption of sustainable finance taxonomies in jurisdictions around the world has increased the need for a greater focus on interoperability between different taxonomies.[53] While sustainable finance taxonomy development generally initially focused on climate change mitigation—reflecting the urgent need for large volumes of financing to support decarbonization globally—taxonomies have gradually expanded to include other pressing environmental objectives and considerations, including climate change adaptation. This presents an important opportunity for taxonomies to help address the large adaptation finance gaps faced by many countries—including AMS—by helping to mobilize private finance for investments in adaptation and resilience.

Table 5: Sustainable finance taxonomies and adaptation coverage in AMS and key ASEAN trading partners as of September 2025

		Sustainable Finance Taxonomy	**Adaptation coverage**
ASEAN countries	Brunei Darussalam	Planned	Unclear – TBC
	Cambodia	Under development	Unclear – TBC
	Indonesia	In place: Indonesia Taxonomy for Sustainable Finance (TKBI)	Yes
	Laos	Under consideration	Unclear
	Malaysia	In place: Climate Change and Principle-based Taxonomy guidance document	Yes
		In place: Principles-Based Sustainable and Responsible Investment Taxonomy	Yes
	Myanmar	Under consideration	Unclear
	Philippines	In place: Guidelines on the Philippine Sustainable Finance Taxonomy	Yes
	Singapore	In place: Singapore-Asia Taxonomy for Sustainable Finance | 2023 Edition	Yes
	Thailand	In place: Thailand Taxonomy Phase II	Yes
	Viet Nam	In place: Decision 21/2025/QD-TTg environmental criteria and the confirmation of projects in the green taxonomy	Yes
	Australia	In place: Australian Taxonomy — ASFI	Adaptation criteria to be developed

[51] ESCAP, UNFCCC RCC Asia-Pacific, ADB, CBI, and IRENA, A Call to Action: Developing Sustainable Capital Markets, Financing Energy Transitions, and Building Project Pipelines. ESCAP Financing for Development Series, No. 6. Bangkok: ESCAP, 30 June 2025
[52] UNEP, Common Framework for Sustainable Finance Taxonomies for Latin America and the Caribbean, July 2023
[53] World Bank, Taxonomy Astronomy: The global search to define sustainable finance, 6 June 2024

Key ASEAN trading partners	China	In place: Green Finance-Supported Project Catalogue (2025)	Yes - include adaptation-related eligible categories and projects
	European Union	Yes: EU taxonomy for Sustainable Activities	Yes
	Hong Kong SAR (China)	In place: Hong Kong Taxonomy for Sustainable Finance	Adaptation coverage under development
	Japan	Under consideration	Unclear
	South Korea	In place: The Korea Green Taxonomy (K-Taxonomy)	Yes

In 2025, the London Stock Exchange Group analyzed 12,000 green bonds and estimated that over a quarter of the eligible use-of-proceeds categories were linked to adaptation and resilience investments.[54] A recent report by the Climate Policy Initiative also observed that over 2022-2023, total adaptation finance from sources other than DFIs increased due to significant step-up in adaptation finance provided through green bonds, which rose by USD 7.9 billion to reach USD 18 billion in 2023 – with more adaptation use-of-proceeds amongst the issuance, attributed to the growth in the quality and quantity of adaptation definitions and resilience taxonomies, as well as potential growth in the adaptation financing space.[55]

In the ASEAN region, financial market regulators and supervisors recognize that taxonomies form an important part of the sustainable finance landscape, helping to direct capital flows toward activities that support sustainable development. The ASEAN Green Bond Standards, launched in 2017, reference climate change adaptation among the environmental objectives and eligible green projects categories for green and labelled bond issuances.[56] The ASEAN Taxonomy[57] provides a common language for defining sustainable economic activities in the ASEAN region while addressing the principles of transparency, credibility, and inclusiveness (see Appendix 1 for further details) – providing the necessary confidence for users and providers of capital.

The development and implementation of sustainable finance taxonomies in the ASEAN region must also reflect national priorities, needs and ambitions in relation to environmental, social, and economic goals.[58] In addition to the ASEAN Taxonomy, six AMS (Indonesia, Malaysia, Philippines, Singapore, Thailand, and most recently Viet Nam[59]) have also developed and are in various stages of implementing national taxonomies tailored to their unique contexts—focusing on climate change mitigation and adaptation, as well as other environmental goals.[60] These AMS taxonomies share the objectives of climate change mitigation and adaptation, in addition to other environmental considerations, including but not limited to, biodiversity protection, circular economy, and marine resource management. There also appears to be significant overlap in sector coverage among the national taxonomies despite different levels of progress in developing sector-specific criteria.[61]

Table 6 highlights the environmental objectives of existing taxonomies in five AMS.

[54] LSEG, Investing in the green economy 2025, May 2025
[55] Climate Policy Initiative, Global Landscape of Climate Finance 2025, June 2025
[56] ASEAN Capital Markets Forum, ASEAN Green Bond Standards, October 2018
[57] ASEAN Taxonomy Board, "ASEAN Taxonomy for Sustainable Finance - version 3", 20 December 2024
[58] Sustainable Finance Institute Asia, Channeling Sustainable Finance: The Role of Taxonomies (Asia-Pacific Climate Report 2024 Background Papers), 2024
[59] Vietnam Bond Market Association, Decision No. 21/2025/QĐ-TTg stipulating environmental criteria and confirming investment projects in the green taxonomy, July 2025
[60] UNEP FI, Sustainable Finance Taxonomies in ASEAN: Towards Regional Harmonization, March 2025
[61] UNEP FI, Sustainable Finance Taxonomies in ASEAN: Towards Regional Harmonization, March 2025

Table 6: Environmental objectives of AMS taxonomies[62]

Taxonomy	Environmental objectives				
	EO1: Climate change mitigation	EO2: Climate change adaptation	EO3: Biodiversity protection	EO4: Circular economy transition	Other listed objectives
ASEAN Taxonomy	✓	✓	✓	✓	NA
Indonesia	✓	✓	✓	✓	NA
Malaysia - Climate Change and Principle-based Taxonomy (CCPT))	✓	✓			NA
Malaysia - Principles-Based Sustainable and Responsible Investment Taxonomy (SRI Taxonomy)	✓	✓	✓	✓	NA
Philippines	✓	✓	To be addressed	To be addressed	NA
Singapore	✓	✓	✓	✓	Pollution prevention and control
Thailand	✓	✓	✓	✓	Sustainable use and protection of marine and water resources Pollution prevention and control[63]
Viet Nam	✓	✓	✓	✓	Pollution prevention and control

[62] UNEP FI, Sustainable Finance Taxonomies in ASEAN: Towards Regional Harmonization, March 2025
[63] Sustainable Finance Institute Asia, Channeling Sustainable Finance: The Role of Taxonomies (Asia-Pacific Climate Report 2024 Background Papers), 2024

3. Key principles for the mARs Guide

The mARs Guide will be developed to enhance the usability and functionality of the ASEAN Taxonomy for adaptation financing through supporting the consistent and robust application of EO2 related assessment requirements. It will facilitate the application of the ASEAN Taxonomy to sectors, activities and investments that are ASEAN priorities for addressing climate change adaptation.

3.1 Common principles for eligible adaptation finance

The eligibility of adaptation finance under the ASEAN Taxonomy is guided by either its EO2 Guiding Principles under the Foundation Framework (FF), or EO2 Technical Screening Criteria (TSC) under the Plus Standard (PS), which in turn reflect established best practices in the definition and tracking of adaptation finance.

In order to deliver its core objective of supporting the functionality of the ASEAN Taxonomy for the assessment of EO2, the mARs Guide will align with the principles of existing adaptation financing frameworks and standards. Alongside the ASEAN Taxonomy, this will include national sustainable finance taxonomies that have been developed and adopted by AMSs, most of which include climate adaptation as an environmental objective, as well as relevant international taxonomies and frameworks including the EU Taxonomy[64] (see Appendix 1).

3.2 Proposed principles for the mARs Guide

The eligibility of adaptation finance under the ASEAN Taxonomy will be based on the Five Core Principles of the ASEAN Taxonomy, as listed in Table 7 below. In addition, Table 7 also sets out some additional principles for the development of the mARs Guide, which address three broad aspects (criteria setting, managing impact, users). These additional principles have been developed through stakeholder feedback, including those collected through survey of the Technical Expert Advisory Group and IAP Working Group on Adaptation. This White Paper seeks to build on these principles by providing further granularity that can inform the development of the mARs Guide, in addition to drawing on other authoritative sources as presented in Appendix 1.

Table 7: Five Core Principles of the ASEAN Taxonomy and proposed principles of the mARs Guide

Five Core Principles of the ASEAN Taxonomy	Proposed principles of the mARs Guide
• **Principle 1:** The ASEAN Taxonomy will be the overarching guide for all AMS, providing a common language and complementing their respective national sustainability initiatives.	• **Context-relevant and locally prioritized:** Criteria for assessing eligible adaptation activities shall be capable of reflecting local vulnerabilities, priorities, and governance conditions across AMS and be practicable under varying data and capacity circumstances.
• **Principle 2:** The ASEAN Taxonomy will take into consideration widely used taxonomies	• **Interoperable and comparable:** Terminology, data fields, and outcome concepts shall enable straightforward mapping to major

[64] Commission Delegated Regulation (EU) 2021/ of 4 June 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives.

and other relevant taxonomies, as appropriate, and shall be contextualized to facilitate an orderly transition towards a sustainable ASEAN.	partner frameworks (e.g., the EU Taxonomy) to support cross-market use and consistent interpretation. The mARs Guide shall also ensure inter-operability with other relevant taxonomies and sustainability guidelines, including but not limited to the ASEAN Green Bond Standards, ASEAN Transition Finance Guidance, and other relevant resources.
• **Principle 3:** The ASEAN Taxonomy shall be inclusive and beneficial to all AMS.	• **Inclusive across AMS:** Requirements shall be accessible and proportionate for all AMS and market maturities – complementing the ASEAN Taxonomy in facilitating equivalence of and which acts as a regional reference approach towards assessment of climate change adaptation related activities, using clear language and avoiding undue procedural burden for users with differing capabilities.
• **Principle 4:** The ASEAN Taxonomy shall provide a credible framework, including definitions, and where appropriate, be science-based.	• **Science-based and evidence-led:** Definitions and eligibility criteria shall be grounded in recognized scientific authorities (e.g., IPCC) with transparent data sources, assumptions, and stated uncertainty ranges. • **Maladaptation risk management (uncertainty-aware):**[65] Eligibility shall explicitly consider future uncertainty, model and parameter calibration error, and residual risk. Activities shall avoid lock-in, burden-shifting, and trade-offs that increase climate vulnerability. The identification and tracking of adaptation outcomes (including positive and negative implications) shall enable and facilitate consistent and credible measurement and monitoring. Preference shall be given to robust or no-regrets options.[66] *(This is distinct from DNSH.)*[67]
• **Principle 5:** The ASEAN Taxonomy will be aligned with the sustainability initiatives taken by the capital market, banking, and insurance sectors, or at least not in conflict.	• **Usable for finance and the real economy:** The Guide shall be readily applicable by various user groups, including AMS, regulators, financial institutions, providers of capital, and rating agencies – in preparing bankable climate adaptation project proposals—producing decision-useful outputs with minimal reporting burden and clear delineation of desired adaptation outcomes.

[65] Further details of how the topic of maladaptation will be handled in the development of the mARs Guide.

[66] For example, a measure that is expected to confer adaptation benefits across a wide range of circumstances and contexts with little or no risk of potentially negative outcomes

[67] See the Glossary at Appendix 5 for definitions of DNSH and maladaptation. DNSH refers to harm to environmental objective other than adaptation. Maladaptation refers to adaptation objectives not being achieved through the inadvertent increasing of climate vulnerability.

APPENDICES

Appendix 1: Mapping of relevant frameworks and taxonomies

This appendix sets out the detailed mapping of relevant frameworks and taxonomies for the preparation of this White Paper.

Overview of existing adaptation finance related frameworks and taxonomies

Table 8 provides a summary of relevant green/sustainable finance taxonomies that include adaptation components. This includes selected countries and regions that have leading sustainable finance markets, have taxonomies that are considered as global best practices, and/or are important trading partners and/or have similar economic mixes to ASEAN countries. It also includes a number of adaptation finance frameworks that have been developed by a range of international organizations.

Table 8: Summary of green/sustainable finance taxonomies with adaptation components, and relevant adaptation finance frameworks

Category	**Taxonomy/framework**
National / regional taxonomies	European Commission, EU taxonomy for sustainable activities
	ASEAN Taxonomy Board, ASEAN Taxonomy for Sustainable Finance - version 3, 20 December 2024
	Securities Commission Malaysia, Principles-Based Sustainable and Responsible Investment Taxonomy, 12 December 2022
	Bank Negara Malaysia, Climate Change and Principle-based Taxonomy guidance document, 30 April 2021
	Bangko Sentral ng Pilipinas (BSP), Securities and Exchange Commission (SEC), and Insurance Commission (IC), Guidelines on the Philippine Sustainable Finance Taxonomy, Version 1, 23 February 2024
	Green Finance Industry Taskforce (GFIT), Singapore-Asia Taxonomy for Sustainable Finance | 2023 Edition, December 2023
	Otoritas Jasa Keuangan, Indonesia Taxonomy for Sustainable Finance (TKBI), Version 2, February 2025
	Thailand Taxonomy Board (TTB), Thailand Taxonomy Phase I, 30 June 2023; Thailand Taxonomy Phase II, 27 May 2025
	Vietnam Government, Decision No. 21/2025/QĐ-TTg—Regulation on Environmental Criteria and Verification of Investment Projects under the Green Taxonomy, 4 July 2025
	People's Bank of China (PBOC), the National Financial Regulatory Administration (NFRA), and the China Securities Regulatory Commission (CSRC), Green Finance Endorsed Project Catalogue (2025 Edition), 27 June 2025

	Hong Kong Monetary Authority (HKMA), Hong Kong Taxonomy for Sustainable Finance, May 2024; Prototype of Hong Kong Taxonomy for Sustainable Finance (Phase 2A) (under consultation by 8 October 2025), September 2025
	Ministry of Environment of South Korea, K-Taxonomy Guidelines, December 2022
	UNEP, Common Framework of Sustainable Finance Taxonomies for Latin America and the Caribbean. Latin America and the Caribbean, July 2023
	Government of Brazil, Sustainable Taxonomy of Brazil, December 2023
	Ministry of Finance and Economic Planning and Ministry of Environment of Rwanda, Rwanda Green Taxonomy - Annex II on adaptation & resilience, 2024
Adaptation finance specific frameworks / taxonomies	UNEP DTU and Green Technology Center, Taxonomy of Climate Change Adaptation Technology: A guidebook for countries conducting a Technology Needs Assessment for Adaptation, April 2021
	Standard Chartered, KPMG and UNDRR, Guide for Adaptation and Resilience Finance, April 2024
	Tailwind, Taxonomy for Climate Adaptation and Resilience Activities, May 2024
	UNDRR, Designing a climate resilience classification framework to facilitate investment in climate resilience through capital markets | UNDRR, June 2023
	Climate Bonds Initiative, Climate Bonds Resilience Taxonomy
	Global Adaptation & Resilience Investment Working Group (GARI), Climate Resilience Investments in Solutions Principles (CRISP) framework, 2024
	Adaptation SME Accelerator Program (ASAP), Adaptation Solutions Taxonomy, July 2020
	Adaptation and Resilience Investors Collaborative (ARIC), Adaptation & Resilience Impact: A measurement framework for investors, April 2024
	C40 Cities, Climate Adaptation and Resilience Taxonomy (CRAFT), 2016
	FAST-Infra Sustainable Infrastructure, FAST-Infra Label Framework
	European Investment Bank, MDB Joint Methodology for Tracking Adaptation Finance, 2022
	International Development Finance Club (IDFC) and Multilateral Development Banks Climate Finance Group, IDFC-MDB Common Principles for Climate Change Adaptation Finance Tracking, November 2023
	World Bank, Joint MDB Methodological Principles for Assessment of Paris Agreement Alignment, June 2023
	Asian Development Bank, Green and Blue Bond Framework, September 2021
	IIGCC, Climate Resilience Investment Framework, June 2025
	Cadlas, Investor Stewardship for Climate Resilience Sourcebook, June 2025
	PRI, Guide on Climate Adaptation and Resilience, June 2025
	OECD, Climate Adaptation Investment Framework, February 2025

	Glasgow Financial Alliance for Net Zero (GFANZ) adaptation guidance (to be launched in Q3/Q4 2025)
	UNEP-FI, Practical Guidance on Implementing Adaptation and Resilience for Banks, July 2025

As part of literature review, Table 9 below lists examples of principles for adaptation finance that were examined for the proposed principles for the mARs Guide in section 3.2 of this White Paper.

Table 9: Examples of principles for adaptation finance proposed by OECD, the EU, and IDFC-MDB[68]

Reference	Principle	Description
Core principles for assessing climate resilience alignment of finance (Mullan and Ranger, 2022)	Process of risk assessment	Relevant climate-related risks have been identified and managed, in a way that is proportionate to the type of investment and vulnerability to climate risks. This process should aim to achieve robustness against uncertainty.
	Consistency with adaptation/ resilience strategies	The investment should be compatible with relevant strategies for adaptation or resilience (if these strategies exist).
	Consistency with Net Zero	The investment should be compatible with achieving progress towards net zero.
	Do No Significant Harm	The investment does not undermine the resilience of people or ecosystems, for example by shifting risks to downstream users, or undermining biodiversity and ecosystems.
	Monitoring strategy	Strategies are put in place to monitor performance over time.
	Positive contribution to resilience beyond the project/ investment	The project or investment actively facilitates societal resilience line with relevant goals and plans (e.g., national adaptation plan).
EU Climate-ADAPT Adaptation Principles	Sustainable	Adaptation should be socially, financially, and environmentally sustainable. The goal is to reduce vulnerability and improve adaptive capacity, building up climate resilience fairly—without neglecting vulnerable groups, sectors, or areas. It is important that adaptation efforts align and create synergies with climate mitigation goals, increasing policy coherence within the organisation. Adaptation measures in one place should not compromise adaptation or mitigation efforts elsewhere, resulting in maladaptation. They should also not harm other sustainability and environmental objectives, but ideally support them. For example, objectives on responsible management of water and marine resources, the shift to a circular economy, preventing pollution, and conserving/restoring biodiversity and ecosystems.
	Evidence-based	Adaptation planning and actions should be informed by the most relevant and appropriate scientific knowledge and data, including future risks. Using this, adaptation should start by addressing risks from past and current climate variability and weather extremes.

[68] NB this table summarizes the findings of a range of external references, not all of which may necessarily be reflected in the mARs Guide.

	Place-based	There is no one-size-fits-all approach to adaptation. Responses should be tailored to the unique local or regional context, addressing current and future risks and vulnerabilities in a precise location. At the same time, it is important to be aware of the risks and adaptation responses of neighbouring authorities. Adaptation responses should also take into account the organisational set-up, bearing in mind the available personnel and financial resources.
	Inclusive and socially just	Effective action on adaptation may require the involvement of a range of actors (e.g., potentially covering public administrations, civil society and different sectors). Citizen involvement, especially from vulnerable groups, is crucial for inclusive and widely accepted adaptation plans. Just resilience should guide this process, addressing systemic injustice and making sure that adaptation efforts consider social vulnerability and provide opportunities for vulnerable groups to benefit.
	Monitored, evaluated, and continuously improved	Using clear indicators is vital to monitor and assess adaptation progress continuously. Ongoing assessment of policies' effectiveness, efficiency, coherence and equity allows for regular reflection and promotes learning and improvement over time.
	Flexible and iterative	Adaptation planning should be flexible due to uncertainties surrounding future climate and socio-economic conditions. Easy adjustments and updates based on lessons learned should be possible, to ensure resilience and effectiveness if circumstances change.
IDFC-MDB Common Principles for Climate Change Adaptation Finance Tracking	Evidence-based	Adaptation finance tracking relates to tracking the finance for activities that address current and expected effects of climate change, where such effects are material for the context of those activities.
	Granular and comprehensive	Adaptation finance tracking may relate to activities consisting of stand-alone projects, multiple projects under larger programs, or project components, sub-components or elements, including those financed through financial intermediaries.
	Process of risk assessment	Adaptation finance tracking process consists of the following key steps: • Setting out the context of risks, vulnerabilities and impacts related to climate variability and climate change; • Stating the intent to address the identified risks, vulnerabilities and impacts in project documentation; • Demonstrating a direct link between the identified risks, vulnerabilities and impacts, and the financed activities.
	Flexible and iterative	Adaptation finance tracking requires adaptation activities to be disaggregated from non-adaptation activities as far as reasonably possible. If disaggregation is not possible using project specific data, a more qualitative or experience-based assessment can be used to identify the proportion of the project that covers climate change adaptation activities. In consistence with the principle of conservativeness, climate finance is underreported rather than over-reported in this case.

Current approach for climate adaptation in the ASEAN Taxonomy and other AMS taxonomies

The ASEAN Taxonomy for Sustainable Finance (ASEAN Taxonomy), first published by the ATB in November 2021 and last updated in December 2024 (Version 3) with new version being developed, was developed to provide a science-based, inclusive framework for classifying sustainable economic activities across the region.

The ASEAN Taxonomy facilitates four Environmental Objectives (EOs). Any Activity seeking classification under the ASEAN Taxonomy must demonstrate that it is contributing to at least one of these EOs, while not detracting from the EO to which it is intended to contribute due to direct or indirect effects caused by the Activity to that EO.

- **EO1:** Climate Change Mitigation
- **EO2:** Climate Change Adaptation
- **EO3:** Protection of Healthy Ecosystems and Biodiversity
- **EO4:** Resource Resilience and the Transition to a Circular Economy

The objective of climate change adaptation (EO2) is defined as "*to lower the negative effects caused by climate change and increase resilience to withstand adverse physical impact of current and future climate change, through implementation of processes or actions*".

To measure substantial contribution to the above objectives while accounting for the different needs of countries, the ASEAN Taxonomy recommends two assessment approaches: the Foundation Framework (FF), which is a principles-based approach suitable for more entry-level assessments, and/or the Plus Standard (PS), which uses threshold-based (quantitative) and process- or practice-based (qualitative) technical screening criteria (TSC). Both approaches classify activities using a "traffic light" system of "Green", "Amber", and "Red" to show the degree of their sustainability alignment. Additionally, any activity classified under the ASEAN Taxonomy must adhere to three essential criteria: "Do No Significant Harm" (DNSH), Remedial Measures to Transition (RMT), and Social Aspects (SA).

In addition to the ASEAN Taxonomy, all of the national taxonomies that are being developed and/or implemented by AMS also consider climate adaptation as an environmental objective[69]. The key features of how each of these taxonomies address climate adaptation are summarized below:

- **Indonesia**[70]**:** flexible, principles-based approach focused on increasing the resilience of business entities to climate change or enable stakeholders and/or other Activities to increase resilience to climate change. Aligned with ASEAN Taxonomy EO2.
- **Malaysia—Climate Change and Principle-based Taxonomy (CCPT)**[71]**:** flexible, principles-based approach focused on lowering the negative effects and/or moderate harm caused by climate change and increasing resilience to withstand the adverse physical impact of current and future climate change. Aligned with ASEAN Taxonomy EO2.
- **Malaysia—Sustainable and Responsible Investment (SRI) Taxonomy**[72]**:** flexible, principles-based approach focused on lowering the negative effects caused by climate change and increasing resilience to withstand the adverse physical impact of current and future climate changes. Aligned with ASEAN Taxonomy EO2.

[69] Sustainable Finance Institute Asia, Channeling Sustainable Finance: The Role of Taxonomies (Asia-Pacific Climate Report 2024 Background Papers), 2024
[70] Otoritas Jasa Keuangan, "Indonesia Taxonomy for Sustainable Finance (TKBI)", Version 2, February 2025
[71] Bank Negara Malaysia, "Climate Change and Principle-based Taxonomy guidance document", 30 April 2021
[72] Securities Commission Malaysia, "Principles-Based Sustainable and Responsible Investment Taxonomy for the Malaysian Capital Market", 12 December 2022

- **Philippines**[73]**:** flexible, principles-based approach focused on managing actual and expected adverse consequences of climate change through evidence and relevant data regarding those effects, and building resilience to mitigate and endure the physical effects of both current and future climate change.
- **Singapore**[74]**:** identified as an environmental objective but yet to be elaborated in depth. Focus on reducing the adverse impact of the current and expected future climate on either (i) other people, nature or assets; or (ii) the economic activity itself, in each case without increasing the risk of an adverse impact on other people, nature and assets.
- **Thailand**[75]**:** identified as an environmental objective.

[73] Bangko Sentral ng Pilipinas (BSP), Securities and Exchange Commission (SEC), and Insurance Commission (IC), "Guidelines on the Philippine Sustainable Finance Taxonomy", Version 1, 23 February 2024
[74] Green Finance Industry Taskforce (GFIT), "Singapore-Asia Taxonomy for Sustainable Finance | 2023 Edition", December 2023
[75] Thailand Taxonomy Board (TTB), "Thailand Taxonomy Phase I", 30 June 2023; "Thailand Taxonomy Phase II", 27 May 2025

Approach for climate adaptation adopted in other taxonomies

Case study 1: EU Taxonomy

The EU Taxonomy[76] defines climate change adaptation as one of its six environmental objectives, alongside climate mitigation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems. To establish whether an investment is environmentally sustainable under the EU Taxonomy, the economic activity needs to contribute substantially to one or more of the environmental objectives as listed above (including adaptation), does not significantly harm any of the other environmental objectives and is carried out in compliance with the minimum safeguards as specified under the EU Taxonomy Regulation.

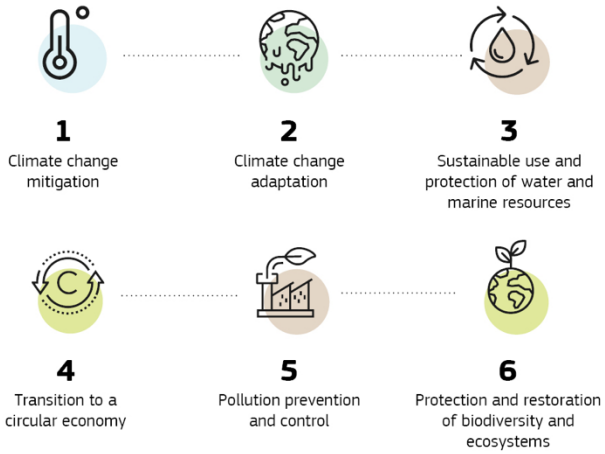

Figure 7: EU Taxonomy Sustainability Objectives[77]

The EU Taxonomy lists all activities eligible to contribute to the objective of climate change adaptation in Annex II of [Delegated Regulation]. For the majority of these activities, the technical screening criteria for substantial contribution are identical (see **Box 1** below). They entail checking that an activity has implemented adaptation solutions that reduce material physical climate risks, that material physical climate risks to the activity have been robustly assessed, that the adaptation solutions implemented are appropriate for that activity and its wider context and do not adversely affect the adaptation efforts of other stakeholders. In addition, enabling activities must also demonstrate that they contribute towards the adaptation efforts and levels of resilience of other activities. These substantial contribution criteria for adaptation in the EU have also been reflected in a number of national sustainable finance taxonomies, including the South African Green Finance Taxonomy[78] and the Sustainable Taxonomy of Mexico.[79] Beyond the EU taxonomy, the EU TSC reflect good practice principles of climate adaptation finance tracking, such as those set out in the Joint MDB Adaptation Finance Tracking Methodology[80] and the Common Principles for Climate Change Adaptation Finance Tracking.[81]

[76] European Commission, EU taxonomy for sustainable activities
[77] European Commission, EU Taxonomy Navigator
[78] National Treasury, Republic of South Africa, South African Green Finance Taxonomy 1st Edition, 2022
[79] Secretaria de Hacienda y Credito Publico, Gobierno de Mexico, Taxonomia Sostenible de Mexico, 2023
[80] European Investment Bank, Joint methodology for tracking climate change adaptation finance, 2022
[81] Common Principles for Climate Change Adaptation Finance Tracking, Version 1, 2 July 2015

Box 1: Summary of the EU Taxonomy Adaptation Screening Criteria

1. The activity has implemented physical and non-physical solutions ('adaptation solutions') that substantially reduce the most important physical climate risks that are material to that activity.
2. The physical climate risks that are material to the activity have been identified by performing a robust climate risk and vulnerability assessment with the following steps:
    a) Screening of the activity to identify which physical climate risks may affect the performance of the economic activity during its expected lifetime;
    b) Where the activity is assessed to be at risk from one or more physical climate risks, a climate risk and vulnerability assessment to assess the materiality of the physical climate risks on the economic activity
    c) An assessment of adaptation solutions that can reduce the identified physical climate risk. The climate risk and vulnerability assessment is proportionate to the scale of the activity and its expected lifespan, such
        i) For activities with an expected lifespan of less than 10 years, the assessment is performed, at least by using climate projections at the smallest appropriate scale
        ii) For all other activities, the assessment is performed using the highest available resolution, state of-the-art climate projections across the existing range of future scenarios consistent with the expected lifetime of the activity, including, at least, 10 to 30 years climate projections scenarios for major investments.
3. The climate projections and assessment of impacts are based on best practice and available guidance and take into account the state-of-the-art science for vulnerability and risk analysis and related methodologies in line with the most recent Intergovernmental Panel on Climate Change reports, scientific peer-reviewed publications and open source or paying models.
4. The adaptation solutions implemented:
    a) Do not adversely affect the adaptation efforts or the level of resilience to physical climate risks of other people, of nature, of cultural heritage, of assets and of other economic activities;
    b) Favour nature-based solutions or rely on blue or green infrastructure to the extent possible;
    c) Are consistent with local, sectoral, regional or national adaptation plans and strategies;
    d) Are monitored and measured against pre-defined indicators and remedial action is considered where those indicators are not met;
    e) (e) where the solution implemented is physical and consists in an activity for which technical screening criteria have been specified in this Annex, the solution complies with the do no significant harm technical screening criteria for that activity.
5. In order for an activity to be considered as an enabling activity, the economic operator demonstrates, through an assessment of current and future climate risks, including uncertainty and based on robust data, that the activity provides a technology, product, service, information, or practice, or promotes their uses with one of the following primary objectives:
    a) Increasing the level of resilience to physical climate risks of other people, of nature, of cultural heritage, of assets and of other economic activities;
    b) Contributing to adaptation efforts of other people, of nature, of cultural heritage, of assets and of other economic activities.

Case study 2: The Latin America & Caribbean (LAC) Common Framework

The Latin America & Caribbean (LAC) Common Framework[82], which serves as a voluntary reference for the development of sustainable finance taxonomies by LAC countries, It defines five options for eligible activities as adaption finance: i) vulnerability assessments, ii) using national or regional adaptation plans, iii) list of directly eligible activities and measures, iv) quantitative metrics and v) qualitative requirements and checks. The LAC Common Framework is an example of an alternative approach to be eligible adaptation finance that provides a range of options entailing more in-depth or more streamlined assessment, as displayed in Figure 8.

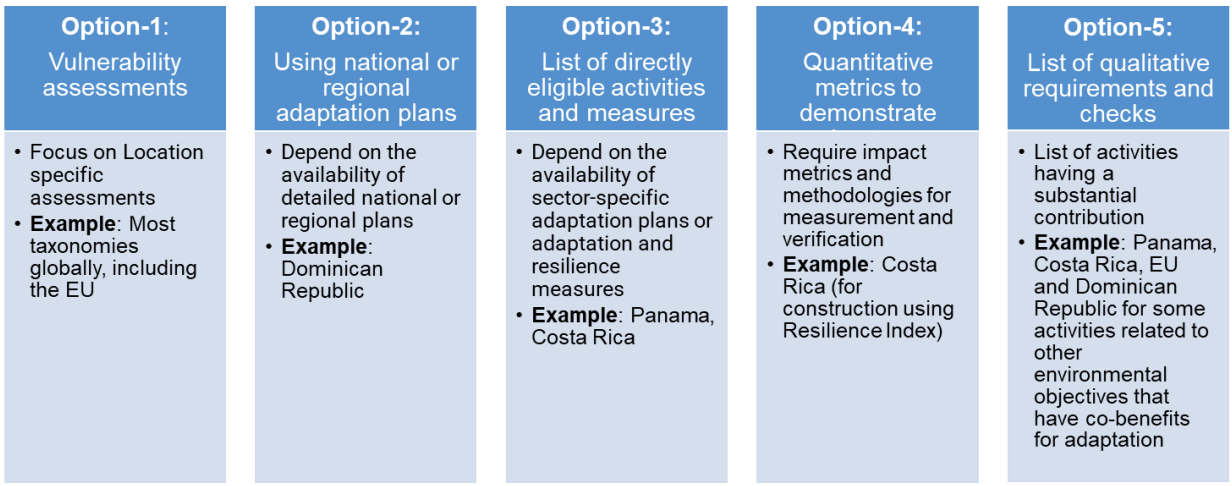

Figure 8: LAC Common Framework Adaptation Assessment Options

[82] UNEP, Common Framework of Sustainable Finance Taxonomies for Latin America and the Caribbean. Latin America and the Caribbean, 2023

Appendix 2: Mapping of ASEAN national adaptation strategies and planning processes

This appendix provides information about National Adaptation Plans (NAPs) and other national adaptation strategies and planning processes in ASEAN countries, organized as follows:

- A comparison of adaptation and resilience definitions and application across key global and ASEAN related frameworks.
- An overview of ASEAN Member States (AMS) submitted NAPs and other relevant national adaptation strategies and plans.
- A summary of submitted national adaptation plans (NAPs) across AMS.

Table 10: Comparison of adaptation and resilience definitions and application across key global and ASEAN related frameworks

Existing Policies & Frameworks	Definition or Key Aspects of the Framework	Key Priority Sectors / Thematic Areas
IPCC AR6	**Adaptation:** In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects **Resilience:** The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation.[83]	-
UAE Framework for Global Climate Resilience	Emphasizes the importance of the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2 of the Paris Agreement[84]	Water and sanitation, food and agriculture, ecosystems, infrastructure, health, livelihoods, cultural heritage
ASEAN Taxonomy for Sustainable Finance	Climate Change Adaptation focuses on managing expected negative effects of climate change, through identifying evidence and relevant information with regards to the impacts of climate change. The objective of this EO is to lower the negative effects caused by climate change and increase resilience to withstand adverse physical impact of	

[83] IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp., doi: 10.59327/IPCC/AR6-9789291691647.
[84] UNFCCC, UAE Framework for Global Climate Resilience, 2023

	current and future climate change, through implementation of processes or actions.[85]	
OECD Climate Adaptation Investment Framework	The concept of adaptation is closely linked to the concept of resilience, which is the "capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure" (IPCC, 2022). For the purposes of this report, climate adaptation is the process that is intended to lead to the outcome of improved resilience to the impacts of climate change.[86]	Agriculture, food and fisheries, buildings, business and industry, infrastructure (energy, transport, communications), natural environment and ecosystems, water and flood management
Standard Chartered, KPMG & UNDRR Guide for Adaptation & Resilience Finance	**Adaptation:** the process of adjusting practices, systems and structures to moderate potential damage and cope with the consequences of natural and climate-related hazards. This includes adjusting socio-economic and environmental practices to limit damage, **Resilience:** the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. [87]	Agrifood systems, cities, health, industry and commerce, infrastructure, nature and biodiversity, societies
ADB Green and Blue Bond Framework	Climate change adaptation projects are those which target the reduction of vulnerability of human or natural systems to the consequences of climate change and enhance resilience and adaptive capacity.[88]	Energy infrastructure resilience, water supply and other urban infrastructure and services, sustainable transport, agriculture
Methodology for Assessing the Alignment AIIB Investment Operations with the Paris Agreement	Adaptation and climate resilience: "… Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production".[89]	Energy, water supply and sanitation, transport, urban development

[85] ASEAN Taxonomy Board, "ASEAN Taxonomy for Sustainable Finance - version 3", 20 December 2024
[86] OECD, Climate Adaptation investment Framework, revised version, February 2025
[87] Standard Chartered, KPMG and UNDRR, Guide for Adaptation and Resilience Finance, April 2024
[88] Asian Development Bank, Green and Blue Bond Framework, September 2021
[89] Asian Infrastructure Investment Bank, Methodology for Assessing the Alignment AIIB Investment Operations with the Paris Agreement, July 2023

Table 11: Overview of AMS submitted NAPs and other relevant national adaptation strategies and plans

Country	Overview of Climate Risks	Key Affected Sectors	Identified Adaptation Activities	Adaptation Finance Needs
Brunei Darussalam[90]	• Rising sea levels • Rising temperature • Increased rainfall • Extreme weather events • Forest fires • Flooding • Landslides • Strong winds	• Agriculture and food security • Biodiversity and environment • Health and livelihood • Infrastructure and urban resilience • Marine protection and coastal resilience • Water resources • Disaster risk reduction • Fisheries	Key adaptation activities focus on ensuring food security, protection of the environment and biodiversity, strengthening public health, improving climate-resilient infrastructure and services, boosting coastal resilience including flood protection measures and ensuring clean and reliable water access.	Unspecified
Cambodia	• Floods • Droughts • Heatwaves • Windstorm • Seawater intrusion	• Agriculture • Coastal zones • Energy • Human health • Industry Infrastructure (incl. roads, buildings and urban land use planning) • Livelihoods, poverty and biodiversity • Tourism • Water resources	Key adaptation activities focus on climate-smart agriculture, resilient aquaculture, sustainable forestry, and strengthening water and sanitation systems. They also include climate-proofing infrastructure, improving early warning and disease surveillance, building institutional capacity, promoting gender-responsive development, enhancing climate education and supporting disaster-resilient land use and resettlement.	Funding for top 40 priority actions: **USD 529.97million** [91] Estimated finance necessary for all adaptation actions: **USD 2.04 billion (by 2030)**[92]
Indonesia	• Sea level rise • Landslides • Increased flooding • Droughts and higher temperatures • Extreme weather events	• Food • Water • Ecosystem • Health • Disaster • Energy	Key adaptation activities focus on boosting food security, strengthening water and energy systems with climate-resilient infrastructure and renewables, improving public health and urban resilience, enhancing climate and disaster governance, and promoting ecosystem-based adaptation	**USD 64 billion** [93]

[90] NB Brunei Darussalam's First Nationally Determined Contribution (2020) also mentions 'ocean warming and acidification' but this is not expected to be included in the updated Second Nationally Determined Contribution which was submitted to the UNFCCC in September 2025
[91] Cambodia National Adaptation Plan Financing Framework and Implementation Plan (2017)
[92] Cambodia Updated Nationally Determined Contribution (2020)
[93] Indonesia Third National Communication (2017)

			through sustainable management and community involvement.	
Lao PDR	• Increased temperatures • Landslides • Increased flooding • Increased rainfall • Droughts • Extreme weather events	• Agriculture • Forestry and land use change • Water resources • Transport and urban development • Public health	Key adaptation activities include climate-resilient farming, forestry management, integrated land use, water system resilience, nature-based infrastructure, climate-resilient urban and transport planning, public health strengthening, and hydropower resilience.	**USD 278-371 million (annually)**[94]
Malaysia	• Increased temperatures • Increased rainfall • Increased flooding • Droughts • Extreme weather events • Sea level rise and coastal inundation • Landslides • Heatwaves • Ocean warming and acidification • Wildfires	• Water and coastal resources • Agriculture and food security • Forestry and biodiversity • Cities, built environment and infrastructure • Energy • Public health	Unspecified	**USD 63.6 million** [95] **RM400 billion (~USD95 billion) to "to fully adapt to climate change over the next 50 year"[96]**
Myanmar	• Extreme weather events • Increased flooding • Droughts • Increased temperatures • Sea level rise	• Agriculture • Natural resources • Health • Disaster risks • Urban planning	Unspecified	Unspecified
Philippines	• Increased temperature and drought • Sea level rise and extreme sea levels • Extreme precipitation • Extreme winds and tropical cyclones	• Agriculture and fisheries and food security • Water resources • Health • Ecosystems and biodiversity • Cultural heritage, population displacement and migration • Land use and human settlements	Key adaptation activities include promoting sustainable agriculture and improved resource management, enhancing water infrastructure and watershed protection, developing climate-resilient health systems, restoring ecosystems, supporting resilient housing and disaster recovery,	Unspecified

[94] Lao PDR Third National Communication (2024)
[95] Malaysia Fourth National Communication (2024). Note: this figure is likely an underestimate and likely associated with identified initiatives.
[96] Ministry of Natural Resources and Environmental Sustainability, Malaysia, National Climate Change Policy 2.0, September 2024

		• Livelihoods and industries • Energy, transport and communications	protecting cultural heritage, strengthening local climate planning and early warning, mandating business adaptation, climate-proofing infrastructure, and expanding renewable energy and resilient technologies.	
Singapore	• Sea level rise • Increased temperatures • Increased rainfall and flooding • Urban heat island effect	• Coastal Protection, Water Resources & Drainage • Biodiversity & Greenery • Buildings & Infrastructure • Public Health & Food Security • Network Infrastructure • Urban Heat Island Effect	Key adaptation actions include engineering and nature-based solutions, sustainable water and food systems, biodiversity conservation, climate-sensitive urban planning, and resilient infrastructure design.	**S $100 billion over next 100 years for coastal protection**[97]
Thailand	• Increased flooding • Extreme weather events • Landslides • Droughts • Sea level rise	• Water resources • Agriculture and food security • Tourism • Public health • Natural resources management • Human settlements and security	Key adaptation activities include enhancing water security, maintaining food productivity, strengthening tourism resilience, building robust public health systems, promoting biodiversity management, and increasing adaptive capacity at local levels.	Unspecified
Viet Nam	• Increased flooding and extreme weather events • Droughts • Landslides • Sea level rise • Coastal erosion and saline intrusion	• Agriculture • Disaster risk reduction • Infrastructure • Health, society and tourism • Water resources • Strengthening policies and resources • Biodiversity	Key adaptation activities include strengthening climate-resilient agriculture, ecosystems, infrastructure, and health systems; mitigating disaster risks through early warnings and resilient planning; enhancing institutional frameworks, public engagement, and finance for adaptation; and developing tailored regional solutions across priority areas.	$27.5 – 64.16 billion USD (estimated adaptation finance needs for 2021-2030)[98]

[97] Charting Singapore's Low Carbon & Climate Resilient Future (2020)

[98] Viet Nam NAP 2021-2030 with vision to 2050, November 2024

Table 12: Summary of submitted national adaptation plans (NAPs) across AMS as of September 2025

Country	LDC (Yes/No)	NAP Status	NAP Submission Date	Additional Documents
Brunei Darussalam	No	In progress	N/A	Brunei Darussalam Initial National Communications (2016) Brunei Darussalam Second National Communication (2017) Brunei Darussalam First Nationally Determined Contribution (2020) Brunei Darussalam National Climate Change Policy (2020) Brunei Darussalam Biennial Transparency Report (2024)
Cambodia	Yes	Submitted	7 July 2021	Cambodia National Adaptation Plan Financing Framework and Implementation Plan (2017) Cambodia Initial Biennial Transparency Report (2024) Cambodia Third National Communication (2022) Cambodia Updated Nationally Determined Contribution (2020)
Indonesia	No	In progress	N/A	Indonesia First Biennial Transparency Report (2024) Indonesia Enhanced Nationally Determined Contribution (2022) Indonesia Adaptation Communication (2022) Indonesia Third National Communication (2017)
Lao PDR	Yes	In progress	N/A	Lao PDR First Biennial Update Report (2020) Lao PDR First Nationally Determined Contribution [Updated Submission] (2021) Lao PDR Third National Communication (2024)
Malaysia	No	In progress	N/A	Malaysia First Nationally Determined Contribution [Updated Submission] (2021) Malaysia Fourth National Communication (2024) Malaysia First Biennial Transparency Report (2024) Climate Risk Country Profile: Malaysia Malaysia National Risk Register (2024)
Myanmar	Yes	In progress	N/A	Myanmar Initial National Communication (2012) Myanmar First Nationally Determined Contribution [Updated Submission] (2021)
Philippines	No	Submitted	30 May 2024	Philippines Second National Communication Philippines First Nationally Determined Contribution (2021) Philippines First Biennial Transparency Report (2025)
Singapore	No	In progress	N/A	Singapore Second Nationally Determined Contribution (2022) Singapore Fifth National Communication & Fifth Biennial Update Report (2022) Singapore Fourth Biennial Update Report (2020) Charting Singapore's Low Carbon & Climate Resilient Future (2020)
Thailand	No	Submitted	18 April 2024	Thailand Fourth Biennial Update Report (2024) Thailand Fourth National Communication (2022) Thailand First Biennial Transparency Report (2024)
Viet Nam	No	Submitted	5 September 2025	Viet Nam Third National Communication [Updated Submission] (2019) Viet Nam Third Biennial Update Report (2020) Viet Nam Nationally Determined Contribution (2022) Viet Nam NAP 2021-2030 with vision to 2050

Appendix 3: Potential additional role of the mARs Guide

Table 13 below provides an overview of the materials that could be developed within the mARs Guide to support the application of EO2. In summary, these are:

Physical climate risk assessment

At present, physical climate hazard and risk data is inconsistent across markets (including the ASEAN region) in terms of their granularity, availability and modelling approaches. The mARs Guide will aim to help address these challenges by providing resources that support:

- Comparability of risk reduction/resilience metrics (e.g., avoided losses, ROI) and approaches including downscaling, scenario assumptions and time horizons, across sectors and jurisdictions
- Gaps in data granularity and availability in some AMS
- Guidance on minimum data requirements or metrics for EO2 assessments, articulate the roles for service providers and insurers in data and modelling gaps and provide direction for users.

Some of the resources that the Guide may provide to meet these needs may include:

- Compendium of key physical climate risks in the ASEAN region
- ASEAN-relevant good practice guidance on how to perform climate risk assessments (building on Annex 3 of the ASEAN Taxonomy).
- Compendium of sources of robust, authoritative and ASEAN-specific climate analytics and data, which may include, but not be limited to, the following:
  - CORDEX—South East Asia: Southeast Asia Climate Downscaling Experiment (SEACLID)
  - IPCC AR6 WGII Chapter 10 (Asia): Chapter 10: Asia | Climate Change 2022: Impacts, Adaptation and Vulnerability
  - South-East Asia Regional Climate Centre: SEA RCC-Network
  - World Bank Adaptation and Resilience Readiness Data | Data Catalog

National context for adaptation financing

- Compendium / summary of AMS NAPs, NDCs and other nationally-owned adaptation strategies and plans for checking activity alignment.
- Compendium of relevant environmental laws in AMS that may be relevant to EO2

Maladaptation

- ASEAN-relevant good practice guidance on assessing and managing maladaptation, which may build on and/or reference as appropriate the following materials:
  - Annex 3 of the ASEAN Taxonomy
  - REGILENCE Maladaptation Self-Assessment Checklist
  - Climate Bonds Resilience Taxonomy Certification Guidance on maladaptation
  - Climate Maladaptation Assessment Tool for Aotearoa New Zealand

Monitoring and managing adaptation outcomes

- Compendium of ASEAN-relevant metrics that can be used to measure and monitor physical climate risk reduction and improved adaptation outcomes
- Compendium of ASEAN-relevant adaptation certification and/or verification mechanisms
- ASEAN-relevant guidance and resources for assessing corporate-level action on physical climate risks management and adaptation by companies.

Assessing adaptation across multiple economic activities and sectors

- ASEAN-relevant compendium and case studies of enabling activities illustrating different ways in which an enabling contribution can be made.
- ASEAN-relevant guidance and case study examples of adaptation cross-linkages and dependencies between sectors.

Table 13: Overview of how the mARs Guide may support EO2 assessment

EO2 Guiding Question	**Specific questions**	**Potential role for mARs Guide**
1A. Does the Activity implement measures to increase the Company's resilience to climate change?	1. How does the Activity contribute to Company's resilience against adverse physical impacts of current and future climate change? (e.g., refurbishing infrastructure for greater resilience to impacts of sea level rise, building flood protection infrastructure to protect facilities, operation of road and rail adapted to current and future heatwaves through the use of more heat-resistant materials during its construction.) • Has a climate risk assessment been conducted to establish the Activity's risk exposure towards physical climate risks? • Has robust and recent climate data, projections and scenarios been used for the assessment? • Do the results of the climate risk assessment showcase the impacts of climate change on the Activity? Is it a positive or negative impact? • Does the Activity align with entity or national level climate adaptation plans? • Does the Activity consider the expected future climate in its current and planned practices? • Does the Activity avoid leading to an increase in the vulnerability of human or natural systems due to the effects of climate change and climate variability–related risks?	• Provide ASEAN-relevant good practice guidance on how to perform climate risks assessments. • Provide a compendium of sources of robust, authoritative and ASEAN-specific climate analytics and data. • Provide a compendium / summary of AMS NAPs, NDCS and other nationally-owned adaptation strategies and plans for checking activity alignment.
	2. Does the Activity avoid leading to an increased adverse impact of the current climate and the expected future climate, on the Activity itself or on people, nature or assets?	• Provide ASEAN-relevant good practice guidance on assessing and managing maladaptation.
	3. Does the Activity avoid impeding the adjustment to actual and expected climate change and its impacts?	
	4. Do the Company's policies and business strategy generally avoid contradicting or impeding alignment with the specified EO2 principles?	• Provide ASEAN-relevant guidance and resources for assessing corporate-level action on physical climate risks management and adaptation by companies.

	5. Where applicable and relevant, is a 3rd party certification or verification of alignment of Activity with EO2 available?	• Provide a compendium of ASEAN-relevant adaptation certification and/or verification mechanisms
	6. Does the Activity fulfil relevant environmental law(s) applicable to EO2?	• Provide a compendium of relevant environmental laws in ASEAN AMS that may be relevant to EO2
	7. Is the reduction and/or prevention of increase in climate physical risks measurable and observable? (e.g., data on monthly transport accidents caused by natural disasters against maintenance activities delivered, data on houses repaired due to floods against budget increase for building safeguards.)	• Provide a compendium of ASEAN-relevant metrics that can be used to measure and monitor physical climate risk reduction and improved adaptation outcomes
1B. Does the Activity enable other stakeholders and/or Activities to increase resilience to climate change?	1. Does the Activity help other stakeholders (including the community) to reduce/manage physical risks? (e.g., provision of infrastructure to facilitate climate change adaptation of stakeholders.) • Does the Activity avoid impeding upstream and/or downstream stakeholders from increasing their resilience to climate change?	• Provide ASEAN-relevant good practice guidance on assessing and managing maladaptation.
	2. Does it promote intersectoral collaborations for climate change adaptation without negatively affecting other sectors?	• Provide ASEAN-relevant guidance and case study examples of adaptation cross-linkages and dependencies between sectors.
	3. How does the Activity enable other Activities to reduce material physical risks? (e.g., removal of technological barriers to adaptation, Activity which primarily provides installation of irrigation systems and improved land drainage measures that lead to reduced exposure to physical climate risks.)	• Provide an ASEAN-relevant compendium and case studies of enabling activities illustrating different ways in which an enabling contribution can be made.
	4. Has a climate risk assessment been conducted on the enabled Activity's risk exposure towards physical climate risks? • Has robust and recent climate data, projections and scenarios been used for the assessment? • Do the results of the climate risk assessment showcase the impacts of climate change on the enabled Activity? Is it a positive or negative impact?	• Provide ASEAN-relevant good practice guidance on how to perform climate risks assessments. • Provide a compendium of sources of robust, authoritative and ASEAN-specific climate analytics and data. • Provide a compendium / summary of AMS NAPs, NDCs and other nationally-owned adaptation strategies and plans for checking activity alignment.

Appendix 4: Definition of key concepts used in the report

Unless otherwise stated in the footnotes, definitions provided by the Intergovernmental Panel on Climate Change (IPCC), mostly from the Sixth Assessment Report (AR6), are used:[99]

- **Adaptation**: In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.
- **Adaptation needs**: The circumstances requiring action to ensure the safety of populations and the security of assets in response to climate impacts.
- **Adaptive capacity**: The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities or to respond to consequences.[100]
- **Capacity building**: The practice of enhancing the strengths and attributes of, and resources available to, an individual, community, society or organization to respond to change.
- **Climate change**: A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. The United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". The UNFCCC makes a distinction between climate change attributable to human activities altering the atmospheric composition and climate variability attributable to natural causes.
- **Disaster**: A "serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts".
- **Disaster risk reduction (DRR)**: Denotes both a policy goal or objective, and the strategic and instrumental measures employed for anticipating future disaster risk; reducing existing exposure, hazard, or vulnerability; and improving resilience.
- **"Do No Significant Harm" (DNSH)**: The principle of ensuring that activities that contribute positively towards one environmental objective (of the ASEAN Taxonomy) do no significant harm to any of the other environmental objectives (of the ASEAN Taxonomy).
- **Early warning systems**: The set of technical and institutional capacities to forecast, predict, and communicate timely and meaningful warning information to enable individuals, communities, managed ecosystems, and organizations threatened by a hazard to prepare to act promptly and appropriately to reduce the possibility of harm or loss. Depending upon context, EWS may draw upon scientific and/or Indigenous knowledge, and other knowledge types. EWS are also considered for ecological applications, e.g., conservation, where the organization itself is not threatened by hazard but the ecosystem under conservation is (e.g., coral bleaching alerts), in agriculture (e.g., warnings of heavy rainfall, drought, ground frost, and hailstorms) and in fisheries (e.g., warnings of storm, storm surge, and tsunamis).

[99] IPCC Glossary: https://apps.ipcc.ch/glossary/
[100] MA, 2005: Appendix D: Glossary. In: Ecosystems and Human Well-being: Current States and Trends. Findings of the Condition and Trends Working Group [Hassan, R., R. Scholes, and N. Ash (eds.)]. Millennium Ecosystem Assessment (MEA). Island Press, Washington, DC, USA, pp. 893–900.

- **Ecosystem-based adaptation (EbA)**: The use of ecosystem management activities to increase resilience and reduce the vulnerability of people and ecosystems to climate change (Campbell et al., 2009).
- **Enabling conditions (for adaptation and mitigation options)**: Conditions that enhance the feasibility of adaptation and mitigation options. Enabling conditions include finance, technological innovation, strengthening policy instruments, institutional capacity, multi-level governance, and changes in human behaviour and lifestyles.
- **Equity**: The principle of being fair and impartial, and a basis for understanding how the impacts and responses to climate change, including costs and benefits, are distributed in and by society in more or less equal ways. Often aligned with ideas of equality, fairness and justice and applied with respect to equity in the responsibility for, and distribution of, climate impacts and policies across society, generations and gender, and in the sense of who participates and controls the processes of decision-making.
- **Extreme weather event**: An event that is rare at a particular place and time of year. Definitions of 'rare' vary, but an extreme weather event would normally be as rare as, or rarer than, the 10th or 90th percentile of a probability density function estimated from observations. By definition, the characteristics of what is called extreme weather may vary from place to place in an absolute sense.
- **Hazard**: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.
- **Maladaptation:** A situation in which actions that are intended to reduce vulnerability to climate change impacts inadvertently result in increasing vulnerability to climate change impacts.
- **Nature-based solutions (NbS)**: Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.
- **Residual risk**: The risk related to climate change impacts that remains following adaptation and mitigation efforts. Adaptation actions can redistribute risk and impacts, with increased risk and impacts in some areas or populations, and decreased risk and impacts in others.
- **Resilience**: The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation.
- **Risk**: The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change. Relevant adverse consequences include those on lives, livelihoods, health and well-being, economic, social and cultural assets and investments, infrastructure, services (including ecosystem services), ecosystems and species.
- **Scenario**: A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships. Note that scenarios are neither predictions nor forecasts, but are used to provide a view of the implications of developments and actions.
- **Technology transfer**: The exchange of knowledge, hardware and associated software, money and goods among stakeholders, which leads to the spread of technology for adaptation or mitigation. The term encompasses both diffusion of technologies and technological cooperation across and within countries.

- **Vulnerability**: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.
- **Well-being**: A state of existence that fulfils various human needs, including material living conditions, meaningful social and community relationships and quality of life, as well as the ability to pursue one's goals, to thrive, and feel satisfied with one's life. Ecosystem well-being refers to the ability of ecosystems to maintain their diversity and quality.

Appendix 5: Useful databases

Table 14: List of databases related to A&R that could be useful for future phases of the project and stakeholders in ASEAN

Database	Description
Regional Centres and Networks	A list of regional centres and networks working on adaptation, compiled by the Adaptation Committee (AC). The list of regional centres and networks related to ASEAN / South-Eastern Asia is reproduced below in Table 15.
Adaptation Knowledge Portal	An online resource of the UNFCCC Knowledge-to-Action Hub for Climate Adaptation and Resilience (also called as the Nairobi work programme (NWP)). It provides free and open access to adaptation knowledge resources.
Private Sector Initiative - database of action on adaptation	Online database featuring good practices and profitable climate change adaptation activities being undertaken by private companies.
NAPA Priorities database	The National Adaptation Programmes of Action (NAPA) Priorities database page presents the list of ranked priority adaptation activities and projects, as well as short profiles of each activity or project, designed to facilitate the development of proposals for implementation. Projects are also arranged by sector
CORDEX—South East Asia: Southeast Asia Climate Downscaling Experiment (SEACLID)	CORDEX (Coordinated Regional Climate Downscaling Experiment) is a World Climate Research Programme (WCRP) framework to evaluate regional climate model performance through a set of experiments aiming at producing regional climate projections. SEACLID / CORDEX-SEA aims to downscale a number of CMIP5 GCMs for the Southeast Asia region through task-sharing basis among the institutions and countries.
South-East Asia Regional Climate Centre (SEA RCC): SEA RCC-Network	The Southeast Asia Regional Climate Centre Network (SEA RCC-Network) was set up following the passing of Resolution 5 of the Sixteenth Session of WMO RA-V (2-8 May 2014, Jakarta, Indonesia) to establish two WMO RCC-Networks in RA-V—one network for the Southeast Asian sub-region and one network for the South-West Pacific sub-region. Beyond the official designation status, future plans of the SEA RCC-Network include the provision of sub-seasonal-to-seasonal (S2S) forecasts and the development of new seasonal wind products by the long-range forecasting (LRF) node.
OECD Development Assistance Committee	The OECD DAC focusses on cross-border flows from developed to developing countries—including bilateral and multilateral public finance, as well as private finance mobilized.

Aon—Impact Forecasting Model Catastrophe Model	A risk modelling tool and catastrophe models that quantify the financial risk from natural and human-made disasters to help businesses, especially in the insurance sector, manage exposure to events like hurricanes, earthquakes, and floods.
IN-depth SYnthetic Model for Flood Damage Estimation (INSYDE)	A model for the estimation of flood damage to residential buildings at the micro-scale.
GEM Foundation—Global Exposure Model	A mosaic of local and regional models with information regarding the residential, commercial, and industrial building stock at the smallest available administrative division of each country and includes details about the number of buildings, number of occupants, vulnerability characteristics, average built-up area, and average replacement cost—covering AMS and Timor-Leste.
Natural Catastrophe Data & Analytics Exchange (NatCatDAX)	A regional data platform hosting economic exposure and natural catastrophe loss database for South-East Asia.

Table 15: Regional centres and networks related to ASEAN / South-East Asia (reproduced from the list compiled by the Adaptation Committee under the UNFCCC)

Name	**Type of organization**	**Adaptation Element**	**Adaptation sector/theme**	**Link**
Asian Cities Climate Change Resilience Network (ACCCRN)	Regional center/network /initiative	Adaptation planning and practices, Capacity-building, Communication and outreach/awareness, Institutional arrangements, Vulnerability assessment	Adaptation finance, Disaster risk reduction, Health, Human settlements and infrastructure, Water resources	https://acccrn.net/
Asian Development Bank (ADB)	Inter-governmental organization (IGO)	Adaptation planning and practices, Communication and outreach/awareness, Financial support	Ecosystems, Health, Human settlements and infrastructure, Water resources	http://www.adb.org/
Asian Disaster Preparedness Center (ADPC)	Regional center/network /initiative	Adaptation planning and practices, Capacity-building, Institutional arrangements, Monitoring and evaluation, Science and research, Vulnerability assessment	Disaster risk reduction, Health, Human settlements and infrastructure	https://www.adpc.net/ver25/
Adaptation Knowledge Platform (AKP)	Regional center/network /initiative	Capacity-building, Communication and outreach/awaren		http://weadapt.org/initiative/adaptation-knowledge-platform-for-asia-akp

Name	Type of organization	Adaptation Element	Adaptation sector/theme	Link
		ess, Science and research		
Asia Pacific Economic Cooperation (APEC)	Inter-governmental organization (IGO), Regional center/network /initiative	Capacity-building, Financial support	Agriculture and food security, Energy, Gender, Health, Water resources	http://www.apec.org/
Asia-Pacific Network on Adaptation (AP-NET)	Regional center/network /initiative	Adaptation planning and practices, Capacity-building, Communication and outreach/awareness, Financial support, Observation and scenarios, Vulnerability assessment	Agriculture and food security, Coastal areas/zones, Disaster risk reduction, Ecosystems, Gender, Human settlements and infrastructure, Water resources	http://www.apan-gan.net/
Adaptation Research Policy Network for Asia and the Pacific (ARPNAP)	Regional center/network /initiative, UN and affiliated organization	Communication and outreach/awareness, Science and research	Socio-economic activities	http://www.unep.org/roap/Activities/ClimateChange/AsiaandthePacificAdaptationNetwork/tabid/6837/Default.aspx
The Association of Southeast Asian Nations (ASEAN)	Inter-governmental organization (IGO)	Adaptation planning and practices, Adaptation policy, Communication and outreach/awareness	Disaster risk reduction, Water resources	http://www.asean.org/

Name	Type of organization	Adaptation Element	Adaptation sector/theme	Link
ASEAN Partnership with The Economics of Ecosystems and Biodiversity	Inter-governmental organization (IGO), Regional center/network /initiative	Adaptation planning and practices, Adaptation policy, Vulnerability assessment	Biodiversity, Ecosystems	http://www.teebweb.org/countryprofile/asean/
Asian Disaster Reduction Center (ADRC)	Regional center/network /initiative	Adaptation planning and practices, Adaptation policy, Capacity-building, Communication and outreach/awareness, Education and training, Observation and scenarios, Vulnerability assessment	Disaster risk reduction	http://www.adrc.asia/
Asia-Pacific Gateway for Disaster Risk Management and Development	Regional center/network /initiative, UN and affiliated organization	Adaptation planning and practices, Adaptation policy, Capacity-building, Communication and outreach/awareness	Socio-economic activities	http://www.drrgateway.net/
Coordinating Body on the Seas of East Asia (COBSEA)	UN and affiliated organization	Adaptation planning and practices, Capacity-building, Communication and outreach/awaren	Biodiversity, Coastal areas/zones	http://www.cobsea.org/

Name	Type of organization	Adaptation Element	Adaptation sector/theme	Link
		ess, Institutional arrangements		
Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF)	Inter-governmental organization (IGO)	Adaptation planning and practices, Adaptation policy, Capacity-building, Communication and outreach/awareness, Education and training, Financial support	Agriculture and food security, Biodiversity, Coastal areas/zones, Socio-economic activities	http://www.coraltriangleinitiative.org/
Global Asia Insurance Partnership (GAIP)	Research institution	Adaptation planning and practices, Adaptation policy, Capacity-building, Communication and outreach/awareness	Adaptation, Risk resilience, Socio-economic activities	https://www.gaip.global/
Greater Mekong Subregion, Environment Operations Centre (EOC)	Research institution	Adaptation planning and practices, Adaptation policy, Capacity-building, Observation and scenarios	Adaptation finance, Biodiversity, Ecosystems, Human settlements and infrastructure, Socio-economic activities	http://www.gms-eoc.org/
International Centre for Integrated Mountain Development (ICIMOD)	Regional center/network/initiative, Research institution	Adaptation planning and practices, Capacity-building, Communication and	Biodiversity, Disaster risk reduction, Ecosystems, Gender, Human settlements and infrastructure,	http://www.icimod.org/

Name	Type of organization	Adaptation Element	Adaptation sector/theme	Link
		outreach/awareness, Monitoring and evaluation, Observation and scenarios, Science and research, Vulnerability assessment	Socio-economic activities, Water resources	
Incheon Regional Roadmap and Action Plan on DRR	Regional center/network /initiative, UN and affiliated organization	Adaptation planning and practices, Adaptation policy, Capacity-building	Disaster risk reduction	http://www.unisdr.org/we/inform/publications/16210
ISDR Asia Partnership	Regional center/network /initiative, UN and affiliated organization	Adaptation planning and practices, Adaptation policy, Capacity-building, Communication and outreach/awareness	Disaster risk reduction	http://www.unisdr.org/asiapacific/activities
Knowledge Center on Climate Change Adaptation in Agriculture and Natural Resource Management in Southeast Asia (KC3)	Regional center/network /initiative	Capacity-building, Communication and outreach/awareness, Education and training, Institutional arrangements, Science and research	Agriculture and food security, Biodiversity, Coastal areas/zones, Ecosystems, Socio-economic activities, Water resources	http://www.climatechange.searca.org/
Mangroves for the Future (MFF)	Regional center/network /initiative	Adaptation planning and practices, Capacity-	Biodiversity, Coastal areas/zones, Disaster risk	http://www.mangrovesforthefuture.org/

Name	Type of organization	Adaptation Element	Adaptation sector/theme	Link
		building, Monitoring and evaluation	reduction, Ecosystems, Water resources	
Mekong River Commission for Sustainable Development (MRC)	Inter-governmental organization (IGO)	Adaptation planning and practices, Adaptation policy, Capacity-building, Communication and outreach/awareness	Agriculture and food security, Coastal areas/zones, Energy, Water resources	http://www.mrcmekong.org/
Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)	Regional center/network/initiative, UN and affiliated organization	Adaptation planning and practices	Agriculture and food security, Coastal areas/zones, Disaster risk reduction, Human settlements and infrastructure, Water resources	http://www.pemsea.org/
Preparedness for Climate Change	Non-governmental organization (NGO), Regional center/network/initiative	Adaptation planning and practices, Adaptation policy, Capacity-building, Communication and outreach/awareness	Disaster risk reduction	http://www.climatecentre.org/site/preparedness-for-climate-change-programme
SEA Change	Regional center/network/initiative	Monitoring and evaluation		http://www.seachangecop.org/

Name	Type of organization	Adaptation Element	Adaptation sector/theme	Link
Southeast Asia Disaster Risk Insurance Facility (SEADRIF)	Regional center/network /initiative	Capacity-building, Communication and outreach/awareness, Institutional arrangements	Disaster risk reduction	https://seadrif.org/
UN Economic and Social Commission for Asia and the Pacific (UNESCAP)	UN and affiliated organization	Capacity-building, Education and training, Institutional arrangements	Human settlements and infrastructure, Water resources	http://www.unescap.org/our-work/environment-development

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