AIGCC
ASIA INVESTOR GROUP ON CLIMATE CHANGE

Mobilising Regional Policy Action and Coordination on Transboundary Physical Climate Risks in Asia

Asia Investor Group on Climate Change (AIGCC)

Discussion Paper

October 2025

info@aigcc.net

www.aigcc.net

Background

As the physical impacts of climate change intensify, the adaptation finance gap continues to widen: recent findings from the 2024 UNEP Adaptation Gap Report estimates an adaptation finance gap of US$187-359 billion per year.[1] Current policy environments have not effectively catalysed critical private capital flows into adaptation and resilience, with less than 3% of overall needs supported by private finance.

Economies in Asia are particularly prone to the effects of floods, extreme heat and sea level rise. Increasing regional interdependencies across Asia further heighten the need for robust and coordinated adaptation strategies to protect populations and sustain economic progress. In particular, physical climate risks can extend across national boundaries through disruptions to trade flows, global supply chains, and impacts to natural ecosystems and biodiversity. Comprehensive adaptation responses to address such cross-border risks require systemic and collaborative approaches involving multiple jurisdictions. However, responses and frameworks to address and manage Transboundary Climate Risks (TCRs) are absent, preventing clear understanding of regional risks and financing opportunities for adaptation and resilience in the region.

Building on AIGCC's report on Financing Asia's National Adaptation Plans published in March 2025, [2] this whitepaper articulates the case for increased attention and strengthened regional coordination to address TCRs in Asia. It outlines how policymakers across markets have begun to integrate TCRs in their National Adaptation Plans and suggests ways forward to create enabling policy environments in the region.

Asia is vulnerable to transboundary physical climate risks

According to a World Meteorological Organisation (WMO) report, Asia is currently warming nearly twice as fast as the global average.[3] 2024 was the warmest year on record, with record-high sea surface temperatures, erratic water cycles [4] and prolonged extreme events across many parts of Asia.

[1] United Nations Environment Programme (UNEP). Adaptation Gap Report 2024. 2024.
[2] AIGCC. Financing Asia's National Adaptation Plans. 2025
[3] World Meteorological Organisation (WMO). Rising temperatures and extreme weather hit Asia hard. June 2025.
[4] World Meteorological Organisation (WMO). From drought to deluge: WMO report highlights increasingly erratic water cycle. Sep 2025.

At the same time, Asia is a highly interconnected region with extensive links through trade and investment, shared natural ecosystems, cross-border supply chain networks, and growing energy interdependence. Critically, climate-related impacts or disruptions in one market or location can cascade or generate impacts across borders and result in ripple effects through multiple transmission channels, including biophysical, economic, financial and human systems (Box 1).[5] These include direct and indirect physical and operational impacts on global supply chains (e.g. food, energy, and critical minerals), physical infrastructure (e.g. airports, roads, ports), trade and financial systems, and natural capital (e.g. green infrastructure, clean water) that support communities and livelihoods.[6,7]

Key events in Asia alone in recent history illustrate these risks acutely:

- Heavy Precipitation and Floods
    - In 2011, prolonged and extensive flooding and damage to automotive production facilities in industrial estates north of Bangkok, Thailand. This resulted in severe supply chain disruptions globally, an estimated economic loss of US$46.5 billion (or 1.1% of national GDP) to the Thai economy, and insured losses of around US$15 billion.[8,9] This consequently affected at least 300 Japanese companies,[10] triggered a 20% reduction in Japanese automobile exports in December 2011, while depressing automotive production in November 2011 in neighbouring regions including Malaysia, Philippines and Vietnam.[11]
    - In December 2021, heavy rainfall and flash floods at Southeast Asia's second-busiest port Port Klang, Malaysia have disrupted port access routes and cargo movement, and damaged semiconductor assembly facilities.[12]
- Tropical Cyclones
    - In 2022, tropical cyclone Noru temporarily suspended crude oil imports and fuel exports at the Dung Quat oil refinery in Vietnam's Quang Ngai province.[13]
- Drought Events

---

[5] Adaptation Without Borders and BCG. The Collective Advantage: Understanding Transboundary Climate Risks in Southeast Asia and Charting a Path Forward. 2024.
[6] Ranger et al. Towards UK Systemic Resilience to International Cascading Climate Risks: The Role of Infrastructure and Supply Chains. 2025. Environmental Change Institute, University of Oxford.
[7] United Nations Environment Programme (UNEP). The risk of cascading climate change shocks and stressors. Science for Adaptation Policy Brief 5. 2022.
[8] World Bank. Thai flood 2011 : rapid assessment for resilient recovery and reconstruction planning. 2012.
[9] Swiss Re Institute. The world's costliest flood: the 2011 Thailand flood, 10 years on. 2021.
[10] Reuters. Thai floods cripple over 300 Japanese firms. 2021.
[11] Ministry of Economy, Trade and Industry, Japan. White Paper on International Economy and Trade (Chapter 2 Section 3). 2012.
[12] The Malaysian Reserve. Operations in Port Klang affected by flash floods. 2021.
[13] Insurance Journal. Typhoon Noru Makes Landfall in Vietnam, Causing Floods, Property Damage. 2022.

- In 2007, drought resulted in a 40% decline in the utilisation rate of the Nam Num Hydropower station in Laos that further impacted electricity exports to Thailand.[14]
- Severe drought in Taiwan from 2020 to 2021 resulted in record low reservoir water levels. While operational or production disruptions and losses were not reported across chip-fabrication sites, the government implemented mandatory freshwater withdrawal restrictions of 5% to 17%.[15]

Recent analysis by the Environmental Change Institute at the University of Oxford estimates that port disruptions globally – particularly in the US, South Korea, East and Southeast Asia – will result in climate-related financial losses of around US$2.5 billion per year to the UK economy, with high trade risk concentrated in East Asian ports. The study also finds that a supply chain shock related to natural capital degradation globally may result in losses of at least 6% of GDP (relative to baseline) to the UK economy in the next decade.[16] Despite being under-assessed, physical climate risks along global value chains can significantly affect Asian economies.

Box 1. Transmission Channels for Transboundary Climate Risks

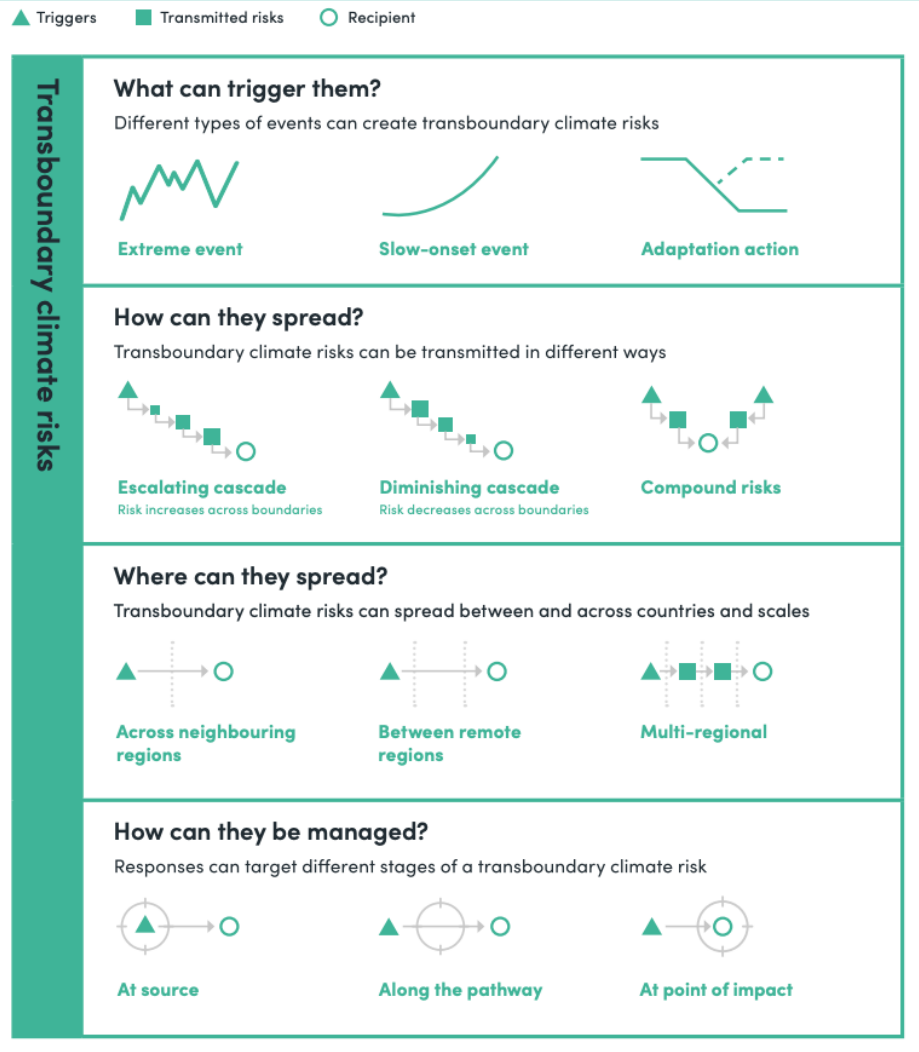
According to the Adaptation Without Borders Global Transboundary Climate Risk Report 2023,[17] TCRs can be transmitted through four main channels:
1. **Biophysical connections**: through changes in shared ecosystems and natural capital, including river basins, oceans, lakes, arid lands and air currents
2. **Economic and trade linkages**: by disrupting the flow of goods, services and commodities and shared infrastructure through international markets and supply chains
3. **Financial flows and capital markets:** by disrupting the flow of capital, investments and remittances, across economic value chains
4. **Human mobility**: through changes in migration and displacement as a result of climate and non-climate drivers.

Transboundary climate risks can be generated by multiple triggers, and spillover or cascade across multiple interdependent sectors, temporal scales and spatial scales.

[14] ASEAN Secretariat. Transboundary Disaster Risk Assessment and Scenario Planning for Tropical Cyclones and Droughts in the ASEAN Region. 2024.
[15] MSCI. How Climate Change Affected Thirsty Chipmakers. 2021.
[16] Ranger et al. Towards UK Systemic Resilience to International Cascading Climate Risks: The Role of Infrastructure and Supply Chains. 2025. Environmental Change Institute, University of Oxford.
[17] Adaptation Without Borders. Global Transboundary Climate Risk Report. 2023.

For instance, regional drought conditions and water scarcity may impact hydropower generation along shared river basins and thus power generation stability and food supplies in the region at the water-energy-food nexus.

Likewise, adaptation responses in one jurisdiction or sector may redistribute, increase, or reduce risk elsewhere.



A conceptual overview of transboundary climate risks. Image source: Adaptation Without Borders (2023). Global Transboundary Climate Risk Report.

Integration of TCRs in adaptation planning essential for systemic and holistic responses

We outline three overarching reasons for the integration of strategies to address TCRs across markets in adaptation planning, as part of a systemic and holistic response in adaptation to climate change, from the perspective of investors in the broader private sector.

POTENTIAL FINANCIAL MATERIALITY IMPLICATIONS OF TCRs

Investors and corporates operating across Asia are exposed to physical climate risks across value chains, geographies and sectors. Corporates and investors will benefit from strengthened risk assessments and resilience stress-testing of corporate supply chains to corporate transboundary impacts, particularly along key infrastructure nodes or chokepoints – such as major access routes, shipping lanes or ports. In the context of Asia's renewable energy transition for instance, increasing cross-border integration of grid systems, such as through the Laos-Thailand-Malaysia-Singapore (LTMS) and Brunei-Indonesia-Malaysia-Philippines (BIMP) Power Integration Projects, provides more links to diverse energy supply options and foster greater grid resilience. However, these interdependencies also underscore a heightened need to assess and track potential transboundary physical climate risks within interconnected grids and to strengthen resilience planning in the power generation sector.

Investors are already engaging corporates around greater transparency of disclosures and management of physical climate risks and opportunities. This has been ongoing and is expected to strengthen through various avenues, including through the AIGCC's Asia Utilities Engagement Program (AUEP) and Climate Action 100+ Program Emerging expectations for companies on physical climate risk management may include establishing a resilience plan and setting out key actions and targets, as well as disclosing policy engagements with government agencies to address physical risks.[18] However, in view of emphasis on mitigation efforts, corporate efforts to enhance adaptation and resilience across the value chain are relatively more nascent. Limited metrics and fragmented data availability of corporate risk exposure particularly at the asset-level across the value chain remains as significant barriers in developing and implementing actionable strategies towards greater resilience.

[18] Investor Group on Climate Change (IGCC). Investor expectations of companies' physical climate risk management and resilience (pilot version). 2024.

SOCIETAL, CORPORATE AND GOVERNMENT ACTIONS ON ADAPTATION ARE INTERTWINED

Across markets, asset-level climate-related financial risks in the form of asset damage or business disruption, and consequently measures to enhance asset-level resilience against physical climate-related risk, are highly dependent on existing key infrastructure (e.g. major ports, transport routes) and their defences such as seawalls or drainage channels constructed and maintained by governments. Aligning with market-level regulatory requirements for climate-related risk disclosures, asset owners are increasingly making advancements in their climate scenario analysis and stress-testing across their portfolios at the asset-level that require granular information of asset vulnerability and resilience. **The private sector and civil society actors rely on clear policy enablers and directions, as well as information (e.g., on district or city-level resilience measures) from adaptation plans, in the implementation of adaptation strategies and targets to avoid maladaptation risks.**

Likewise, progress on adaptation planning and implementation across governments in Asia cannot advance adequately and systemically without informed views of resilience actions undertaken at the local level, particularly those of infrastructure and real asset owners. Beyond communication of adaptation policy directions, concerted efforts are required to track the extent and alignment of current private sector and local community adaptation measures, to ensure that adaptation measures deliver actual risk reduction outcomes, and to enhance the investibility and credibility of adaptation projects.

OPPORTUNITIES TO INCENTIVISE CAPITAL MOBILISATION FOR ADAPTATION

While risks can cascade or extend across borders, adaptation responses and opportunities likewise can have positive or negative transboundary effects. Strengthened policy coordination across governments to identify systemic approaches that enhance physical risk transparency across supply chains and geographies, identify innovative financing models, and to outline adaptation opportunities at a regional level, can incentivise financing and capital mobilisation towards adaptation at scale.

The widening climate adaptation finance gap underscores the need for amplified regional and systemic coordination to address interregional and interdependent risks. The UNEP Adaptation Gap Report 2024 estimates global annual adaptation financing needs at US$187-359 billion per year, far above current flows. Current policy

environments have not effectively catalysed critical private capital flows into adaptation and resilience, with less than 3% of overall needs supported by private finance.

Key barriers to unlocking adaptation and resilience financing cited by investors include:

- inadequacies in climate risk modelling/scenario analysis and information around national and local adaptation plans and measures;
- insufficient corporate transparency and disclosure around supply chain physical climate risks and vulnerabilities;
- the absence of a visible pipeline of investible, sizeable and scalable resilience projects, and;
- the lack of policy clarity around adaptation.

Investors within AIGCC's Physical Risk and Resilience Working Group have thus collectively articulated expectations for adaptation planning and engaged with policymakers in Asia on elements of the NAP process. These include outlining consistent views of national climate risks through enhancing the availability and accessibility of information around adaptation efforts, ensuring corporate disclosure on physical risks, and integrating financing strategies within NAPs through whole-of-government approaches. These expectations also include integrating interregional effects in the assessment of climate risks and in the development of NAPs to build systemic resilience to climate change.

NAPs however have largely not assessed nor outlined plans to address TCRs

As a nascent topic, TCRs however remain poorly understood and inadequately addressed in national and regional policy frameworks. A large fraction of climate adaptation planning remains domestically focused on addressing impacts within national boundaries. At present, there are no dedicated regional mechanisms to jointly assess and manage climate risks at a regional scale. Supply chain and key infrastructure risks and their transmission have largely been unassessed across Asian markets.

AIGCC assessed adaptation plans and policies across nine Asian markets and their alignment with investor expectations in early 2025. This analysis found that few markets consider TCRs within their adaptation plans nor account for cross-border effects or linkages:

Climate risk analysis remains largely domestically focused, and do not reflect TCRs: Across nine Asian markets assessed, most adaptation policies and plans remain predominantly domestically focused, lacking an assessment of TCRs within national risk assessments. Consequently, adaptation policy objectives and responses proposed within national plans do not include consideration of TCRs.

While adaptation plans and policies include scenario analyses of hazard exposures and risks domestically (for example, changes to crop yields), NAPs have yet to systematically outline or assess transboundary physical climate risks and their potential impacts. Across several instances, NAPs have made sporadic references to potential impacts on shared regional ecosystems (e.g., impacts to water bodies such as the Mekong River) or outlined international cooperation efforts.

There are, however, instances of progress. Japan's 2021 Climate Change Adaptation Plan has emerged as an NAP that has begun to outline the impacts of climate change internationally on the domestic economy **(Box 2)**. The plan highlights a relative absence of scientific assessments and evidence on transboundary or supply chain risks and impacts. This is partially due to the complex and diffused nature of TCRs across multiple jurisdictions, supply chains and sectors, as well as an underlying lack of accessible and granular location and vulnerability information on supply chain assets and infrastructure.

Box 2. Transboundary Climate Risks in Japan's 2021 Climate Change Adaptation Plan

Japan's 2021 Climate Change Adaptation Plan[19], backed by its 2018 Climate Change Adaptation Act, emerges as an example of a NAP that has begun to outline potential transboundary climate risks along with planned actions to support adaptation efforts among overseas markets and corporations.

The plan acknowledges the effects of overseas climate impacts on Japan's economy and supply chains. These include potential fluctuations in crop production and prices of agricultural commodities due to rising temperatures or changes in precipitation at a global and local scales, direct physical impacts on the overseas production sites of Japanese corporations. Recognising the lack of evidence around impacts, the plan recommends further studies of overseas impacts to the Japanese economy.

[19] Ministry of Environment, Japan. Climate Change Adaptation Plan. 2021.

At the G7 Summit in June 2021, Japan has announced adaptation financing totalling 6.5 trillion yen from 2021-25 to support adaptation efforts in developing markets. The Ministry of Environment (MOEJ) has also outlined a policy goals to contribute towards enhancing the adaptation capacities of developing markets through (i) helping Japanese businesses expand their adaptation businesses globally and (ii) to promote technical cooperation around the observation, monitoring, projection, and assessment of climate change and its impacts in developing regions. These objectives are delivered by expanding the Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT) [20] launched in 2019 by the National Institute for Environmental Studies as an international platform for information sharing, and through international technical cooperation frameworks.

Corporate climate risk disclosure frameworks have emerged, but disclosures are lagging: The International Sustainability Standards Board (ISSB) S2 guidelines require a company to disclose their "current and anticipated effects of climate-related risks and opportunities on its business model and value chain", including physical climate risks across upstream, direct operations and downstream activities. Several governments in the Asia-Pacific region, such as Hong Kong, Japan and Malaysia, have finalised approaches to fully incorporate or align with ISSB disclosure guidelines.[21] Other markets such as Indonesia have not mandated alignment of disclosures with international standards.

Companies are increasingly enhancing their assessment of supply chain risks across their value chains through supplier audits, traceability platforms that map supplier risks and integrating stress testing in procurement strategies. However, an analysis in 2024 highlighted that actual disclosure rates of corporate financial exposures to physical risks ranges from 5% to 43% while use of climate scenario analysis ranges from 9% to 49% across markets in the region.[22] The lack of comprehensive assessment and disclosure of a firm's exposure to physical climate risks and supply chain vulnerabilities limits the identification of opportunities for further intervention.

Where disclosures are undertaken by corporates, the quality of disclosures generally remains low due to challenges around data quality and a lack of comparability or standardisation (i.e., inconsistent use of assumptions, scenarios, time frames and

[20] National Institute for Environmental Studies, Japan. Asia-Pacific Climate Change Adaptation Information Platform.
[21] IFRS Foundation. Use of IFRS Sustainability Disclosure Standards by jurisdiction. 2025.
[22] London Stock Exchange Group. State of ISSB Regulations and Disclosures in APAC. 2024.

hazards) across companies.[23]

Limited articulation of channels for investor engagement and pathways for financing resilience-building: Current adaptation policies and plans have mostly not articulated the roles of private investors and financial institutions. AIGCC's analysis highlighted the general lack of information around the role of investors and corporates in adaptation implementation. While two markets—Indonesia and China—have taken initial steps to outline private-investor roles in adaptation financing, others have yet to outline explicit mechanisms or project pipelines to mobilise adaptation finance, both domestic and beyond. The lack of clear financing strategies or roadmaps for adaptation finance, at both national and regional levels, serves as a barrier to further unlocking regional-level finance. **Systemic and coordinated responses at regional level with policy direction can help unlock further regional financing and holistic solutions to address TCRs.**

Emerging focus on TCRs within international policy environment

The Global Goal on Adaptation, established under Article 7 of the Paris Agreement, acknowledges the transboundary nature of climate risk. At COP28 in 2023, parties to the UN climate conference formally recognised that "climate change impacts are often transboundary in nature and may involve complex, cascading risks that require collective consideration and knowledge-sharing, climate-informed transboundary management and cooperation on global adaptation solutions." [24] While the importance of transboundary risks is recognised in the broader context, the integration or consideration of transboundary risks in global discussions, particularly within the Baku to Belem Roadmap to scale up climate finance, is still evolving at present.

The NAP process recognises the importance of transboundary risks and provides entry points for countries to consider and address them through transboundary coordination and collaboration. The process encourages countries to assess external sources of climate risk, such as climate impacts on trade partners, cross-border river basins, regional energy systems, or migrant flows. The process encourages stakeholder engagement with ministries and agencies to ensure comprehensive understanding of risks and opportunities, along with regional coordination for implementation and monitoring.[25]

---

[23] University of New South Wales. Challenges, limitations and risks associated with climate-related physical risk disclosure. 2024.
[24] UNFCCC. Global Goal on Adaptation. 2023.
[25] UNDP. Entry Points for Integrating Transboundary Climate Risks into NAP Process. 2019.

A systematic review and content analysis by the NAP Global Network on 41 NAP documents submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2023 however found that some countries have made sporadic references to transboundary risks such as shared ecosystems and natural resources or waterways, but do not apply conceptual logics or deliberative approaches to identify or assess them. There is room for more systematic approaches identification and assessment of transboundary risks in future NAPs, [26] such as in the case of the UK's National Climate Change Risk Assessment and Adaptation Plan **(Box 3)**.

Box 3. Responses to International Climate Risks in the UK's National Adaptation Plan

In 2022, the UK's third climate change risk assessment (CCRA3)[27] highlighted that the transmission of risks across borders could cost the UK economy over £1 billion per annum from 2050. The report outlines that under a 4°C warming scenario by the 2080s, high economic losses are potentially expected across as a result of the following risks: (i) risks to UK food availability, safety and quality from climate change overseas, (ii) risks from climate change on international trade routes and (iii) risks to the UK finance sector from climate change overseas.

The assessment also recommended to keep a 'watching brief' on potentially strong opportunities for UK food availability and exports from climate impacts overseas, and opportunities from climate change (including arctic ice melt) on international trade routes.

Following this assessment, the UK's Third National Adaptation Programme (NAP3) from 2023 to 2028[28] outlined plans to mitigate international impacts on the UK with industry partners. Some of these plans include[29]:

i) On Trade

[26] NAP Global Network. Transboundary Climate Risks and the National Adaptation Planning Process. 2023.
[27] HM Government (2022). UK Climate Change Risk Assessment 2022. https://assets.publishing.service.gov.uk/media/61e54d8f8fa8f505985ef3c7/climate-change-risk-assessment-2022.pdf
[28] HM Government (2023). The Third National Adaptation Programme (NAP3) and the Fourth Strategy for Climate Adaptation Reporting. https://assets.publishing.service.gov.uk/media/64ba74102059dc00125d27a7/The_Third_National_Adaptation_Programme.pdf
[29] A complete description of the government's planned actions to address the international dimensions of climate risk is available in Chapter 6 of the UK NAP3.

a. Continuing to provide guidance for businesses (e.g. the Department for Business and Trade's Supply Chains Resilience Framework[30]) to enhance supply chain resilience and reduce dependencies
b. Enhancing identification and visibility of vulnerabilities and opportunities in supply chains
c. Partnering industry to understand best practices for supply chain resilience, and assembling the Business of Resilience Taskforce to develop approaches to manage climate risks and external shocks, including the development of insurance solutions and the integration of resilience in the design of infrastructure systems.

ii) On Food
a. Providing funding for a Water Roadmap to address water scarcity and pollution through water stewardship with industry partners prioritising food sourcing areas domestically and internationally
b. Supporting research on flood supply resilience; incorporating climate scenario analysis into trade models
c. Partnering industry to reduce risks to supply in the agri-food sector

iii) On the International Finance Sector:
a. Encouraging the international adoption of the ISSB Standard
b. Enhancing understanding of climate risks to the financial sector through the Bank of England's stress testing exercises and research with the NGFS to assess climate-related financial risks.

However, the UK Climate Change Committee's evaluation[31] of the NAP3 in 2024 found that while the NAP had acknowledged all 61 climate risks and opportunities from the CCRA3 including international risks, only around 25% of recommended actions related to international risks from the CCRA3 had been deemed significantly or fully addressed. The report recommends a need to fundamentally reposition how adaptation is approached: to further embed adaptation and resilience within financial control mechanisms, to align NAP3 developments with the next spending review, and to accelerate development of indicators to track adaptation progress including those of private sector adaptation responses.

[30] Department for Business and Trade (2022). Supply Chains Resilience Framework. https://www.gov.uk/government/publications/supply-chain-resilience/dit-supply-chains-resilience-framework

[31] Climate Change Committee. Independent Assessment of the Third National Adaptation Programme (NAP3). 2024.

Ways Forward

We outline several ways forward for governments across Asian markets to integrate consideration of transboundary climate risks in NAPs, and to ensure systemic and coordinated responses towards greater resilience of societies and economies.

STRENGTHENING CAPACITIES TO ASSESS AND INTEGRATE TRANSBOUNDARY CLIMATE RISKS

Collaboration across governments and private sector stakeholders in the following areas can strengthen government capacities in the assessment and integration of TCRs:

1. **Mainstreaming Physical Climate Risk Assessment across Economic Sectors:** Emphasize and embed physical risk scenario analysis and adaptation to physical risks within economic strategies and policies across sectors. This includes:
    a. Integrating top-down and bottom-up physical climate risk modelling approaches such as integrated assessment models and catastrophe models within macroeconomic assessments of the financial impacts of transboundary and local physical climate risks on economic sectors, including impacts on food security, energy access and labour markets.
    b. Developing national research, development and innovation roadmaps and internal capacity to i) enhance the availability and granularity of climate model outputs and asset-level risk and resilience information and ii) interpret and integrate outputs from physical climate risk assessments;
    c. Outlining clear expectations and common metrics for corporate reporting on physical risks, recognising the multitude of approaches and methodologies that can be undertaken for risk assessments that result in the lack of comparability and consistency of variables and output metrics;
    d. Communicating risks and vulnerabilities with real economy stakeholders including financial institutions in a coordinated or central platform that can include access to granular risk maps, location information of infrastructure resilience measures and relevant standards. This should go beyond go beyond hazard assessments (e.g. temperature extremes, precipitation variability) to quantify risks and vulnerabilities at sectoral levels, and impacts to local populations.
    e. Prioritising and articulating key sectors for coordinated risk assessment and responses, in particular on:

i. food and agriculture systems,
ii. water resources,
iii. energy and utilities,
iv. materials, and
v. labour and migration.

2. **Integrating systematic assessment of TCRs in national risk assessments and the NAP process:** In conducting national climate risk assessments and developing NAPs, governments should aim to establish a systematic framework to integrate assessment of transboundary climate risks, and quantify key risks to the national economy across sectors and populations at the onset. This can take the form of a dedicated section focused on TCR assessment. NAPs, and accordingly plans outlined by individual ministries and agencies, should recognise and outline the potential impacts of international risks on domestic economies and priority sectors.

   Effective planning and implementation of adaptation measures requires systemic coordination across multiple sectors, scales and functions within governments involving but not limited to budgeting, investment, regulation and implementation.

   Across governments, Ministries of Finance (MoFs) can take on central roles in safeguarding macroeconomic stability in the face of climate risks, mobilising resources for climate-resilient economic and social development, and facilitating new economic opportunities in addressing climate resilience.[32] They can facilitate tight-knit coordination and regular communication channels with relevant government departments or bureaus involved in assessing physical climate risk impacts, undertaking planning and examining opportunities for financing required. For instance, trade and commerce ministries will need to be equipped to integrate physical climate risk considerations in supply chain resilience assessments, and in investment risk and opportunity mapping across sectors.

3. **Leveraging regional partnerships and coordination mechanisms**: Given the transboundary nature of risks, regional cooperation on these efforts involving academic research institutions, insurers, and risk analytics providers is essential to build the necessary information and evidence base across markets. We note

[32] Coalition of Finance Ministers for Climate Action Helsinki Principle 4 initiative. How Ministries of Finance can Assess and Manage Physical Climate risks and Adaptation. June 2025.

that there are existing platforms that serve as potential gateways for further collaboration to enhance regional climate resilience, most notably through ASEAN (e.g. the sharing of high-resolution climate projections through the ASEAN Specialised Meteorological Centre hosted in Singapore, and the Japanese Government's AP-PLAT platform that aims to provide climate risk data and support capacity building).

At the ASEAN level, the ASEAN Working Group on Climate Change (AWGCC) and has been established as the primary platform to enhance regional cooperation on climate action. In 2023, ASEAN leaders adopted the ASEAN Declaration on Sustainable Resilience to strengthen cooperation on cross-sectoral climate and disaster risk governance, and capabilities to "prevent, mitigate, prepare for, respond to and recover from disasters" to ensure greater resilience. Notably, the Declaration notes the interconnected transboundary risks due to multi-layered compounding natural hazards and interrelated challenges of risks, and aims to (i) further increase financial resilience through risk financing and insurance, contingency planning, public-private partnerships, international cooperation assistance and sustainable development practices, and (ii) intensify efforts to utilise and harness the full potential of science, technology and innovation in strengthening climate and disaster resilience infrastructure through knowledge exchange, capacity building and resource sharing.[33]

In addition, under the ASEAN Committee on Disaster Management (ACDM), five priority programmes will be coordinated under - (i) Risk Assessment and Monitoring, (ii) Prevention and Mitigation, (iii) Preparedness and Response, (iv) Resilient Recovery and (v) Global Leadership. Pertinent sub-priorities include (a) developing transboundary risk assessment scenarios to anticipate risks from potential major disasters, (b) strengthening regional multi-hazard monitoring and early warning systems across ASEAN, (c) increasing multi-hazard resilience of private sectors and supply chains and expanding reach of disaster risk financing and insurance.[34]

Governments can further leverage these existing coordination mechanisms at the regional level to develop or enhance frameworks and tools that address physical climate risks and TCRs.

[33] ASEAN Secretariat. ASEAN Leaders' Declaration on Sustainable Resilience. 2023.
[34] ASEAN Secretariat. ASEAN Committee on Disaster Management. 2024.

TWO-WAY EXCHANGE BETWEEN GOVERNMENTS AND THE PRIVATE SECTOR ON RISK DISCLOSURE AND RESILIENCE RESPONSES

Comprehensive assessment of TCRs requires that corporates provide accurate and adequate disclosure of supply chain locations and risks across assets.

4. **Outlining clear expectations and common metrics for corporate reporting on physical risks**: To strengthen corporate disclosure of physical risk exposures across value chains, governments will need to establish roadmaps that outline clear expectations for corporates reporting on physical climate risks. Recognising the multitude of approaches and methodologies that can be undertaken for risk assessments that result in the lack of comparability and consistency of variables and output metrics (e.g. scenarios, time horizons used), common and standardised metrics for physical risk reporting and progress tracking should be identified and emphasised. Financial institutions and corporates will simultaneously need to engage partners across their portfolios and value chains on physical risk assessments, and to identify and disclose key asset-level risks particularly those of key infrastructure.

5. **Tracking of private sector and community adaptation responses and resilience outcomes:** Private sector adaptation actions are rapidly emerging, but visibility of their effects on actual risk reduction, their benefits to the resilience of local communities, and alignment with national or local level adaptation plans or current resilience measures (e.g., the extent to which a property is protected against a 1-in-100 year pluvial flood or expected storm surge level by 2050) is largely lacking. Consolidating or mapping private sector or local level adaptation measures at the asset-level, as well as establishing systems to track and monitor adaptation investments among the public and private sector including MDBs can facilitate more comprehensive and complete views of risks and opportunity areas for de-risking among real economy stakeholders and communities. Governments, financial institutions, civil society organisations and corporates can co-develop indicators to track adaptation impact and outcomes locally and across sectors.

DEVELOPING REGIONAL ADAPTATION OPPORTUNITY PIPELINES

In order to unlock climate finance at scale, there is a need for governments to adopt systemic views and approaches by considering wider funding sources, opportunities

and mechanism for adaptation across borders beyond jurisdictions, and to communicate strong policy signals.

6. **Developing adaptation planning and investment roadmaps across sectors that scale up institutional and private finance flows:** Clear and visible project pipelines that identify adaptation projects with objectives and targets, funding needs and co-financing opportunities at a local and regional level, while outlining the roles and outcomes of financing instruments and mechanisms (e.g. blended finance, resilience bonds and risk transfer mechanisms), can provide greater clarity and direction for financial institutions and the broader private sector to design products and catalyse finance. Governments and financial institutions including multilateral development banks can work towards co-developing regional finance mechanisms to support regional-level financing.

7. **Outlining the roles of the private sector and civil society actors**: In tandem, governments should integrate private sector and civil society considerations, and outline their roles in the development and financing of NAPs and design of adaptation solutions. Within Asia, ASEAN has outlined priorities for the development of national and regional adaptation strategies, including engagement with partners to accelerate the flow of climate finance, and the development and implementation of the ASEAN Climate Finance Strategy. ASEAN has also called for innovative financing mechanisms and augmented public and private sector investments to support adaptation efforts in the region.[35]

8. **Regular stakeholder forums on physical climate risk**: Regular regional stakeholder dialogues and channels focused on addressing climate risk information and impacts involving policymakers across relevant ministries or agencies, investors, insurers, civil society organisations and corporates are needed to ensure coherent and effective adaptation responses to climate risks and to avoid maladaptation risks.

***

Contact

For more information, please contact:
Jeffrey Tong
Policy Analyst
jeffrey.tong@aigcc.net

[35] ASEAN Secretariat. ASEAN Joint Statement on Climate Change to the UNFCCC COP29. 2024.

About AIGCC

About AIGCC

AIGCC is the leading network of investors in Asia focussing on risks and opportunities in climate and nature.

Our 80+ members have a combined AUM of $36 trillion and have headquarters in 11 markets across the region.

We were founded by institutional investors as a not-for-profit to drive action on climate, and bring an evidence driven, long-term focus on climate, nature, and investment across Asia.

Our work is underpinned by science, economics, and a highly effective theory of change that channels the influence of powerful Asian and international institutional investors, integrated across finance, business and policy making towards systemic impact.

We bring deep knowledge and familiarity with Asian markets and dynamics, and play a founding role in global initiatives, making us a trusted force in driving climate-aligned finance across the region and globe.