CLIMATE ADAPTATION AND RESILIENCE IN ASIA:

Pricing Risk, Sizing Opportunities, Financing Solutions

Centre for Impact Investing and Practices

IN PARTNERSHIP WITH TEMASEK Invesco Alliance Bioversity & CIAT Impact SF

SUPPORTED BY Dalberg

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Contents

This study's scope

This study examines the landscape of climate adaptation and resilience (CA&R) in Asia, spanning climate risks and their impacts on economies, businesses, and communities. It highlights the range of solutions needed, alongside the capital required to scale them relative to current financing flows. The resulting gap underscores the importance of mobilising actors across the full spectrum of capital.

While recognising the central role of governments and development finance institutions (DFIs) in driving impact at scale in CA&R, this report focuses on how the **private and philanthropic sectors** can and must complement and amplify these efforts. The analyses contained in this study concentrates on opportunities for private and philanthropic engagement.

This report is distinct in its contribution as it:

- Provides a dedicated **Asia lens**, anchoring needs, solutions, and opportunities based on the specific climate risks faced by Asia. Primary analyses mainly cover China, India, and SEA, with deeper insights on SEA where relevant. Specific coverage in geographic scope varies across analyses, this is footnoted alongside the relevant analysis.
- Establishes a **common language for CA&R** around needs, priorities and solutions in Asia across the capital spectrum, based on the context of each country, as outlined in their national adaptation plans (NAPs), and matched to solutions that exist today that can be invested in.
- Identifies and prioritises **250+ solutions for Asia** for the private and philanthropic sectors by evaluating impact potential (hazards addressed, support for vulnerable populations, and coping vs. transformative outcomes) alongside commercial viability, considering funding flows, sources of capital, market dynamics, and scaling capital requirements.
- Highlights opportunities across the **capital spectrum, ranging from philanthropic to commercial investors**, and the role of innovative mechanisms like blended finance.

For additional information on study methodology, please refer to the Annex document.

Released together with:

Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP, with contributions from Invesco and ImpactSF

Click to read now

50 case studies of companies and funders shaping the business case and impact pathways in this space

Building a climate adapted and resilient agri-food system in Southeast Asia (2026) by CIIP and ImpactSF

Click to read now

A deep-dive report on strengthening agri-food resilience in SEA

An interactive dashboard

Click to explore

Providing detailed insights on Asia CA&R financing flows by region, sector, and solutions

Insights based on:

US$100B of real fund flows to Asia tracked

where possible to a solution level (~US$30B), between 2021-2025, including government, development, philanthropic, and private investment data

~250 stakeholders

engaged, via

Survey of
165 Asian funders
representing
>US$1 trillion AUM

105 interviews
with industry actors including investors, philanthropy, corporates, ventures

Acknowledgements

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- AgBase, a programme by Briter
- AgFunder
- Agriculture and Rural Development Bank (ARDB)
- Alta Alternative Investments
- Anyssa Venture Capital
- Arukah Capital
- Audacy Partners
- Australian Ethical Investments
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- Bintang Capital Partners
- BlackRock
- blisce/
- Blue InCube
- BlueOrchard Finance
- Cambodia Post Bank Plc.
- Centurium Capital
- Cerulean Ventures
- Circulate Capital
- CLIMBS
- Climate Fund Managers
- Corundum Systems Biology
- Double Delta
- Dutch Fund for Climate and Development
- Earth Venture Capital
- Elevar Equity
- Emerald Ventures
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- Federal Capital
- GLIN Impact Capital
- Global Innovation Fund
- Green Climate Fund
- Green Leaf Ventures
- Hatch Blue
- HDBank
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- Motion Capital
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- NH Absolute Return Partners
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- The Norinchukin Bank
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- Sumitomo Mitsui Trust (HK) Limited
- Sweef Capital
- Tailwind
- TIDLOR Holdings
- Tokio Marine & Nichido Fire Insurance Co., Ltd.
- Touchstone Partners
- TradeFlow Capital Management Pte Ltd
- Tsao Family Office
- Tundra Capital
- UOB Venture Management
- Vertex Ventures SEA & India
- Volta Circle
- Wellington Management
- World Bank Group
- WYNG 43 Social Investment

Foundations and philanthropies

- Aspen Impact Foundation
- Chaudhary Foundation
- ECCA Family Foundation
- elea Foundation for Ethics in Globalization
- Gates Foundation
- Golden Philanthropies
- Heading for Change
- H&M Foundation
- The Hong Kong Council of Social Service
- Hyundai Motor Chung Mong-Koo Foundation
- Ishk Tolaram Foundation
- KIBOW Foundation
- The Nand & Jeet Khemka Foundation
- Prudence Foundation
- Quantedge Foundation Singapore
- Rare
- Re:wild
- The Rockefeller Foundation
- Temasek Foundation
- Wellcome
- Yayasan Hasanah

Corporates and incumbent businesses

- Airport Authority Hong Kong
- CLP Holdings Limited
- Danone Ecosystem Association
- ECOM Agroindustrial
- Japfa Pte Ltd.
- Mars
- SJ Group
- Thai Wah
- Toll Group
- Thryve, powered by Yara

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- Akshayakalpa
- Amartha
- Arukah Capital
- Aruna
- DigiVriddhi Technologies (DGV)
- CarbonPool
- Eratani
- IBISA S.A.
- GRST
- Igloo
- Kilimo
- Koltiva
- Mayani
- Oceanfarmr
- PasarMIKRO
- Samunnati
- Sarvagram
- SOLshare
- Sunday
- Tian Tian Xue Nong

Ecosystem enablers

- 100x100
- Asia Climate Philanthropy Advisory (of TARA Climate Foundation)
- Asia Investor Group on Climate Change (AIGCC)
- Asian Philanthropy Circle
- Beanstalk AgTech
- Capacity-building Alliance of Sustainable Investment
- Centre for Sustainable Finance & Private Wealth
- Genco Oil
- Global Climate Finance Accelerator
- The Global Energy Alliance for People and Planet
- The Grantham Institute, Imperial College London
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- ISF Advisors
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- Tathva Pte.
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Study partner contributions

CIIP Centre for Impact Investing and Practices

CIIP served as the overall author and coordinator of this study, leading the report's direction, shaping insights and findings across all chapters, identifying key takeaways, drafting all case studies, designing and disseminating the funder survey, and analysing survey findings and climate financing flows. We are grateful to our co-authors for their time and contributions, which enrich the report with diverse perspectives and expertise.

IN COLLABORATION WITH

TEMASEK

Temasek provided strategic inputs and investor perspectives as our study thought partner, helping shape the study's analytical approach, identify priority areas, and ensure insights generated were relevant to private investors.

Invesco

Invesco contributed its global asset management expertise on financing flows, the role of funders across the capital spectrum, investment opportunities across asset classes, and innovative financing mechanisms, alongside a dedicated analytical framework case study, contributing to Chapter 1 and Chapter 3.

Alliance Bioversity & CIAT | Impact SF

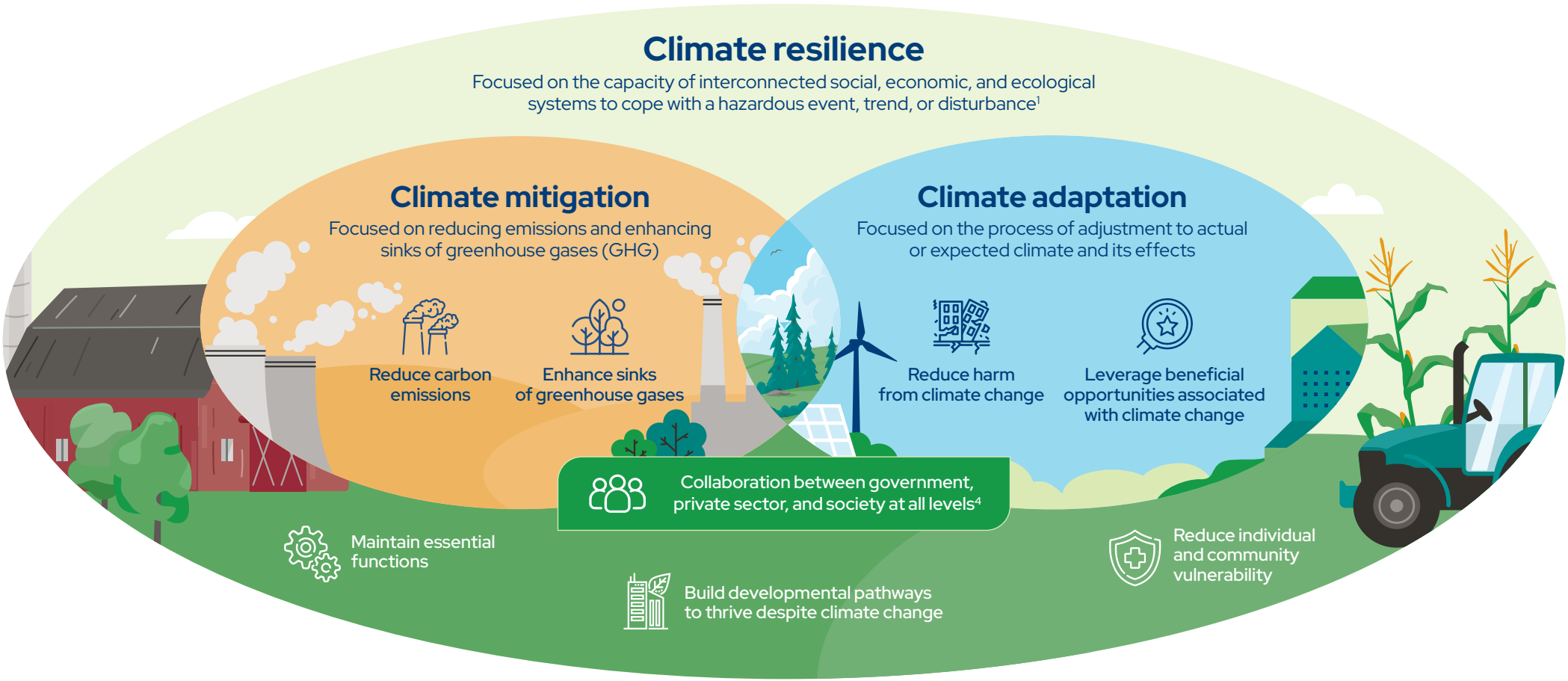
CGIAR's Hub for Sustainable Finance (ImpactSF) contributed insights and analysis on the impact of climate on agriculture and food systems, as well as identified key agricultural value chains where opportunities lie, contributing to the agriculture deep dive report *Building a climate adapted and resilient agri-food system in Southeast Asia (2026)*.

SUPPORTED BY

Dalberg

Dalberg assembled a long list of existing and investable CA&R solutions most relevant to the region, analysed financing flows to date across sectors, particularly focusing on private investment flows, and assessed the impact potential and capital requirements of these solutions, contributing to Chapters 2 and 3.

Key terms: Climate mitigation, adaptation, and resilience



Source: **1** IPCC (2018): Annex 1 Glossary; **2** UNFCCC (n.d): The Sixth Assessment Report of the IPCC | UNFCCC; **3** UNFCCC (n.d): Introduction | UNFCCC; **4** UNFCCC (2021): IPCC AR6 WGII.

Climate adaptation and resilience (CA&R): A globally recognised imperative

Key milestones to both **enhance climate adaptation** and **strengthen climate resilience** to reduce vulnerabilities to climate change have been achieved at recent COP discussions as part of the UN Framework Convention on Climate Change.

UAE Framework for Global Climate Resilience adopted after COP28

Adopted in 2023, the UAE Framework for Global Climate Resilience details global goals on adaptation around seven objectives to be reached by 2030, together with four cross-cutting targets across the adaptation cycle:[1]

Objectives for adaptation:

- **Significantly reducing climate-induced water scarcity** and enhancing climate resilience to water-related hazards
- Attaining **climate-resilient food and agricultural production** and supply and distribution of food
- Attaining **resilience against climate change related health impacts**
- Reducing climate impacts on **ecosystems and biodiversity**

- Increasing the **resilience of infrastructure and human settlements** to climate change impacts to ensure basic and continuous essential services for all
- Substantially reducing the adverse impacts of climate change on **poverty eradication and livelihoods**
- Protecting **cultural heritage** from the impacts of climate-related risks

Key climate adaptation milestones at COP30

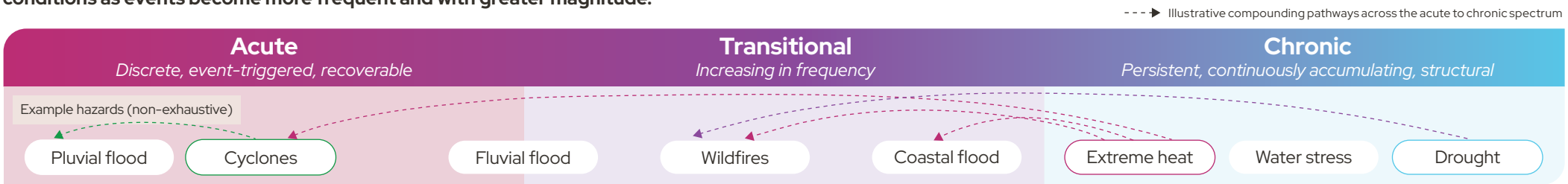
COP30 held in November 2025 in Brazil, framed as the 'COP of implementation and adaptation', saw new milestones announced under the Belém Package and Mutirão Decision:[2]

- COP30 adopted **59 global indicators** for the Global Goal on Adaptation, providing a technical framework for tracking and reporting progress.
- A new target was set to triple adaptation finance provided from developed to developing nations by 2025 to at least US$120 billion by 2030, drawing from publicly funded grants and loans from governments and MDBs. **However, this falls short of the overall adaptation finance gap of US$365 billion per year by 2035**.[3]
- The Global Implementation Accelerator was launched to **accelerate the implementation of climate commitments** by supporting countries in implementing their Nationally Determined Contributions (NDCs) and NAPs.

Source: 1 W1UN Foundation (2023): UAE Framework for Global Climate Resilience; **2** COP30 (2025). COP30 approves Belém Package; **3** UNEP (2025): 2025 Adaptation Gap Report: Running on Empty.

Evolution of climate hazards: from event triggered shocks to persistent erosion

Physical climate hazards are commonly divided into 'chronic' and 'acute' categories. However, some hazards that are event-based in origin are actively migrating toward chronic conditions as events become more frequent and with greater magnitude.



- Discrete, short-duration, high-intensity events causing concentrated damage in a defined area
- Event-triggered, generally have identifiable time horizons
- In principle insurable through conventional risk transfer mechanisms and engineering

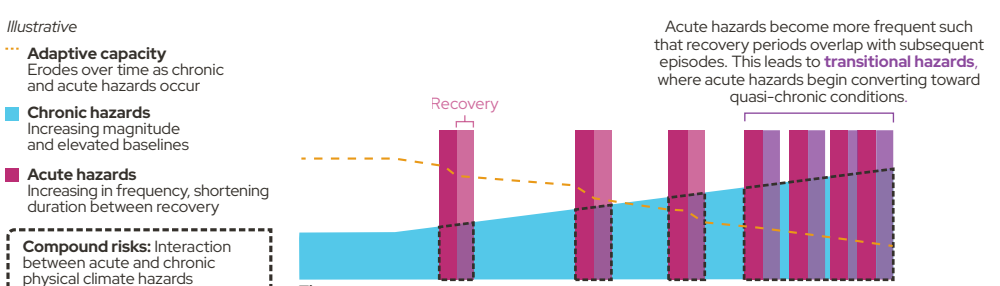
- Hazards begin as discrete, event-based phenomena with identifiable frequencies, but are actively converting toward quasi-chronic conditions as frequency increases
- The acute/chronic binary breaks down and conventional risk transfers face structural challenges
- Chronic occurrence erodes adaptive resources and capability

- Hazards arising from sustained, long-term shifts in climate patterns that accumulate continuously, depleting adaptive capacity over time
- Not discrete shocks; damage accrues daily
- Requires long-duration, structurally embedded adaptation solutions, or innovative risk-transfer models, such as parametric insurance

Compound risks

The interconnection between physical climate hazards is creating compounding risks. For example, chronic hazards such as extreme heat gradually weaken system resilience, while acute events like floods and storms cause sudden disruptions and are occurring more frequently, producing outcomes that exceed single-hazard model predictions.

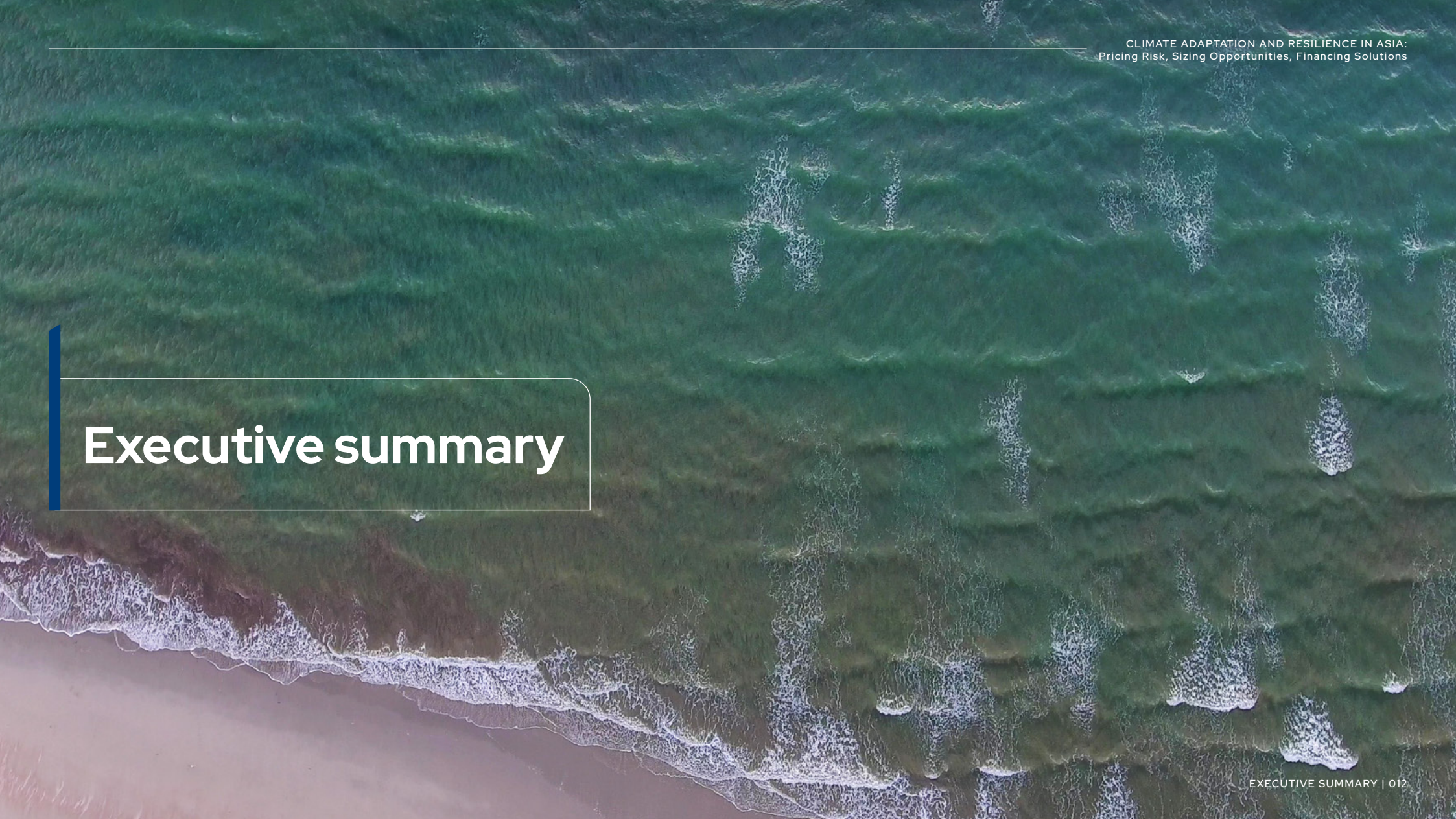
Hence, hazards should never be studied in isolation. A systems lens to addressing climate hazards is required.



Source: S&P Global Sustainable1 (2024): Physical Risk: Country & Subnational Data Methodology; Intergovernmental Panel on Climate Change (2022): Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report.

List of acronyms

Acronym		Acronym		Acronym		Acronym	
AI	Artificial Intelligence	**EMDE**	Emerging markets and developing economy	**KPI**	Key performance indicator	**pp**	Percentage point
APAC	Asia-Pacific	**EMEA**	Europe, the Middle East, and Africa	**KYC**	Know-your-customer	**PPP**	Public-private partnership
APC	Asia Philanthropy Circle	**EMS**	Emergency medical systems	**LCCY**	Local currency	**PPP**	Purchasing power parity
ARIC	Adaptation & Resilience Investors Collaborative	**EPBD**	Energy Performance of Buildings Directive	**LEED**	Leadership in Energy and Environmental Design	**PV**	Photovoltaic
ASEAN	Association of Southeast Asian Nations	**ESG**	Environment, social, and governance	**M&A**	Merger and acquisition	**RE**	Renewable energy
AUM	Assets under management	**EU**	European Union	**MDB**	Multilateral development bank	**ROW**	Rest-of-world
BESS	Battery energy storage systems	**FI**	Financial institution	**MFI**	Multilateral financial institution	**RTC**	Round-the-clock
bps	Basis points	**FPO**	Farmer producer organisation	**MRV**	Monitoring, reporting, and verification	**SEA**	Southeast Asia
CA&R	Climate adaptation and resilience	**FSP**	Fixed station points	**MSME**	Micro, small, and medium enterprise	**SHG**	Self-help group
CAGR	Compound Annual Growth Rate	**GCF**	Green Climate Fund	**NAP**	National Adaptation Plans	**ToC**	Theory of Change
CapEx	Capital expenditure	**GDP**	Gross domestic product	**NbS**	Nature-based solution	**UAE**	United Arab Emirates
CBI	Carbon Bonds Initiative	**GHG**	Greenhouse gas	**NDC**	Nationally determined contribution	**UNEP**	United Nations Environment Programme
CBRT	Climate Bonds Resilience Taxonomy	**GICS**	Global Industry Classification Standard	**NGO**	Non-governmental organisation	**UNFCCC**	United Nations Framework Convention on Climate Change
COP	Conference of the Parties	**GIIN**	Global Impact Investment Network	**ODA**	Official Development Assistance	**UNHCR**	United Nations High Commissioner for Refugees
CPI	Climate Policy Initiative	**GPS**	Global Positioning System	**OpEx**	Operational expenditure	**UoP**	Use-of-proceeds
DALYs	Disability-Adjusted Life Years	**GSS**	Green, social, and sustainability	**P&C**	Property and casualty	**USAID**	United States Agency for International Development
DEWATS	Decentralised wastewater treatment systems	**ICT**	Information and communications technology	**p.a.**	Per annum	**VC**	Venture capital
DFI	Development finance institution	**IMM**	Impact measurement and management	**PE**	Private equity	**WACC**	Weighted average cost of capital
EIRR	Economic internal rate of return	**IMP**	Impact Management Project	**PE/VC**	Private equity and venture capital	**WASH**	Water, sanitation, and hygiene
EM	Emerging market	**IoT**	Internet-of-things	**PES**	Payment for ecosystem services	**WMO**	World Meteorological Organization



Executive summary

Foreword by study author and collaborators

CIIP Centre for Impact Investing and Practices

The effects and damages of climate risks are a lived reality for many today, particularly amongst Asia's most vulnerable communities. Climate adaptation and resilience (CA&R) has become a global imperative as a form of risk mitigation but also a source of significant opportunities, with commercial and broader value creation potential. At CIIP, we believe all actors across the capital spectrum, from philanthropic to commercial, have a role to play, and that coordinated action will be essential to scale impact. Produced in collaboration with our partners, this report maps over 250 CA&R solutions prioritised for Asia, alongside insights from funders actively deploying capital into the space. In doing so, we hope to help lay the foundation for further action with data-backed insights and qualitative perspectives, highlighting emerging pathways to building a more climate-adapted and resilient region. We welcome like-minded partners to join us in this collective effort moving forward.

TEMASEK

As a long-term investor, Temasek seeks to make sense of an evolving world and how structural shifts shape risk and opportunity over time. Climate adaptation and resilience is increasingly relevant in this context, particularly across Asia - a region that is warming at twice the global average, and bears a disproportionate share of climate-related economic and human costs. We partnered on this study to contribute an investor's perspective of where resilience gaps are most pronounced, where opportunities may be emerging, and the different forms of capital needed.

Invesco

Southeast Asia faces rising physical climate risk, making adaptation and resilience an increasingly important consideration for investors. We partnered on this study to support understanding of how CA&R may be approached across asset classes, strategies, and time horizons. This report invites market participants to reflect thoughtfully as the CA&R investment landscape continues to evolve, and to consider how best to participate in ways aligned with their portfolio objectives.

Alliance Bioversity & CIAT | Impact SF

At ImpactSF, we have witnessed first-hand impacts of climate resilience on the financial bottom line of agri-food investments. Many investors often contribute to resilience improvement through their investments without realising it, while many others would benefit from such strategies but don't do it because of perceived costs. We reduce the cost of decision-making through our science-based approaches and cutting-edge data analytics in climate risk identification, co-design, and implementation of appropriate de-risking solutions, impact measurement and reporting all in a cost-efficient manner.

Dalberg

This is the first study of its kind to do three important things: it lays out a comprehensive taxonomy of investable CA&R solutions tailored to the needs of Asia; it assesses the gaps between needs and investments to date; and it identifies opportunities across the capital spectrum that exist today. We hope this report lays the groundwork for greater collaboration across investors, private companies, philanthropies, DFIs and government and brings more CA&R funding to the region.

Summary by numbers

The risk

GLOBAL

~5x
increase in damages from extreme weather events and natural disasters as a share of global GDP, from 0.03% in the 1970s to ~0.16% in 2024[1]

~US$1.3T
annual physical risk cost faced by listed corporates by 2030s[2]

11% GDP loss
by 2050 under 2.0°C warming[3]

ASIA

7
Asian economies in world's top 20 list of most impacted by climate-related events; 3 from SEA[4]

~US$336B
annual cost faced by listed corporates by 2030s[2]

17% GDP loss
by 2050 for SEA under 2.0°C warming, **the highest of regions globally**[3]

The gap

GLOBAL

US$310–365B
global CA&R financing needs p.a. by 2035[5] vs. **~US$26-50B flows today**[5, 6] and **US$120B latest commitment by 2035**[7]

<11%
currently funded by private[8] and **<1%** by philanthropic sector,[6] though **15–20%** potential to be privately financed[5]

ASIA

~US$200B+
needs p.a. for CA&R financing across Asia by 2030 vs. **~US$19B** flows today[9]

~75%
of global CA&R financing gap and ~69% of needs concentrated in Asia[9, 10]

The opportunity

GLOBAL

US$1T
investment opportunity by 2030[8]

Up to US$4T
addressable revenues by 2050[11]

190–375M
jobs created by 2035[12]

US$2–36
returns (including avoided losses and social and environmental benefits) for every US$1 invested[13]

ASIA

CA&R #1 impact theme
of interest and activity based on this study's survey of **165 Asian funders** representing **>US$1 trillion AUM**[14]

250+ CA&R solutions
prioritised based on needs of Asia across **9 key sectors**:[15]

~65 commercially viable solutions exist today

~93 emerging solutions have potential to become viable but require de-risking/ early-stage support

~94 solutions that have low near-term commercial viability but are system enabling

Source: 1 Board of Governors of the Federal Reserve System (2024): On the GDP Effects of Severe Physical Hazards, calculations based on data from EM-DAT, CRED / UCLouvain, 2025, Brussels, Belgium – www.emdat.be; World Bank, World Development Indicators; **2** CIIP analyses; S&P Global Sustainable1; **3** Centre for Impact Investing and Practices (2025): Transforming for Sustainability: Driving Impact and Value through Supply Chain Action based on data from Swiss Re Institute (2021): The economics of climate change: no action is not an option; **4** Germanwatch (2026): Climate Risk Index 2026; Brunei and Singapore rankings unavailable; **5** UNEP (2025): 2025 Adaptation Gap Report: Running on Empty; **6** CPI (2026): Global Landscape of Climate Finance Data Dashboard; **7** World Resources Institute (2025): Reaching $120 Billion in International Adaptation Finance Is Possible – Here's What It Takes; **8** McKinsey & Company (2025): Climate resilience technology: An inflection point for new investment; **9** Dalberg analyses; Climate Policy Initiative (2025): Bridging the adaptation finance gap in Asia; **10** UNEP (2023): Adaptation Finance Gap Update 2023; **11** GIC and Bain & Company (2025): Sizing the Inevitable Investment Opportunity: Climate Adaptation; **12** Systemiq and World Resources Institute (2025): Jobs and Skills for the New Economy: An Action Agenda for a People-Centered Climate Transition; **13** International Fund for Agricultural Development (IFAD) (2025): Adaptation Finance: Building the Investment Case; **14** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA; **15** Dalberg analyses.

Climate risks are material, but systematically underpriced

The world has collectively exceeded key planetary boundaries, with **the economic toll of climate change compounding rapidly.** Climate hazards are becoming more frequent and severe, with growing exposure to both acute extremes and chronic climate stresses, compounding pressures on societies' adaptive capacity.

Markets are starting to differentiate, especially in location-focused asset classes that are exposed to physical risks.[1]

Yet risk remains systematically underpriced, with the scientific community warning that today's climate-economic models are **understating climate risks** as the world moves towards 2°C.[2]

The gap between potential and priced risk is driven by **persistent data gaps** and structural limitations in how **capital markets account for long-duration, non-linear risks**, such as climate change. Deep uncertainty is increasing as climate impacts become more complex and harder to predict, making risk pricing, risk transfer, and investment planning progressively more difficult. This in turn restricts the capital flows required to build climate adaptation and resilience (CA&R).

>1.5°C
temperature rise above pre-industrial levels with **2023-2025 being the three hottest years** on record[3]

~5x
increase in weather related economic damage as share of GDP in **2020s vs. 1970s**[4]

~US$1.3T
cost of climate faced companies **by 2030** according to S&P Global[5]

<1%
of S&P rating actions since April **2020** have stemmed from physical climate risk[6]

"Climate adaptation and resilience hinges on economic externalities, capturing both direct impacts and broader societal and environmental ripple effects. Yet dynamic baselining is a defining challenge: as climate change reshapes structural and institutional realities, benchmarks for measuring cost and value are constantly shifting, further complicated by persistent data gaps and evolving methodologies."

- Dr. Megumi Muto, Senior Managing Executive Officer and Group Deputy Chief Sustainability Officer, Mizuho Financial Group, Inc.

At the same time, climate adaptation and resilience is critically underfunded

CA&R presents a US$1 trillion opportunity at scale.[7]

Yet, it has remained critically underfunded, making up <10% of overall climate finance.[8] Private market innovation in capital allocation or business models will be required to unlock economic potential from CA&R. Additionally, a significant portion will require structural changes.

US$310-365B p.a.
adaptation finance needed in developing countries[a] **by 2035**, with additional ~US$250B needed p.a. for private sector[9]

US$1.2T+ p.a.
needed to achieve developed-economy resilience standards[b] globally **by 2050**[10]

US$26-50B p.a.
average adaptation fund flows p.a. globally **today**[8, 9]

US$120B p.a.
by 2035 in latest COP commitment[11]

Key challenges

Pipeline and business model challenges
Adaptation solutions are highly context-specific, often localised, and do not always generate clear private returns or have clear exit timelines.

Insufficient and misaligned financing
Limited participation of private markets, mismatch between capital types and perceived risk-return profiles, time horizon mismatch: short-termism in pricing vs long-term climate risk.

Capacity limitations
Technical, human, and operational capacity gaps limiting ability to interpret data, recognise systemic and cascading risks, and perform effective risk assessment, solution design, and capital allocation.

Information and data issues
Limited availability and accuracy of local climate information especially forward-looking scenarios, poor visibility into systemic risks and costs, information asymmetry across actors.

Underdeveloped enabling environment
Policy/regulatory frameworks need constant update, incentives for adaptation investments can be made clearer, climate resilience and public-good benefits not internalised.

Note: a Based on National Adaptation Priorities (NAPs); **b** Based on McKinsey Global Institute's definition, "developed-economy resilience standards" refer to the protection standards commonly established in developed economies against climate-related hazards. **Source: 1** BloombergNEF (2026): Climate Risk and US Municipal Finances: Storm Ahead? Mapping county-level vulnerability; **2** Carbon Tracker (2026): Recalibrating Climate Risk; **3** World Meteorological Organization (2026): State of the Global Climate 2025; **4** Board of Governors of the Federal Reserve System (2024): On the GDP Effects of Severe Physical Hazards, calculations based on data from EM-DAT, CRED / UCLouvain, 2025, Brussels, Belgium – www.emdat.be; World Bank, World Development Indicators; **5** CIIP analyses; S&P Global Sustainable1; **6** S&P Global Ratings(2025): Sustainability Insights: The Credit Materiality Of Physical Climate Risks Is Uneven Across Asset Classes; **7** McKinsey & Company (2025): Climate resilience technology: An inflection point for new investment; **8** Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard; **9** UNEP (2025): 2025 Adaptation Gap Report: Running on Empty; **10** McKinsey Global Institute (2025): Advancing adaptation: Mapping costs from cooling to coastal defenses; **11** World Resources Institute (2025): Reaching $120 Billion in International Adaptation Finance Is Possible – Here's What It Takes.

Asia faces a significant climate resilience gap

2x
faster warming in Asia than global[1]

3.7B
people in Asia affected by climate events **since 2000** vs. 1.1B in the rest of the world[2]

Asia is disproportionately exposed to climate risks, including:

- **Heat**: Large land mass and faster warming (~0.24°C/decade vs. ~0.13°C globally), amplified by urban heat island effects and rapid urbanisation.[1]
- **Flooding**: High exposure across coastal megacities.[3]
- **Infectious diseases**: Elevated transmission risks in dense urban populations.[4]

As a result, **7 Asian economies rank among the top 20 globally** for severe economic and social losses from climate-related events over the past two decades.[5]

~50% of companies facing US$1.3T global annual physical climate risk costs by 2030s have a material footprint in Asia, creating significant global supply chain and financial spillovers.[6]

Despite this, Asia bears **~69% of financing needs by 2035 and ~75% of the global financing gap**.[7] With geopolitical tensions rising and global ODA declining, there is a clear need for Asia-led leadership to close the gap.

> **"Climate change isn't a 2100 problem – it is already reshaping every sector, in every region, today. We saw a massive macro trend with few investors acting, and built a strategy to scale smart, cost-effective adaptation."**
>
> - Sanjay Wagle, Co-Founder and Managing Director, The Lightsmith Group

A diverse landscape of CA&R opportunities is emerging across the region, though the ability to capture them remains uneven. This study identified:[8]

250+
solutions prioritised based on Asia's needs

9
key sectors

- **Infrastructure**
- **Water**
- **Agriculture and allied sectors**
- **Energy**
- **Industry and commerce**
- **Disaster management**
- **Health**
- **Ecosystems and biodiversity**
- **Social system**

Solutions were drawn from a review of ~1,400 solutions across global frameworks, prioritised against Asia's key climate hazards, development contexts, and the needs of vulnerable populations. Financial services are a crosscutting enabler for both private industry and communities to fund CA&R measures and solutions, as well as build financial resilience to better manage and absorb the financial impact of climate events.

3 tiers of solutions

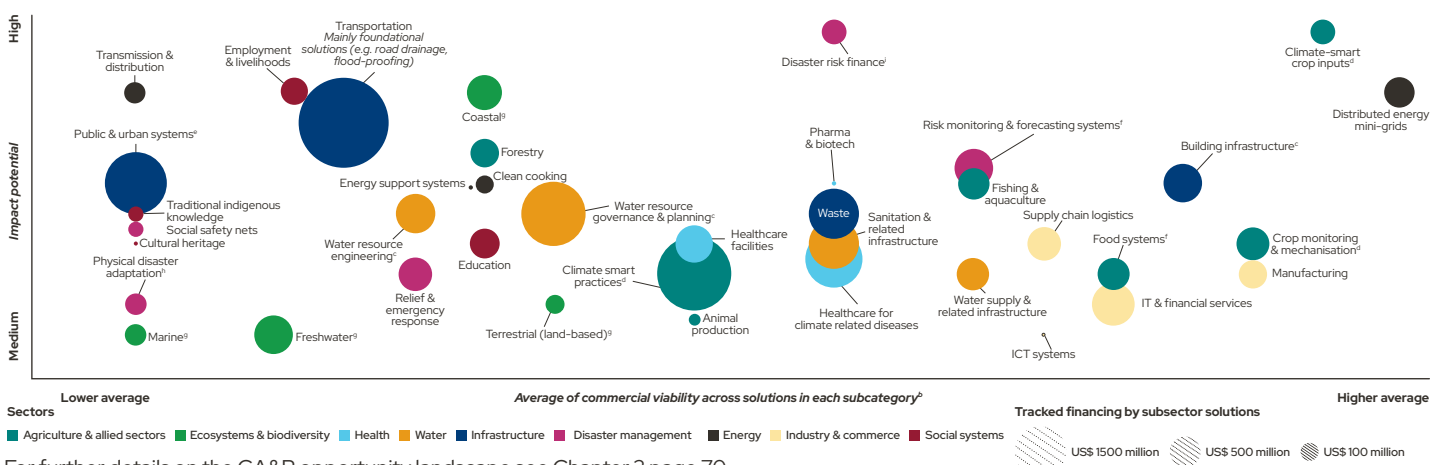
94 solutions with **limited or no commercial viability**
No clear revenue pathways in the short term, typically involving shared public goods

93 solutions with **emerging commercial viability**
Clear use case and demand but not yet consistently scalable, repeatable, or profitable

65 solutions with **proven commercial viability**
Proven, repeatable revenue and scalable unit economics across markets

The CA&R opportunity landscape in Asia[8]

Indicative commercial viability, impact potential, and tracked financing for solutions across CA&R sub-sectors



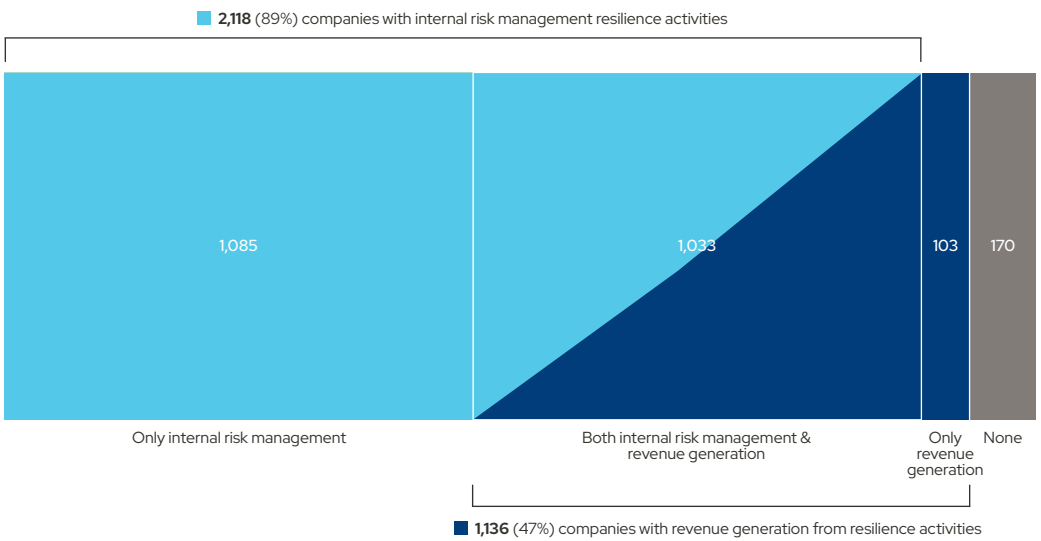
For further details on the CA&R opportunity landscape see Chapter 2 page 70.

Source: **1** World Meteorological Organization (2025): Rising temperatures and extreme weather hit Asia hard; **2** EM-DAT data, calculations by CIIP; **3** ASEAN (2025): Enhancing the Resilience of Coastal Cities in ASEAN; **4** World Economic Forum, GAEA, CIIP, and PAA (2025): Targeted Action and Financing the Fight Against Antimicrobial Resistance in Asia; Nature Communications (2020): Accelerating invasion potential of disease vector Aedes aegypti under climate change; **5** Germanwatch (2026): Climate Risk Index 2026; Brunei and Singapore ranking unavailable; **6** CIIP analyses; S&P Global Sustainable1; **7** Dalberg analyses; Climate Policy Initiative (2025): Bridging the adaptation finance gap in Asia; UNEP (2023): Adaptation Finance Gap Update 2023; **8** Pitchbook data (2021-2025); Dalberg analyses.

Unlocking full potential requires coordination across the capital spectrum: Private and philanthropic capital have a distinct and urgent role

There is a business case and clear value drivers for investing in CA&R, from mitigating risks and reducing costs to generating upside

Corporate resilience activities of the MSCI ACWI Index: risk management vs. revenue generation[1]



"As a foundation, we support organisations across the full disaster management cycle, with an increasing shift from disaster response toward climate adaptation and resilience, helping communities not only respond to emergencies but also prepare for and recover from them more effectively."

- Kristina Svartling, Project Manager, Disaster Management, H&M Foundation

There are specific, high leverage entry points to CA&R for all funders, depending on impact and financial mandates:

		Key themes	Example solutions
Private investors	**Late-stage** Deploy, embed, implement at scale	Fund **proven technologies** with stable, scalable revenue models and unit economics	Renewable energy-powered cold rooms, telemedicine platforms
		Invest in / finance **long-duration, asset-backed infrastructure** in climate-exposed sectors	Water treatment plant upgrades, resilience retrofits
		Scale production and adoption of **climate-resilient materials and engineered solutions**	Passive cooling and heat-resilient building envelope solutions
		Back established **incumbent businesses** and scale CA&R product lines (e.g., utilities)	Cross-cutting across sectors, e.g., smart water metering for utilities
	Early-stage Validate, expand, prove repeatability	Validate **data/AI-enabled technologies** with scalable, cross-sector potential	Digital route optimisation for waste collection, blockchain-based traceability platforms
		Expand **platforms that enable distribution** and adoption of solutions	Phygital direct-to-consumer marketplace for climate-resilient produce
		Invest in **climate-finance and risk transfer** solutions and enabling platforms	Carbon credit programmes, parametric insurance for crop, livestock, and aquaculture
		Enable **cross-regional transfer** and localisation of emerging solutions	Biofortified climate-resilient crops
Philanthropy Lay foundations, discover and catalyse, bridge last mile		Build **enabling systems**, including data and capacity (work with governments)	Climate hazard registries, early warning systems
		Support **first-of-a-kind technologies** and accelerate early solution viability (work with private sector)	Climate-smart crop diversification, climate-smart disease surveillance
		Enable **place-based, community-led resilience** initiatives	Community-based fisheries co-management
		Drive **deep last-mile inclusion and delivery** especially for essential services	Renewable-energy powered cold-chain for essential medicines to rural areas, round-the-clock microgrids

Source: 1 MSCI (2025): Building Resilience: Understanding and Managing Physical Climate and Nature Risks; Dalberg analyses.

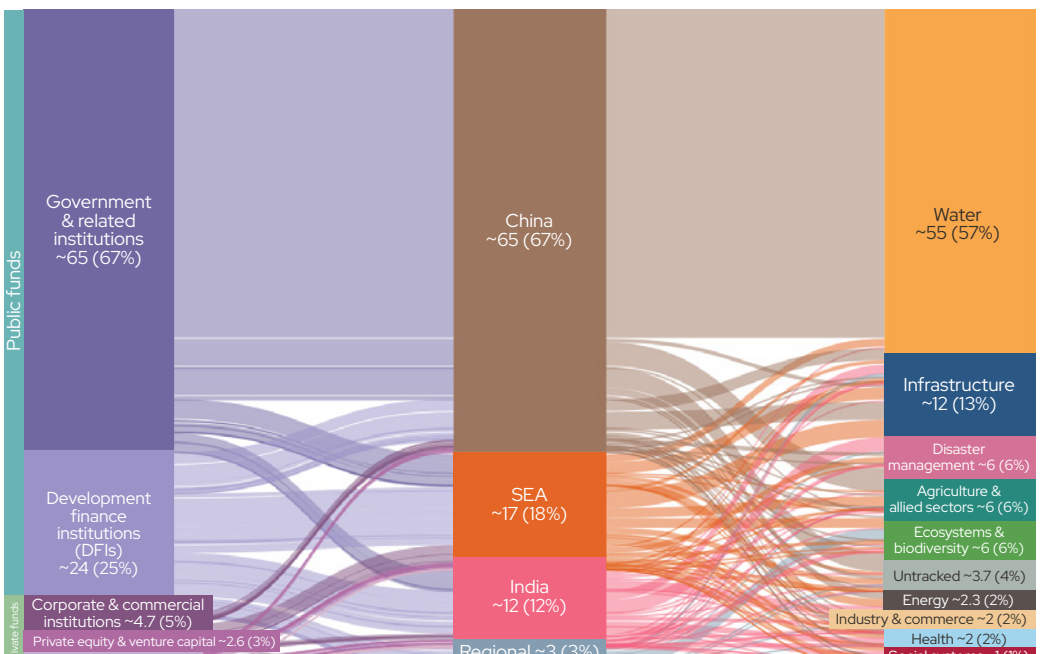
Private sector participation is limited today but interest is growing

~15-20%
of global adaptation could be privately financed[1]

<11%
currently funded by private capital globally,[2] with <1% from philanthropy[3]

3.5x
new CA&R funds recorded on BlueMark's platform, from 4 funds in 2015-2020 to 14 in 2021-2025[4]

Global flow of CA&R finance across Asia, by funder and sector[a, b, c, d, 3, 5]
Total: ~US$96B (cumulative 2021-2025); 2025 data may be partial due to data limitations



For further details on the CA&R financing flows see Chapter 3 page 111.

According to a survey[6] of 165 Asian funders with >US$1 trillion AUM

CA&R top impact theme by combined activity and exploratory interest

Top sectors of interest for CA&R

#1 Agriculture and allied sectors consistently top 3 across funder types

#2 Energy top for commercial investors and DFIs

#3 Ecosystems and biodiversity driven by DFIs, foundations, and VCs

The barriers and enablers for greater participation are clear, for both funders who are:

	Active or interested	Not interested
Top challenges	**1. Pipeline**	
	2. Macro challenges	**2. Mandate**
	3. Deal structuring	**3. Knowledge and capacity**
Top enablers	**1. Stronger business models** with clear exit timelines / better returns	
	2. Broader pipeline	**2. Change in strategy**
	3. Downside protection	**3. Improved organisation capability**

The focus on pipeline and business models is in line with the opportunity landscape analysis, which found less than a third of solutions are commercially viable at scale, and points to a structural gap in valuing CA&R businesses rather than a shortage of capital.

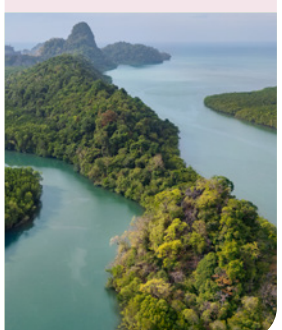
Note: a Data should be interpreted directionally; **b** Asia refers to SEA, China, and India, 'Regional' refers to transactions where funding data is only at a regional level (e.g. Asia) and the split between countries is not given; **c** As government funding data is reported only at the regional level (East Asia & Pacific; South Asia), all such funding has been attributed to China and India respectively, since the majority flows to these economies due to their size (as confirmed by data source); government data unavailable for 2024 and 2025; **d** The proportion of private capital in this analysis may differ from other sources, as this study includes an extensive mapping and tagging of private fund flows not replicated elsewhere. In addition, results may be skewed due to the absence of government funding data for 2024 and 2025. **Source: 1** UNEP (2025): 2025 Adaptation Gap Report: Running on Empty; **2** McKinsey & Company (2025): Climate resilience technology: inflection point for investment; **3** CPI (2026): Global Landscape of Climate Finance Data Dashboard; **4** BlueMark; **5** Dalberg analyses; Pitchbook data (2021-2025) **6** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

Impact accountability must keep pace with capital mobilisation

73%
Asian funders surveyed[1] ranked impact outcomes as important

#2
out of 14 factors in funding decisions, after financial returns[1]

62%
of investors surveyed by GIIN cited the leading challenge for impact investing is "impact washing"[2]



CA&R funding generates intersectional impacts across climate (including mitigation), social systems (e.g., livelihoods, health), and economic (e.g., avoided losses). However, the nascent field, which is inherently local and context specific, remains characterised by fragmented definitions and inconsistent metrics.

An analysis of CA&R-focused funders, funds, and bonds identified a broad range of distinct metrics. **Top 3 categories of impact indicators:**

Asian funders (n=65)[a,1]	CA&R impact funds (n=17)[3]	GSS Bonds (n= 1,004)[4]
Livelihood improvement	Livelihood improvement	GHG emissions reduction
GHG emissions reduction	Land, water, and ecosystems	Renewable energy capacity
Land, water, and ecosystems	Education and skills	Individuals benefited

Across datasets, metrics are predominantly output and activity-based rather than outcome-focused. The infrastructure to measure CA&R outcomes, particularly long-term resilience, livelihood stability, and avoided loss, remains underdeveloped and costly.

While structural fundamentals will take time to develop, philanthropic, private, and public actors must work together to pilot and scale mechanisms that reward solutions delivering clear CA&R outcomes. This will require improvements in data capture, sharing, and monitoring to track performance and demonstrate impact.

The Theory of Change (ToC) framework offers a practical foundation for funders and companies to develop a robust impact theses and measure impact while navigating the complexities of CA&R.

"Standalone solutions cannot solve systemic problems. To build sustained climate adaptation and resilience for our region, we need aligned, multi-pronged, cross-sector action at scale."

- JT Solis, CEO, Mayani

The path forward: coordinated, systems-level action

Bridging the CA&R gap in Asia requires more than incremental capital deployment. It requires a fundamental reorientation of how climate risk is priced; how CA&R solutions are identified, validated, and valued; how capital is structured across public, private, and philanthropic actors; and how impact is defined and held accountable. This means concerted efforts to establish building blocks to achieve lasting CA&R at scale.

Asia's climate trajectory is a lived reality, not a distant scenario. CA&R is not just defensive spending, but a long-term growth strategy, protecting economic value, securing livelihoods, and strengthening systemic stability for a economically significant yet climate exposed region.

With CA&R gaps substantial and growing globally, the main constraint is not only where capital is deployed, but how effectively it is used across sectors and geographies. Our collective focus should be on how to maximise catalytic impact, i.e., to reduce fragmentation, unlock synergies, and ensure capital delivers the greatest impact per dollar deployed. This report seeks to make the proactive pathway clearer and more actionable, supporting a shift from fragmented responses to coordinated, high-leverage investment in regional resilience and value creation.

What needs to happen now

Key building blocks for CA&R

Catalyse action

1. CA&R as growth engine and value driver (demand)
2. Strategic capital mobilisation across the spectrum (supply)

Inform decisions

3. Climate risk pricing and resilience valuation
4. Impact-linked decision pathways
5. Shared data and knowledge infrastructure

Lay foundations

6. CA&R-aligned financial systems
7. Cross-sector collaboration and delivery for scale

Note: a n=65 for this question differs from the total number of survey respondents of n=165, as this was an optional free-text question that not all respondents answered. **Source: 1** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA; **2** GIIN (2025): State of the Market 2025; **3** BlueMark, **4** Bloomberg (Mar 2026).

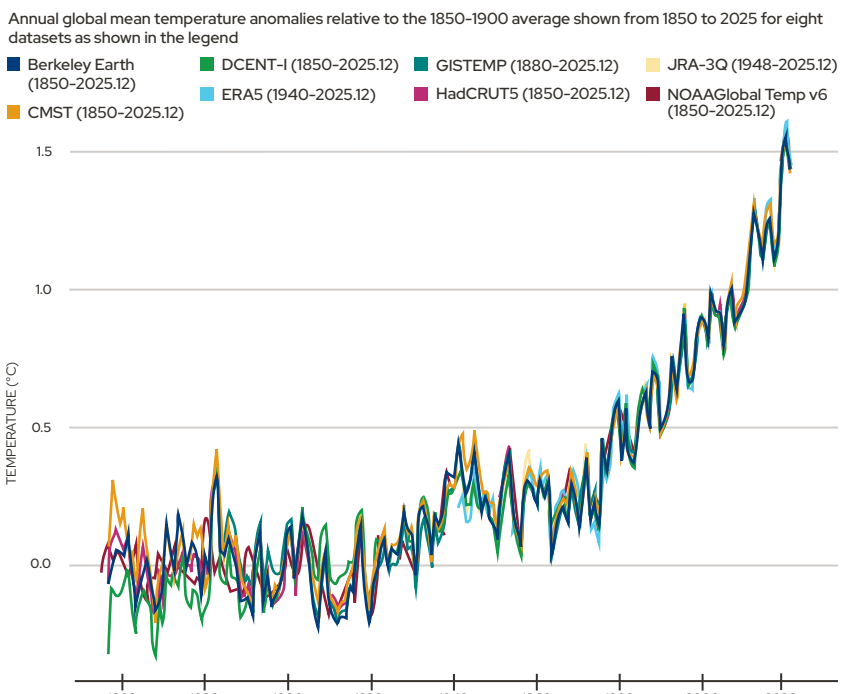
Introduction

Climate adaptation and resilience –
Today's global imperative

Climate change is a certain and accelerating reality

Average annual temperatures are climbing from pre-industrial levels

Figure 1. Global mean temperature difference (°C) from 1850-1900 average[a, 1]



The world is on track to collectively overshoot its climate and planetary boundaries

Figure 2. Peak warming over the twenty-first century (°C) relative to pre-industrial levels[2]

2024

was the hottest year on record globally, followed by 2023 and 2025, with temperatures continuing to exceed **>1.5°C** above pre-industrial levels (1850-1900) for the year[1]

70%

chance that average annual temperature will continue to **exceed the 1.5-degree threshold between 2025 and 2029**[2]

2.8°C

of warming above pre-industrial levels is expected to be **exceeded by the end of the 21st century** if current policies continue[3]

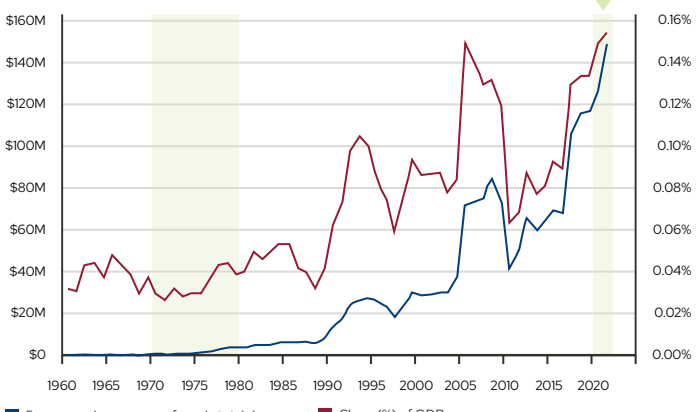
Note: a NDCs = Nationally determined contributions. **Source: 1** World Meteorological Organization (WMO) (2026): State of the Global Climate 2025; WMO (2026): Global mean temperature 1850-2025; **2** WMO (2025): WMO Global Annual to Decadal Climate. Update (2025-2029); **3** UNEP (2025): Emissions Gap Report 2025: Off Target - Continued Collective inaction puts Global Temperature Goal at Risk.

At current climate trajectory, economies and societies face material consequences

Globally, economic damages from natural disasters and extreme weather events have increased steadily, with acceleration in recent years...

Figure 3. Global economic damages from hazards as share of global GDP (%)[1]

~5x increase in direct weather-related disaster damages as a share of global GDP, growing from 0.03% in the 1970s to nearly 0.16% as of 2024.



Note: Share (%) of GDP measures direct physical damages in nominal dollars divided by nominal GDP.

Top hazards contributing to economic loss:[2]

Storms
Top contributor to overall economic losses and growing across years (>50% of all economic damages from disasters as a share of GDP in 2020s vs ~33% in the 1970s).

Floods
Significant and stable contributor at ~20-29% economic losses from disasters as a share of GDP across time.

Earthquakes and droughts
Moderate, stable contributors to economic losses, at ~10% each across time.

...and profound impact on economies and communities

~20% of GDP of the 55 most climate-vulnerable economies wiped out due to climate change

between 2000 and 2019, representing US$525B in losses, and disproportionately in the Global South[3]

250M internal displacements globally

from 2015 to 2025 caused by weather-related hazards such as floods, storms, wildfires, and droughts, according to the United Nations High Commissioner for Refugees (UNHCR)[4]

In 2025 alone, US$224B in economic losses & 17,200 fatalities globally

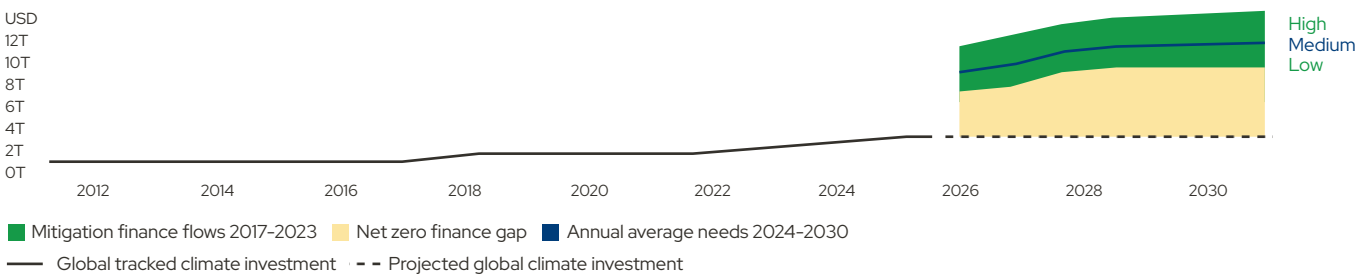
driven by natural disasters, including wildfires, floods, and severe storms, according to estimates by Munich Re[5]

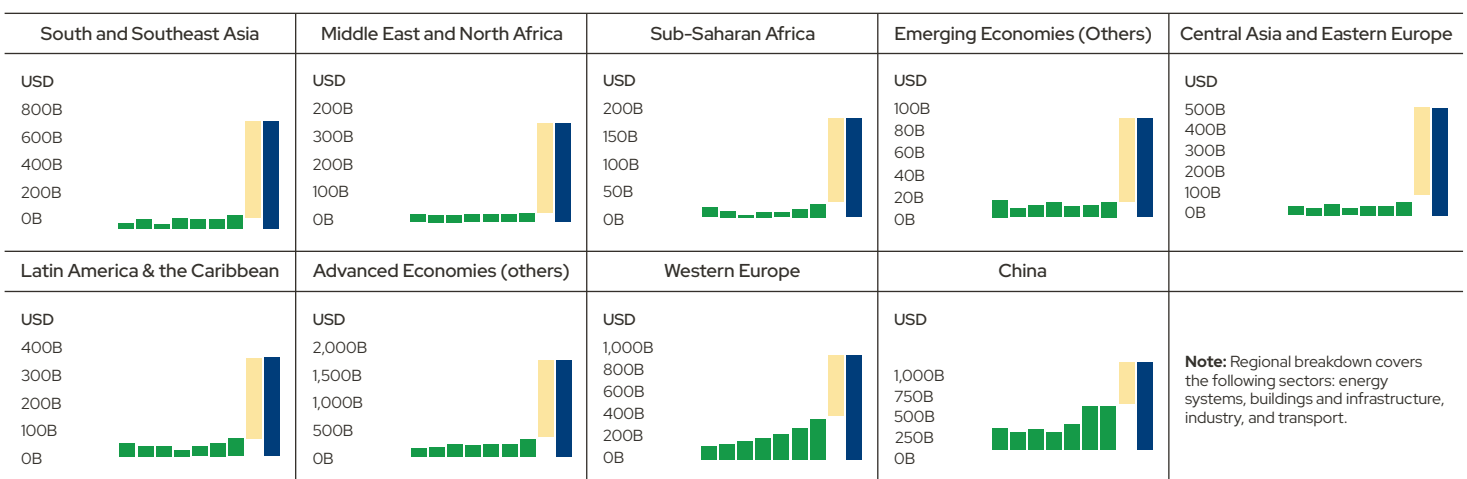
Source: 1 Board of Governors of the Federal Reserve System (2024): On the GDP Effects of Severe Physical Hazards, calculations based on data from EM-DAT, CRED/UCLouvain, 2025, Brussels, Belgium – www.emdat.be; World Bank, World Development Indicators; **2** Our World in Data (2025): Decadal average: Economic damages from disasters as a share of GDP, World; **3** Vulnerable Twenty Group (2022): Climate Vulnerable Economies Loss Report; The V20 membership stands at 55 economies including Afghanistan, Bangladesh, Barbados, Benin, Bhutan, Burkina Faso, Cambodia, Colombia, Comoros, Costa Rica, Democratic Republic of the Congo, Dominican Republic, Ethiopia, Eswatini, Fiji, The Gambia, Ghana, Grenada, Guatemala, Guinea, Guyana, Haiti, Honduras, Kenya, Kiribati, Nicaragua, Lebanon, Liberia, Madagascar, Malawi, Maldives, Marshall Islands, Mongolia, Morocco, Nepal, Niger, Palau, Palestine, Papua New Guinea, Philippines, Rwanda, Saint Lucia, Samoa, Senegal, South Sudan, Sri Lanka, Sudan, Tanzania, Timor-Leste, Tunisia, Tuvalu, Uganda, Vanuatu, Vietnam and Yemen; **4** United Nations High Commissioner for Refugees (2025): No Escape II: The Way Forward; **5** Munich Re (2026): Climate change presses on: Devastating wildfires and intense thunderstorms exacerbate losses for insurers.

While climate mitigation finance is increasing, Net Zero goals are still beyond reach, increasing the need for adaptation

Climate mitigation finance flows have grown over the past decade...

Figure 4. Global tracked climate mitigation finance vs estimated annual climate finance needs (2012-2030)[1]





Note: Regional breakdown covers the following sectors: energy systems, buildings and infrastructure, industry, and transport.

...but lag far behind what is needed to achieve Net Zero goals

The need

US$6.2-9.5T p.a.

of climate financing between now and 2030, and US$6.9 to 11.3T p.a. by 2050, to deliver Net Zero.[1]

vs

Current flows

US$1.9T tracked in 2023

for global climate finance, including mitigation and adaptation measures, a new high. Private climate finance contributions exceeded US$1T, outpacing public investment for the first time.[1] However, **this still falls short of annual climate financing needs**.

Source: 1 Climate Policy Initiative and A&O Shearman (2025): As climate change investing evolves, how do we mind the gap?

Global climate adaptation and resilience financing gaps remain stark

Adaptation receives <10% of global climate finance[1]

Figure 5. Share of global climate finance by category

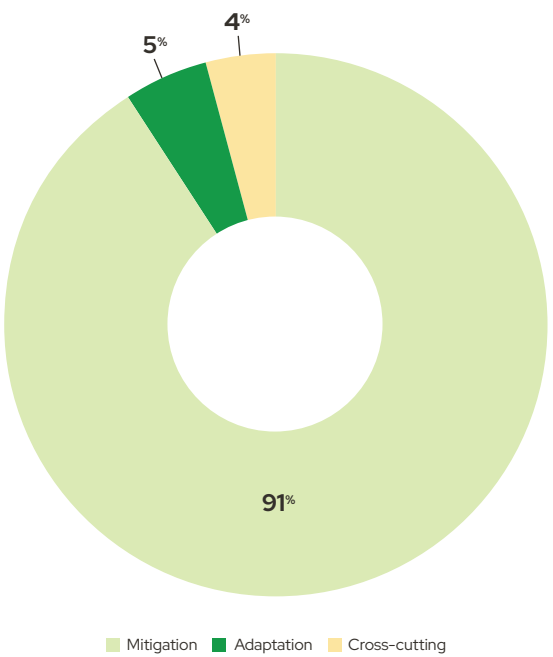
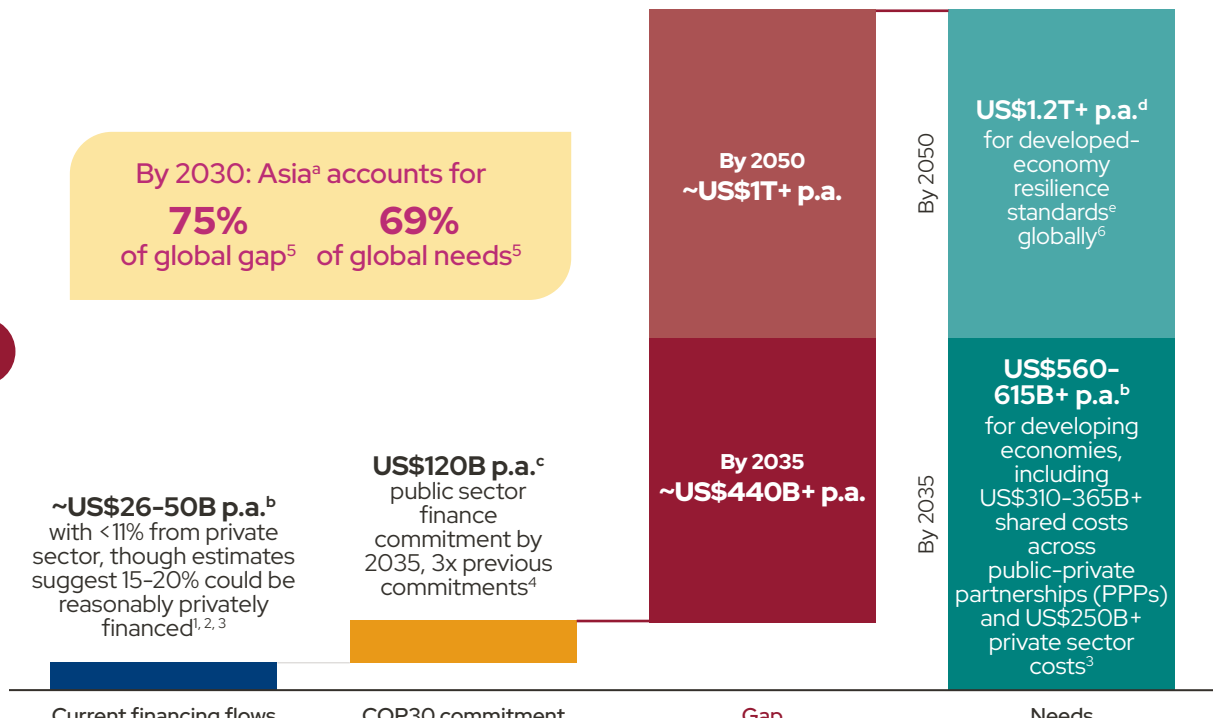


Figure 6. Global CA&R annual financing flows, commitment, and needs



Note: a Asia is defined here as East Asia (China, Chinese Taipei, Hong Kong SAR, Japan, Macao SAR, Mongolia, North Korea (DPRK), South Korea), Southeast Asia (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Vietnam), and South Asia (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka; **b** Current financing flows and needs by 2035 are in constant 2023 prices; **c** US$120 billion is part of the US$300 billion New Collective Quantified Goal (NCQG), which includes a larger target where developed countries scale climate financing, covering both mitigation and adaptation, to at least US$1.3 trillion annually by 2035, and does not specify if the goal will increase with inflation; **d** US$1.2 trillion by 2050 is in 2020 dollars; **e** Based on McKinsey Global Institute's definition, "developed-economy resilience standards" refer to the protection standards commonly established in developed economies against climate-related hazards. **Source: 1** Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard; **2** UNEP (2025): Adaptation Gap Report 2025; **3** McKinsey & Company (2025): Climate resilience technology: An inflection point for new investment; **4** World Resources Institute (2025): Reaching $120 Billion in International Adaptation Finance Is Possible – Here's What It Takes; UNCTAD (2024): Countries agree $300 billion by 2035 for new climate finance goal – what next?; **5** Dalberg analyses; Climate Policy Initiative (2025): Bridging the adaptation finance gap in Asia; **6** McKinsey Global Institute (2025): Advancing adaptation: Mapping costs from cooling to coastal defenses.

Asia faces severe social and economic consequences

Asia will bear a significant brunt of looming climate challenges

Asia is warming 2x as fast as the global average

Since 1991, Asia's warming has been twice the global mean due to faster land heating. Regional sea surface temperatures rising at ~0.24 °C per decade vs ~0.13 °C globally.[1]

The deadliest natural disasters in 2025 were in Asia, especially from floods and storms; extreme heat impact expected to rise

1,300 fatalities across Indonesia, Malaysia, the Philippines, Thailand, and Vietnam due to floods and storms from September to December 2025, leading to ~US$20 billion in damages.[2]

A 2.0°C increase in global temperature will have catastrophic consequences across Asia by 2050

By 2050, high tides could affect over 79 million in Asia and the number of people experiencing extreme heat will increase from 1.5 billion to 3.8 billion globally.[3] Further, climate change will put >20% of the SEA population at risk of food insecurity by 2050.[4]

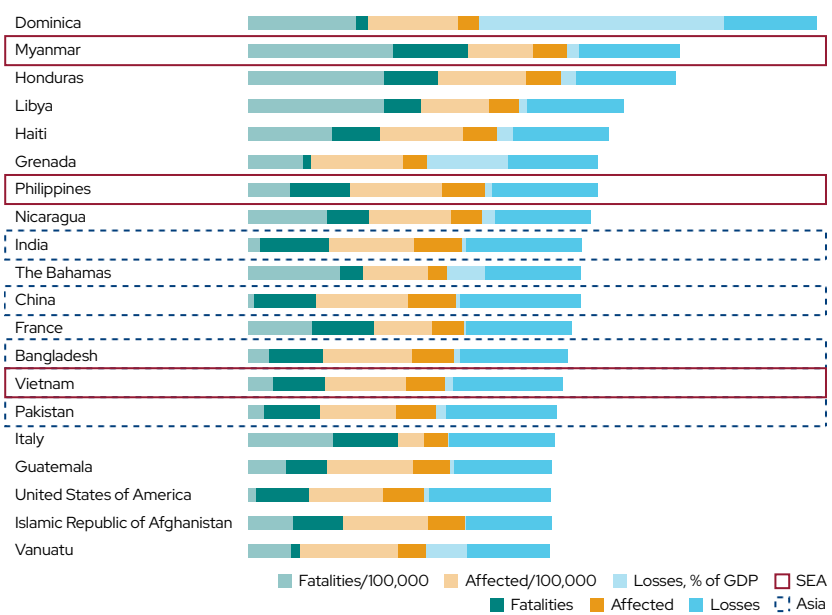
By the 2030s, annual costs of US$336B from physical climate risks are expected for companies headquartered in Asia

Costs to public companies globally will reach US$1.3 trillion by 2030s, ~50% of these companies have material Asian footprint. Top Asian sectors with disproportionate impact are information technology (50% of global sector costs) and industrials (42%), reflecting the region's role in global manufacturing.[5]

Myanmar, the Philippines, and Vietnam are among the countries in SEA most affected by climate change, with high numbers of **fatalities, people affected, and economic losses**. India and China have also experienced substantial losses in absolute terms given their size of economy and population.

7 Asian economies are in the top 20 globally that have experienced severe economic and social/health losses from climate-related events

Figure 7. Top 20 economies most affected by the consequences of climate change (1995-2024)[6]



Other SEA markets

Rank	Market
22	Thailand
37	Malaysia
43	Cambodia
48	Indonesia
66	Lao PDR
127	Timor-Leste

Source: **1** World Meteorological Organization (2025): Rising temperatures and extreme weather hit Asia hard; **2** Bloomberg (2025): Losses Top $20 Billion in Asia Floods as Climate Risks Grow; **3** CSIS (2021): Oceans of Opportunity: Southeast Asia's Shared Maritime Challenges; Nature Sustainability (2026): Global gridded dataset of heating and cooling degree days under climate change scenarios; **4** RSIS (2024): Climate Change and Its Impact on Peace and Security in Southeast Asia; **5** CIIP analyses; S&P Global Sustainable1. Material Asian footprint is defined as companies with >10% of asset count within Asia; **6** Germanwatch (2026): Climate Risk Index 2026; Brunei and Singapore ranking unavailable.

Climate costs and impact will be significant for all stakeholders

Key stakeholders	A Public sector	B Private industry	C Communities
	Governments, state-owned infrastructure	Businesses, investors	Individuals, households, communities
Costs	**US$6.1T** climate-related government spending since 2000, with **50%** borne by governments in Asia[1]	Global public companies face **US$1.3T** annual climate costs by 2030s, of which **US$336B** borne by Asian companies[2]	Since 2000, natural disasters have affected a total of **3.7B people in Asia**, vs. **1.1B in the rest of the world**[3]

Figure 8. Climate-related disaster costs (2000-2025)

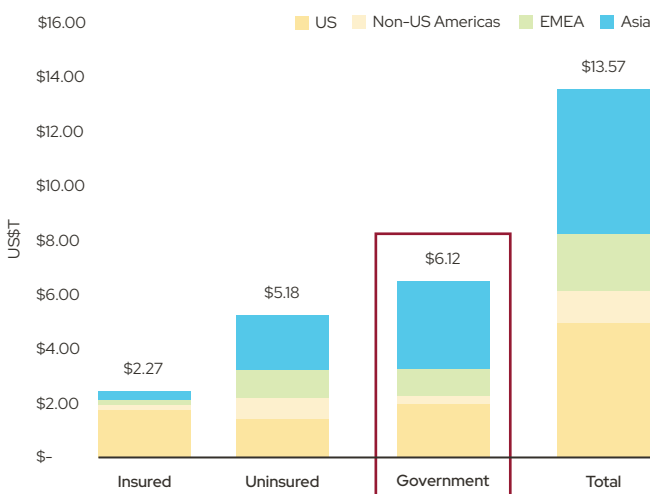


Figure 9. Global annual cost of physical risks
Medium climate change scenario (2.1-3.5°C by 2100)

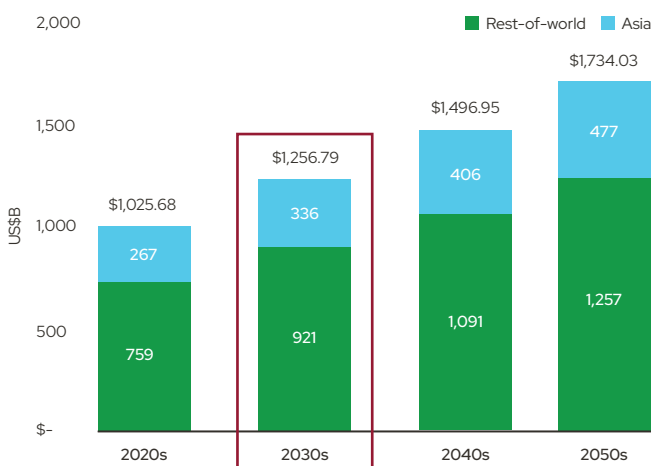
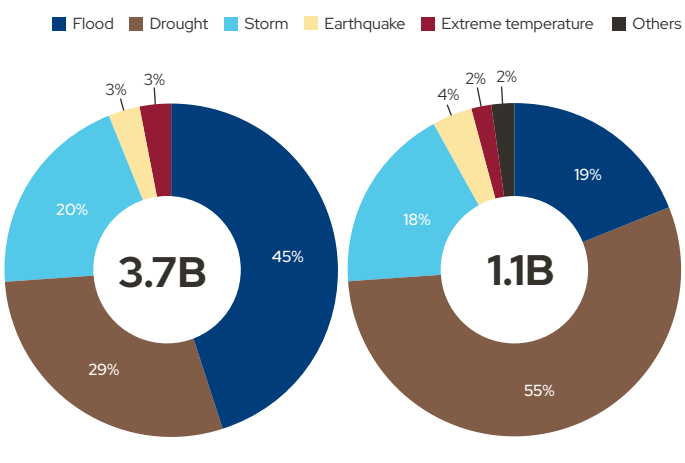


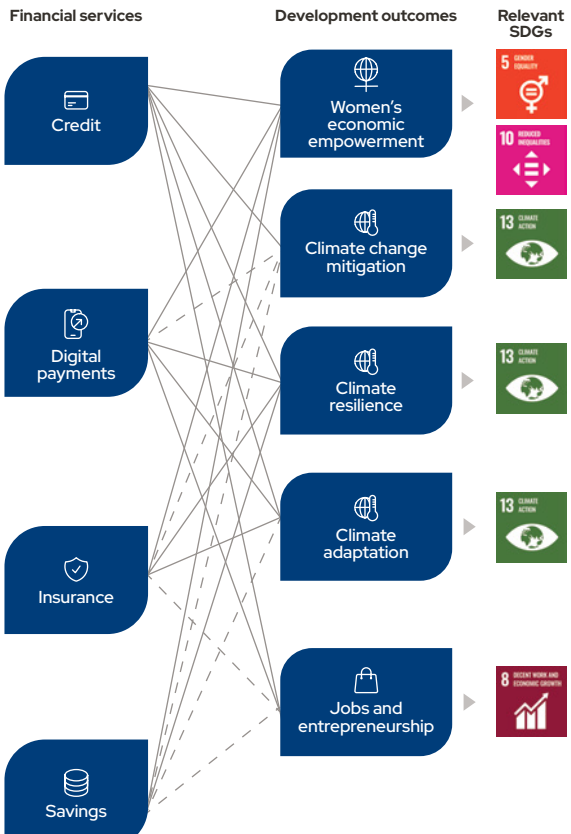
Figure 10. Number of people affected from disasters in Asia and rest of the world (2000-2026 partial, cumulative)[3]



Source: **1** Bloomberg Intelligence (2026); **2** CIIP analyses; S&P Global Sustainable1; **3** EM-DAT data as of March 2026, calculations by CIIP. Asia includes Bangladesh, Brunei, Cambodia, China, Chinese Taipei, Hong Kong SAR, India, Indonesia, Japan, Lao PDR, Macao SAR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Thailand, and Vietnam. Data availability for Bloomberg Intelligence climate damages data has material coverage for China, India, Japan, Philippines and South Korea.

Financial services are crucial for both industry and communities to adapt

Figure 11. Financial services impact pathways[1]



The interaction and interconnection of climate hazards and risks, which test and erode adaptive capacity, requires a systems lens, recognising the wide-ranging effects of climate change.

Financial services address the need to shift and deploy capital across entire systems, including industries and societies, rather than on an isolated project basis, to address climate impacts on companies and individual households.

B Private industry

Enables businesses and investors to safeguard assets, maintain operations, and capture upside from CA&R

C Communities

Enables individuals, households, and local systems to secure essential resources, and sustain livelihoods during and after climate shocks

Funding CA&R: Provide access to capital to build physical adaptation and social resilience	**Building financial resilience:** Improve ability to manage and absorb financial impacts of climate events
• Enable financing to strengthen and harden assets • Invest in CA&R solutions	• Maintain liquidity to sustain operations during and after climate events • Transfer risk through insurance and other risk management tools
• Enable fair and inclusive financing including to hard-to-reach segments	• Build and mobilise personal savings to support resilience and recovery • Access risk-sharing mechanisms during climate shocks • Strengthen social protection to sustain livelihoods and essential daily functions under climate stress

Spotlight: Agriculture sits at the nexus of CA&R, with high exposure to climate shocks and systemic importance to food security and rural economies.

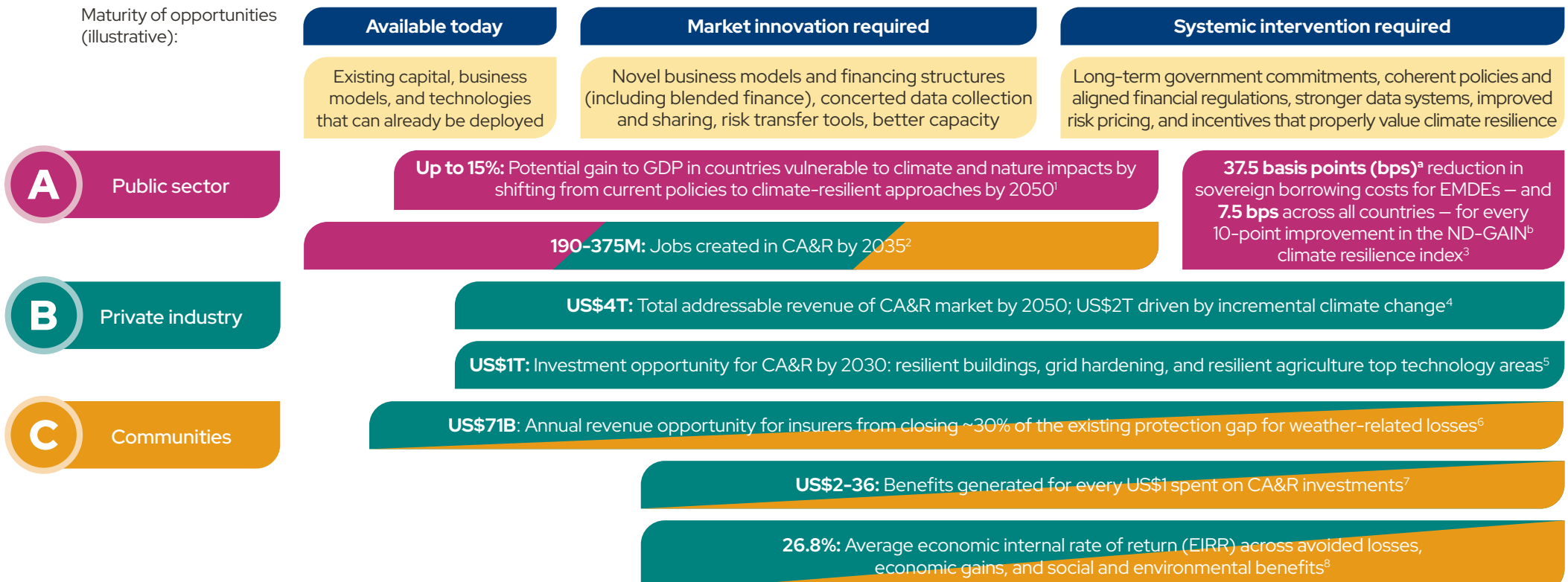
Strengthening access to finance is critical to fund upfront investments in climate-smart practices and solutions, while also building financial resilience, i.e., the ability of smallholders and agri-SMEs to absorb, manage, and recover from climate-related losses.

Together, this enables risk reduction and management, income diversification and stability, and continuity of production amidst increasing climate volatility, ultimately reducing long-term climate vulnerabilities from farmgate to the broader economy.

Source: 1 Consultative Group to Assist the Poor (2026): Impact Pathfinder.

Amidst risks, there are unrealised economic opportunities in CA&R

Realising the full potential of opportunities in CA&R will require responses from both private and public sectors



Note: a 100bps = 1%; **b** ND-GAIN = Notre Dame Global Adaptation Initiative. **Source: 1** World Bank (2024): People in a Changing Climate: From Vulnerability to Action - Insights from World Bank Group Country Climate and Development Reports covering 72 economies; **2** Systemiq and World Resources Institute (2025): Jobs and Skills for the New Economy: An Action Agenda for a People-Centered Climate Transition; **3** International Monetary Fund (IMF) (2021): Why Climate Change Vulnerability Is Bad for Sovereign Credit Ratings; Systemiq, et al. (2025): Returns on Resilience: Investing in Adaptation to Drive Prosperity, Growth and Competitiveness; **4** GIC and Bain & Company (2025): Sizing the Inevitable Investment Opportunity: Climate Adaptation; **5** McKinsey & Company (2025): Climate resilience technology: An inflection point for new investment; **6** Marsh (2023): Building a Climate Resilient Future: Five priorities for the global insurance industry; **7** International Fund for Agricultural Development (IFAD) (2025): Adaptation Finance: Building the Investment Case; **8** World Resources Institute (2025): Strengthening the Investment Case for Climate Adaptation: A Triple Dividend Approach.

CA&R solutions already exist across key sectors in Asia...

Top 5 most funded solutions (in US$ million, 2021-2025[a])

Infrastructure	Agriculture & allied sectors	Water	Ecosystems & biodiversity	Health	Disaster management	Industry & commerce	Social systems	Energy
Climate-proof physical assets to reduce long-term economic losses and service disruption	Protect food systems, farmer livelihoods, and agri-value chains	Secure water availability, quality and system resilience under increasing climate variability	Protect natural systems that buffer climate risks and sustain livelihoods	Reduce climate-related health risks and strengthening system preparedness	Strengthen preparedness, response and recovery to reduce economic and livelihood losses	Protect businesses, supply chains and employment from disruption	Strengthen household-level resilience and social protection	Ensure reliable, climate-resilient power supply to critical services
Strategic elevation of critical road corridors **1730**	Farmer-to-farmer extension networks **1660**	Basin integrated water resources management **830**	Floodplain reconnection systems **310**	Telemedicine platforms **500**	National multi-hazard risk registries **540**	Climate scenario stress-testing software **400**	Climate-resilient livelihood diversification programmes **280**	Insurance for mini-grids **180**
Advanced road drainage upgrades **1480**	Assisted natural regeneration **390**	Integrated flood and drought forecasting systems **600**	Community-led wetland restoration **300**	Climate-smart disease surveillance **300**	Integrated emergency operations centres **430**	Real-time supply chain visibility platforms **340**	Climate integration in school curricula **180**	Round-the-clock microgrids **180**
Nature-based urban flood management **860**	Climate-smart crop diversification **280**	Decentralised wastewater treatment **360**	Mangrove-based ecotourism **270**	Zoonotic disease surveillance **300**	Sovereign disaster credit lines **190**	Technical assistance hubs for MSMEs **300**	Climate-focused vocational certifications **170**	Climate-integrated generation planning **130**
Urban tree canopy expansion **710**	Agroforestry models **220**	Zero-liquid-discharge systems **320**	Living shoreline systems **170**	Training for health workers **270**	Seasonal preparedness protocols **150**	Climate-adjusted credit scoring models **190**	Digital learning platform for continuity **130**	Automated reclosers **100**
Material recovery facilities **610**	On-farm water harvesting **210**	Urban drainage & stormwater infrastructure **310**	Coastal payment for ecosystem services **150**	Portable cold-chains for vaccines **200**	Community disaster response teams **130**	Climate bond issuance platforms **160**	Indigenous knowledge networks **90**	Off-grid battery energy storage systems **70**
& 26 more	**& 47 more**	**& 32 more**	**& 19 more**	**& 22 more**	**& 17 more**	**& 21 more**	**& 15 more**	**& 8 more**

Financial services

Financial services solutions cut across all sectors by facilitating access to CA&R funding and strengthening financial resilience; enabling better preparedness for, response to, and recovery from climate shocks

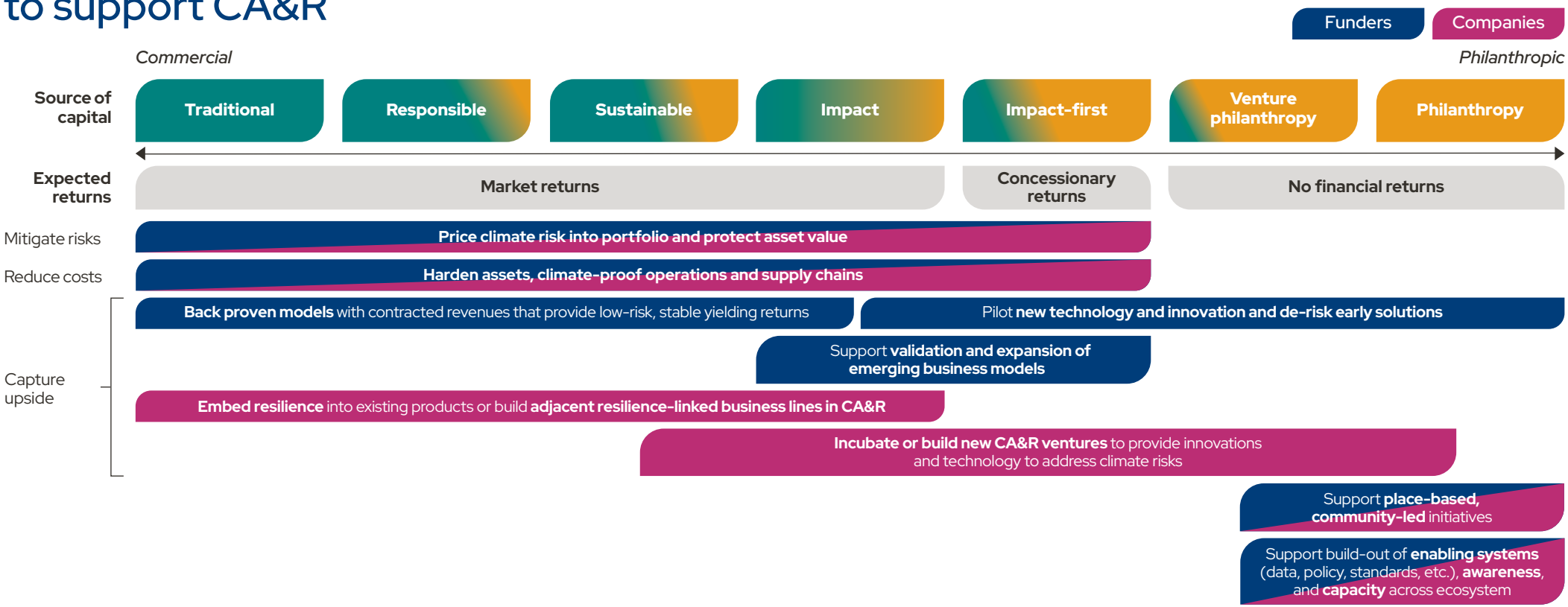
Note: a TAM estimates are based on projected 2030 global addressable market for selected solutions, mapped to sectors in the taxonomy (Resilient Agriculture to Agriculture; Resilient Buildings to Infrastructure; No relevant map for Social Systems); TAM for SEA, India, and China is derived by applying each region's projected share of global GDP in 2030; TAM derived from a mixed method of forecast adoption rates, addressable spending to deploy physical solutions, and project revenue for software solutions; Energy TAM is a combination of on-grid, and off-grid solutions, where off-grid is investment needed for universal access to energy estimated for SEA, China, and India, allocated across Energy, Agriculture, Industry, Health, and Infrastructure.
Source: 1 McKinsey & Company (2025): Climate resilience technology: An inflection point for new investment; **2** ESMAP (2024): Off-Grid Solar Market Trends Report 2024; **3** IMF (2026): DataMapper; **4** Dalberg analyses.

...addressing critical needs across climate impact pathways

		CA&R solutions enable businesses and communities to address all stages of climate risk and impact		
	Key impact of climate risks	**Prepare** **Anticipate and reduce exposure to climate risk** before climate shocks occur	**Respond** **Enable effective action and continuity** during climate shocks	**Recover** **Support restoration, rebuilding, and longer-term recovery** after climate shocks
Infrastructure	• Flood-prone transport links • Heat stress on building and asset depreciation	Reduce asset exposure	Maintain continuity of critical infrastructure systems	Enable restoration of essential services
Agriculture & allied sectors	• Yield volatility • Livestock mortality, disease outbreaks and market disruptions	Strengthen yields and productivity	Enable adaptive responses during shocks	Support livelihoods recovery and food system stability
Water	• Flooding, stormwater overload • Water shortages and unsafe water	Secure water availability and manage variability	Maintain access during shocks	Restore water systems and quality
Ecosystems & biodiversity	• Coastal erosion, coral reef bleaching, watershed degradation, biodiversity loss	Strengthen natural and ecosystem buffers against climate events	Maintain ecosystem functions during climate stress	Restore degraded ecosystems and services
Health	• Heat-related deaths, vector-borne diseases • Cold chain failures and health facility disruptions	Reduce and provide early warning for climate-related health risks	Ensure continuity of care via portable diagnostic and treatment tools	Restore health systems and services
Disaster management	• Delayed emergency response • Liquidity gaps post-disaster • Weak risk information systems	Strengthen early warning and preparedness systems	Enable coordinated emergency responses	Support recovery and risk reduction planning
Industry & commerce	• Business interruptions, asset damage, and supply chain fragility	Reduce operational and supply chain exposure	Maintain business continuity via real-time supply chain visibility platforms	Enable rapid resumption of economic activity through parametric business interruption insurance for hazards
Social systems	• Income shocks, missed schooling, poverty traps	Build resilience of vulnerable populations	Provide safety nets	Support livelihood and community recovery
Energy	• Grid instability, power outages/infrastructure failure and high energy costs • Rising cooling demand	Strengthen reliability of energy systems under climate stress	Ensure uninterrupted access during shocks	Enable restoration and sustained energy access for affected populations
Financial services (cross-cutting)	• Distress sales, income shocks, business continuity risks	Enable risk anticipation and financial preparedness of industry and communities	Provide liquidity and risk transfer during shocks	Support financial recovery and enable long-term financial health

Source: 1 Dalberg analyses.

There are opportunities for funders and companies across the spectrum of capital to support CA&R



Delivering CA&R impact at scale **requires action from across the spectrum of capital**

Source: **1** Centre for Impact Investing and Practices; **2** Dalberg analyses.

Unlocking full potential will require better data, scalable solutions, innovative financing, and system-wide capacity building

Key challenges

Pipeline and business model challenges

Adaptation solutions are highly context-specific, often localised, and do not always generate clear private returns or have clear exit timelines.

Insufficient and misaligned financing

Limited participation of private markets, mismatch between capital types and perceived risk-return profiles, time horizon mismatch: short-termism in pricing vs long-term climate risk.

Capacity limitations

Technical, human, and operational capacity gaps limiting ability to interpret data, recognise systemic and cascading risks, and perform effective risk assessment, solution design, and capital allocation.

Information and data issues

Limited availability and accuracy of local climate information especially forward-looking scenarios, poor visibility into systemic risks and costs, information asymmetry across actors.

Underdeveloped enabling environment

Policy/regulatory frameworks need constant update, incentives for adaptation investment can be made clearer, climate resilience and public-good benefits not internalised.

Failure to address these challenges holistically will lead to cascading difficulties, such as:[1]

Hard limits: Physical geographical limitations where adaptation is no longer possible

Maladaptation: Unintended negative consequences of adaptation measures

What is required

Strengthen data and knowledge infrastructure

- Build shared, interoperable datasets linking climate risk (hazard, exposure, vulnerability), solution deployment, and financial flows
- Improve data quality through harmonised standards and validate protocols
- Establish transparent uncertainty ranges in climate scenario modelling

Define solution universe, with clear entry points for diverse set of actors

- Map and categorise deployable adaptation solutions by sector and risk pathway
- Identify concrete entry points (e.g., agricultural inputs, infrastructure planning, financial risk management) to make solutions visible, accessible, and actionable for adopters: through innovative instruments to accelerate deployment and scaling

Mobilise financing, with concerted efforts across the capital spectrum

- Coordinate philanthropic and commercial capital to fund technical assistance, pilots, and scaled solutions
- Ensure concerted efforts that address soft limits of adaptation and maximise cross-sector impact. The right type of capital will be needed for each stage of a company's growth

Build collective capacity and strengthen systems

- Develop technical, human, and operational capability
- Reinforce governance and policy frameworks
- Foster cross-sector collaboration and institutional coordination to enable sustained, system-wide delivery of CA&R solutions

Source: 1 Intergovernmental Panel on Climate Change (2022): Climate Change 2022: Impacts, Adaptation and Vulnerability.

Against this backdrop, this report will...

Bring to light a more holistic view of the costs of climate extremes
by highlighting impacts across the public sector, private industry, and communities.

Identify scalable, high-impact CA&R opportunities across sectors
by prioritising Asia-relevant solutions and assessing the associated capital needs and business model innovations required for wider adoption.

Establish pathways to mobilise and structure CA&R financing across the capital spectrum
by defining the roles of different capital providers, including catalytic capital and blended finance, to de-risk and crowd in investment.

Highlight the intersectional impacts of CA&R
and set out a theory of change (ToC) across actors spanning philanthropic to commercial capital.

Showcase real-world examples
of companies, funders, and organisations applying diverse strategies to deliver CA&R outcomes.

Chapter 1
Pricing the risk

Climate costs, human consequences

Climate risk represents significant costs to countries, businesses and investors, and people

There is no single path to pricing climate risks, with data limitations hampering efforts on all fronts

Understanding the cost structures of physical climate risk involves choosing appropriate analytical lenses—whether top-down frameworks that capture systemic exposure, bottom-up models that assess specific assets, or hybrid approaches to map transmission channels across various value chains and scales. These approaches require decision-useful and context-relevant data, much of which is unavailable or challenging to acquire today.

This section explores how climate risks at varying scales may be priced – at the country-level, company-level, and human costs – illuminating the need for analytical approaches depending on where and how funders operate.

	A Public sector	B Private industry	C Communities
Key actors	Governments, state-owned infrastructure	Businesses, investors	Individuals, households, communities
Impact transmission channels (examples)	GDP exposed, increased sovereign borrowing costs, increased infrastructure spend, etc.	Physical assets, operational disruptions, supply chain impacts, workforce productivity, credit quality etc.	Exacerbated inequality, displacement, health, fatalities, etc.
Cost examples	**US$6.1T** Climate-related government spending since 2000[1]	**~US$ 1.3T** global physical asset costs by 2030 faced by private sector[2]	**US$1.1T** projected cost on healthcare systems globally from climate-induced impacts by 2050[3]

Source: 1 Bloomberg Intelligence (2026); **2** CIIP analyses; S&P Global Sustainable1; **3** WEF and Oliver Wyman (2024): Quantifying The Impact Of Climate Change On Human Health.

Climate impacts are rising globally with significant exposure in economically concentrated regions

Figure 12. Past global GDP exposure to climate hazards (1981-2010)

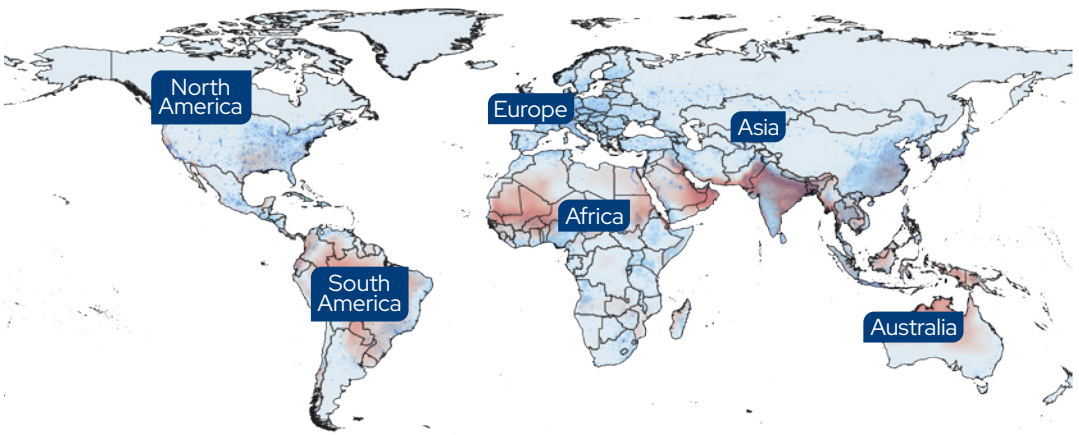
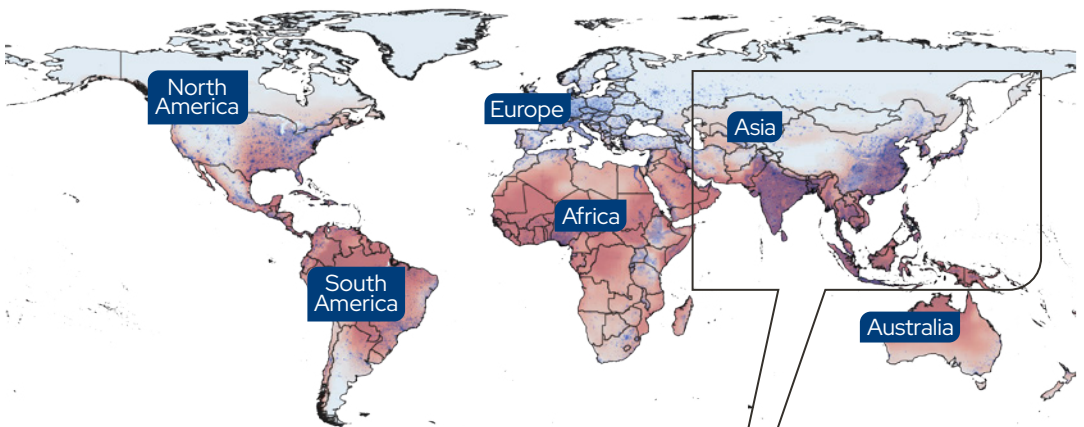


Figure 13. Future global GDP exposure to climate hazards (2020-2040)



GDP: High, Mid, Low
Composite climate risk: High, Mid, Low

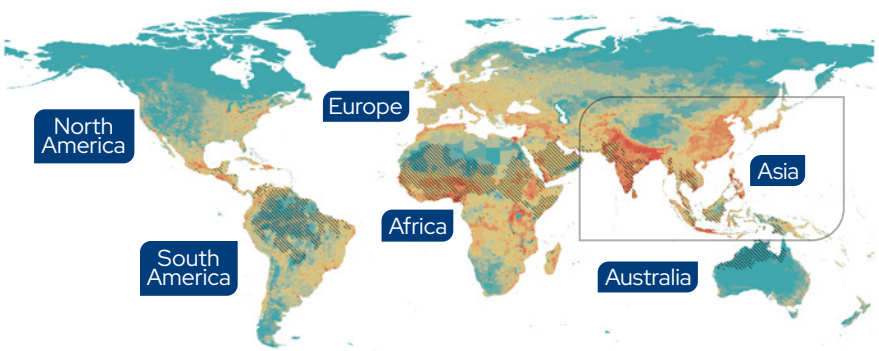
Looking ahead, climate risks are intensifying, and increasingly concentrated where economic output, as measured by GDP, is highest, especially in Asia

Note: Climate hazard risks are normalised values ranging from 0 – 1. GDP refers to annual GDP in the unit of purchasing power parity (PPP) 2005 international dollars, and calculated based on spatial resolutions of 0.25 degrees; Figure 12. is based on 2000 GDP data and Figure 13. is based on 2020 GDP data. **Source:** World Bank (2025): World Bank Official Boundaries; Zenodo (2023): Global gridded GDP under the historical and future scenarios; CGIAR (2024): Global climate hazard indices: heat, drought, flood and compound; CIIP analyses.

Asia faces accentuated climate risks...

Populations in Asia are disproportionately exposed to extreme heat, and this is projected to worsen

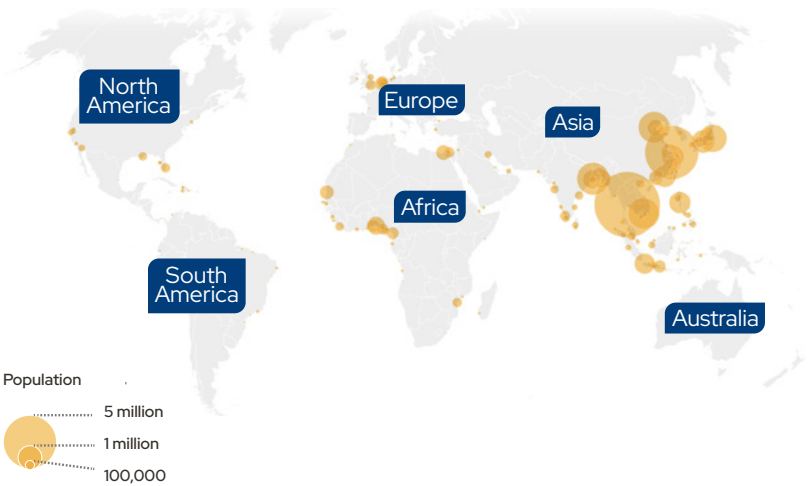
Figure 14. Population exposed to temperatures over 29°C in 2070[1]



- Key risks from extreme heat across rural and urban areas include **heat injuries and related illnesses, water scarcity, agricultural disruption, and ecosystem stress**
- This has **implications for food security and supply chains globally** given Asia's production of key crops such as palm oil, rice, cotton, and rubber

Asia also faces acute flood risk due to its fast-growing coastal urban areas

Figure 15. Population within 2 feet of high tide in cities with over 300,000 residents as of 2026[2]



- Growing populations in coastal megacities, including Bangkok, Jakarta, and Manila **heighten exposure to flooding as well as health and economic risks**
- Rising sea levels will also contribute to **coastal erosion, storm surges, and declining fisheries,** directly affecting ecosystems and biodiversity and impacting coastal communities

2x

the global average—that's how fast Asia is warming, with high population exposure to drought and heat risks[3]

~2B

people are expected to live in areas of extreme heat by 2070, especially in South Asia and SEA, disproportionately affecting the urban poor, elderly, children, and people with disabilities

>77%

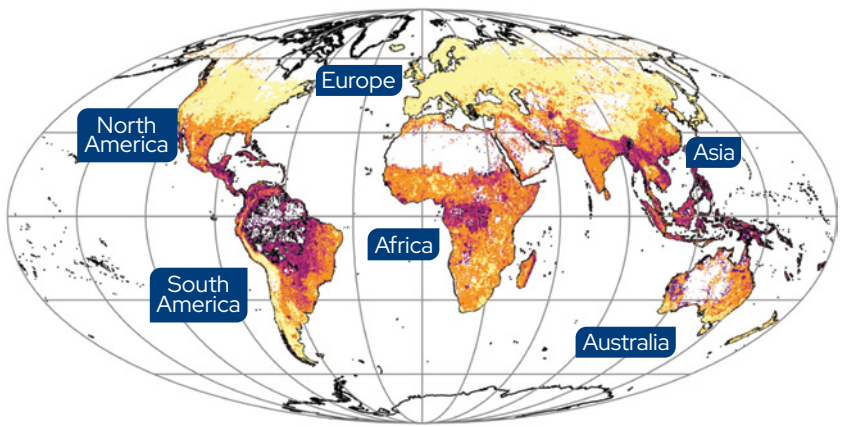
of SEA's population lives in coastal regions, with significant exposure and vulnerability to coastal flooding[4]

Source: 1 PNAS (2022): Climate Endgame: Exploring catastrophic climate change scenarios; **2** The New York Times (2026): How a Melting Glacier Could Affect Tens of Millions Around the Globe; New York Times analysis of data from Climate Central CoastalDEM 3.0, Worldpop and Jerry Mitrovica, Harvard University; **3** World Meteorological Organization (2025): Rising temperatures and extreme weather hit Asia hard; **4** ASEAN (2025): Enhancing the Resilience of Coastal Cities in ASEAN.

...which have real human consequences

Climate change is also exacerbating disease outbreak risk in Asia

Figure 16. Population exposed to high risk of disease outbreaks[1]



Risk	Area (%)	Population (M)
Very High	3.0	7.7
High	6.3	122.9
Medium	17.3	1,198.0
Low	37.0	2,695.3
Very Low	36.5	1,234.4

4.1B – 5.2B

cases of climate-sensitive diseases (malnutrition, malaria, diarrhoea) projected between 2026 and 2050 in low- and middle-income countries, though actual impacts likely higher[2]

1.1–3.8%

of annual global GDP potentially wiped out by antimicrobial resistance intensified by climate change by 2050. In Asia, climate change will exacerbate disease spread and antibiotic misuse[3]

57%

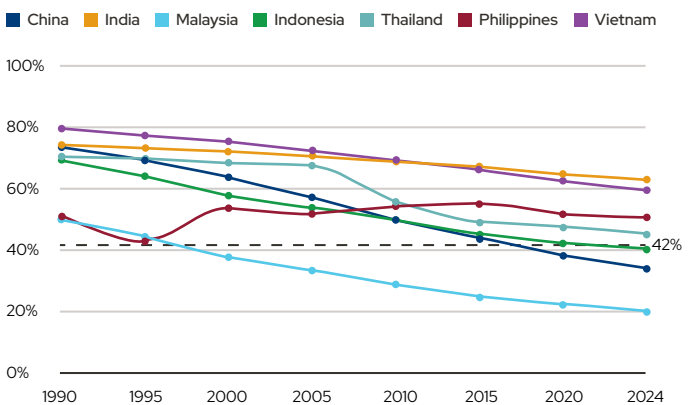
increase in global dengue transmission potential due to climate change, with faster mosquito reproduction and spread to higher latitudes and altitudes[4]

Source: 1 Science Advances (2025): Assessing the risk of diseases with epidemic and pandemic potential in a changing world; **2** World Bank (2024): The Cost of Inaction: Quantifying the Impact of Climate Change on Health in Low- and Middle-Income Countries; World Bank Group (2016): By 2050, drug-resistant infections could cause global economic damage on par with 2008 financial crisis; **3** World Economic Forum, GAEA, CIIP, and PAA (2025): Targeted Action and Financing the Fight Against Antimicrobial Resistance in Asia; Nature Communications (2020): Accelerating invasion potential of disease vector Aedes aegypti under climate change; **4** BMJ Global Health (2025): Mosquito and global dengue cases in a warming world; Nature Communications (2020): Accelerating invasion potential of disease vector Aedes aegypti under climate change.

This is exacerbated by demographic shifts and urban migration...

Asia is experiencing declines in rural and agricultural populations

Figure 17. Rural population as % of national population[a, 1]



Across Asia, **rural populations have declined as proportions of national populations.** This is especially noticeable in **China, Indonesia, Malaysia, and Thailand,** which have seen sharp decreases over the last 30 years. **Rural-urban migration** is a key factor behind this increase, leading to the continued hollowing out of agricultural communities.

Urbanisation is increasing across the region, with major cities becoming more densely populated

Figure 18. Urban population as % of national population[b, 1]

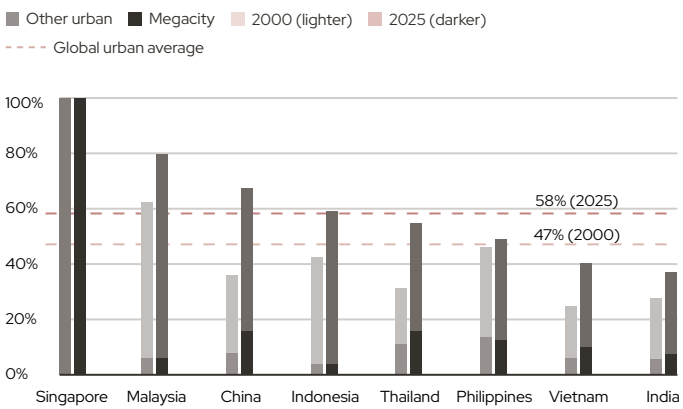
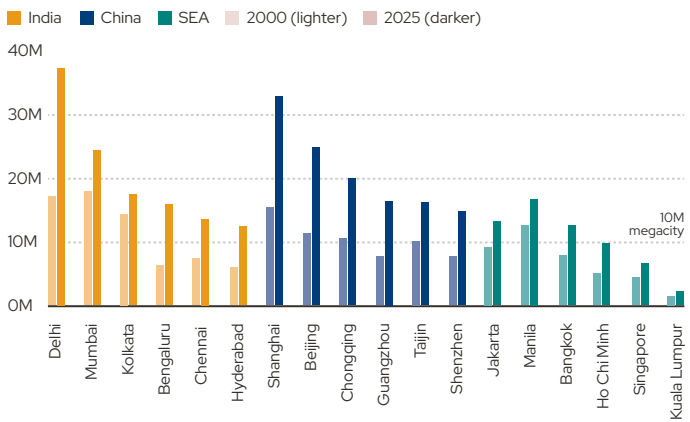


Figure 19. Absolute population in Asian cities[c, 1]



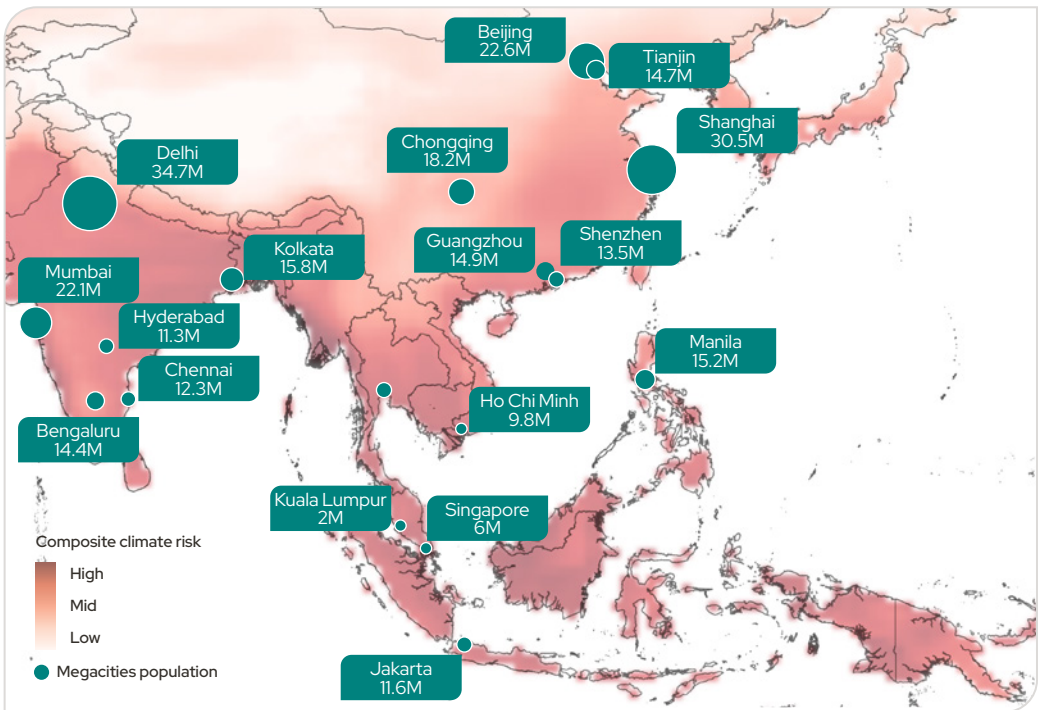
Urban populations have continued to increase over time as a proportion of national populations, driven by employment and economic needs, with China, Indonesia, Malaysia, and Singapore being above the global average while others showing steady increases.

China and India have multiple large cities that are dense and populous. By contrast, **SEA cities contain a larger proportion of overall national populations,** with cities such as Bangkok and Ho Chi Minh City seeing marked population growth over the last 25 years.

Note: a Dashed line of 42% is the 2024 global rural average per UN World Urbanization Prospects 2025. List of countries featured is non-exhaustive; **b** Dashed line of 58% is the 2024 global urban average per UN World Urbanization Prospects 2025. Singapore is 100% urban; **c** Each city's metro area as share of country's total population, 2000 vs 2025. List of cities included is non-exhaustive. Cities have a population of at least 50,000 inhabitants in contiguous dense grid cells (>1,500 inhabitants per km^2). Megacities are defined as having a total population of more than 10 million inhabitants. **Source: 1** World Population Review (2026): Largest Cities by Population 2026; United Nations (2024): 2024 Revision of World Population Prospects; and World Bank (2025), analysis by CIIP.

...with the region's dense and low lying, coastal cities facing heightened climate risks

Figure 20. Asian megacities vs composite climate risks (2020-2040)



Asia's cities face heightened exposure to climate risks including sea-level rise, flooding, storm surges, land subsidence, heatwaves, and tropical storms, resulting in significant economic and human impacts

Top 3 projected climate risks across major Asian cities in the 2050s include (non-exhaustive examples):

City	Extreme heat	Water stress	Wildfire	Coastal flood	Pluvial flood	Fluvial flood	Tropical cyclone
Bangkok	✓	✓		✓			
Ho Chi Minh City	✓				✓	✓	
Jakarta	✓	✓			✓		
Kuala Lumpur	✓			✓	✓		
Manila	✓	✓					✓
Mumbai		✓	✓		✓		
Shanghai	✓	✓				✓	
Singapore	✓			✓	✓		

Note: Megacities are defined as having a total population of more than 10 million inhabitants. **Source:** ND-GAIN Country Index (2023): Adaptive Capacity; CIIP analysis.

The region's economic exposure to climate risk expected to increase dramatically in the decades ahead, especially to extreme heat and floods

Figure 21. Hazard Exposure Scores under a Medium climate change scenario, based on S&P Global Sustainable1[a, 1]

Hazard type: Chronic | Transitional | Acute

2020s	Brunei	Cambodia	China	India	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Timor-Leste	Vietnam
Extreme heat	42	22	21	19	44	20	39	18	38	48	20	61	25
Drought	3	10	12	2	13	14	5	8	6	9	13	10	8
Water stress	5	10	35	62	17	5	6	7	18	5	45	5	13
Wildfire	1	18	9	45	5	16	1	32	6	1	18	29	9
Coastal flood	4	3	3	4	5	1	3	6	2	5	6	2	2
Fluvial flood	10	11	22	14	5	13	8	14	9	4	7	6	9
Pluvial flood	24	17	17	21	18	18	19	23	11	17	15	13	14
Tropical cyclone	1	1	10	4	1	1	1	5	46	1	1	5	2

2050s	Brunei	Cambodia	China	India	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Timor-Leste	Vietnam
Extreme heat	81	33	31	28	87	28	76	26	69	93	31	100	39
Drought	9	17	19	2	22	23	14	11	11	24	24	19	14
Water stress	5	10	33	61	26	5	12	7	33	7	47	5	13
Wildfire	1	20	10	45	6	17	1	33	7	1	19	30	10
Coastal flood	22	14	11	25	23	1	20	38	10	30	38	12	13
Fluvial flood	15	17	36	22	8	20	12	21	15	6	11	9	15
Pluvial flood	39	28	28	35	29	29	31	38	19	27	24	20	23
Tropical cyclone	1	1	11	4	1	1	1	4	34	1	1	3	2

Note: The Exposure Score derived by S&P Global Sustainable1 represents the relative intensity of climate hazards at a given location, normalised on a 1–100 scale against a global distribution of hazard severity. At the country level, this score reflects the average hazard exposure across all locations (defined at a uniform grid resolution within that country). A higher score indicates greater relative exposure compared to the global baseline. Modelling is based on a Medium climate change scenario (SSP2-4.5), which sees global temperatures rising by 2.1-3.5°C by 2100. **a** Excluding Timor-Leste. **Source:** CIIP analysis, S&P Global Sustainable1; **1** Asian Development Bank Institute (2021): Bracing for the Typhoon: Climate Change and Sovereign Risk in Southeast Asia.

Increasingly frequent climate-induced extreme weather disasters have created significant losses in SEA

From 1993 – 2018, SEA countries and their combined population of 622 million experienced **direct economic losses from weather-related events worth US$124 billion** (US$5.2 billion p.a.).[1]

By the 2050s, SEA, India and China face simultaneous accumulation of high exposure across chronic, acute, and transitional hazards

Chronic heat is expected to rise dramatically. Extreme heat transitions from low exposure in the 2020s to high or very high levels (scores of 70–90+) by the 2050s across nearly all SEA economies.

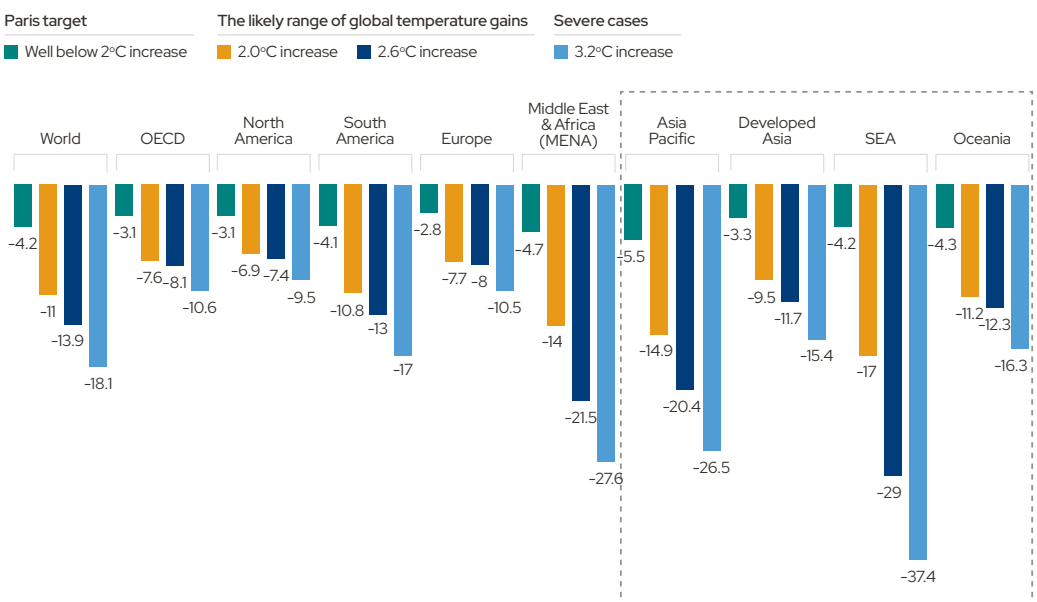
Flood hazards begin as acute, but with increasing frequency, have the potential to become structurally embedded. The interval between flooding events can compress from decades to years, meaning what was priced as a discrete shock becomes a quasi-baseline condition.

These are compounding, not additive, risks. Chronic heat erodes adaptive capacity at the same time acute events arrive more frequently, producing outcomes that exceed single-hazard model predictions. Exposure is structural, so hazards must be addressed collectively through a systems approach.

This will translate into significant GDP losses, especially for SEA...

SEA could lose up to 17% of GDP by 2050 if temperatures rise by 2°C, the highest globally

Figure 22. Estimated impact of rising temperatures on GDP (in terms of %), relative to a world without climate change[1]



17%

of GDP could be lost in Southeast Asia by 2050 under a 2°C warming scenario due to the collective effect of climate change on agriculture, tourism, energy demand, labour productivity, human health, and ecosystems.[2] Significant losses are projected for Indonesia (17%), Malaysia (22%), and Singapore and Thailand (20% each)[3]

US$2.8–4.7T

of GDP in Asia will be at risk annually by 2050 from effective loss of outdoor working hours due to **increased heat and humidity** – accounting for more than two-thirds of total annual global GDP impact[3]

Source: Adapted by CIIP from graph published by World Economic Forum (2023): Accelerating Asia's Advantage: A Guide to Corporate Climate Action, based on data from Swiss Re Institute (2021): The economics of climate change: no action is not an option, April 2021, Centre for Impact Investing and Practices (2025): Transforming for Sustainability: Driving Impact and Value through Supply Chain Action. **1** Centre for Impact Investing and Practices (2025): Transforming for Sustainability: Driving Impact and Value through Supply Chain Action; **2** Asian Development Bank (2024): Asian Economic Integration Report 2024: Decarbonizing Global Value Chains; **3** McKinsey Global Institute (2020): Climate risk and response in Asia.

...and cause persistent erosion of adaptive capacity over time, as societies and economies face compounding risks

The multidimensional and multilayered nature of climate risks means that chronic and acute hazards must be addressed collectively through a systems approach

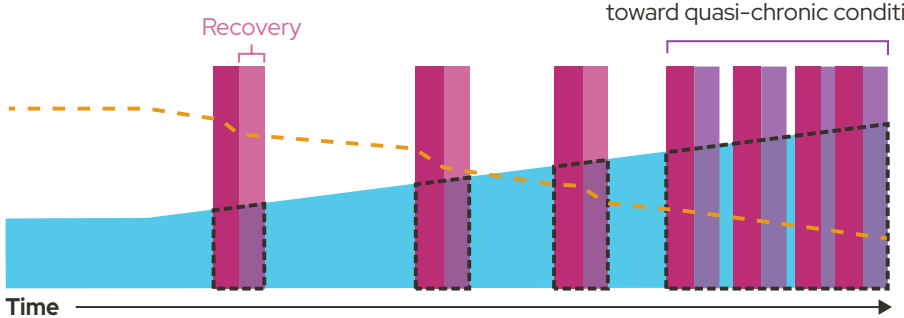
Illustrative

Adaptive capacity
Erodes over time as chronic and acute hazards occur

Chronic hazards
Increasing magnitude and elevated baselines

Acute hazards
Increasing in frequency, shortening duration between recovery

Compound risks: Interaction between acute and chronic physical climate hazards



Acute hazards become more frequent such that recovery periods overlap with subsequent episodes. This leads to **transitional hazards**, where acute hazards begin converting toward quasi-chronic conditions.

Some National Adaptation Plans (NAPs) are in place across the region

Country	NAP publication year	National adaptive capacity (0-1)	Adaptive capacity global ranking	Agriculture & allied sectors	Disaster management	Ecosystems & biodiversity	Energy	Health	Industry & commerce	Infrastructure	Social systems	Water
Brunei	2025	0.580	116	✓		✓		✓	✓	✓	✓	✓
Cambodia	2021	0.682	141	✓	✓	✓	✓	✓	✓	✓	✓	✓
China	2022[a]	0.424	52	✓	✓			✓	✓	✓		✓
India	–[b]	0.562	106	✓	✓		✓	✓				✓
Indonesia	2022	0.530	91	✓	✓	✓	✓			✓		✓
Lao PDR	2025	0.701	149	✓		✓	✓	✓	✓	✓	✓	✓
Malaysia	**2026**[c]	0.420	50	✓		✓		✓		✓		✓
Myanmar	**2012**[d]	0.666	136	✓	✓	✓	✓	✓		✓		✓
The Philippines	2024	0.506	84	✓		✓		✓			✓	✓
Singapore	**2027**[e]	0.307	24	✓	✓	✓		✓		✓		✓
Thailand	2018	0.476	50	✓		✓		✓	✓			✓
Timor-Leste	2020	-	-		✓	✓					✓	
Vietnam	2024	0.521	88	✓	✓	✓		✓	✓	✓	✓	✓

Across Asia, there are varying levels of readiness, with NAPs largely targeting action towards **Agriculture (Food security), Water, and Ecosystems** interventions

Notes: a China has published the National Climate Change Adaptation Strategy 2035 (2022), which replaces an earlier strategy that covered the years 2013-2020; **b** India priorities derived from India's Economic Survey 2025/26; **c** Malaysia NAP to be released in 2026, but initial priorities have been shared in UNFCC 2025; **d** Myanmar published a National Plan of Adaptation Action in 2012 and has implemented adaptation projects since then, but no new plans released subsequently; **e** Singapore's inaugural NAP to be released in 2027, with heat resilience under Health and Infrastructure being key priority announced in 2026. **Source:** Brunei NAP (2025); Cambodia NAP (2021); Indonesia NAP (2022); Lao PDR NAP (2025); Philippines NAP (2024); Thailand NAP (2018); Vietnam NAP (2024); Timor-Leste NAP (2020); CIIP analyses; United Nations Framework Convention on Climate Change (UNFCC). Adaptive capacity based on ND-GAIN Country Index's ranking of 177 countries; Indiplomacy News (2026): Singapore declares 2026 the year of climate adaptation to prepare for future climate risks.

Listed companies globally face >US$1.3T annual physical asset costs by 2030s; US$336B borne by companies with HQ in Asia

Global annual costs to physical assets of publicly listed companies due to climate risks amount to:

>US$1.3T
in the 2030s

>US$1.7T
in the 2050s

>50% of these companies have a material Asian footprint

Asia headquartered (HQ) companies face physical climate costs of:

US$336B
in the 2030s

US$477B
in the 2050s

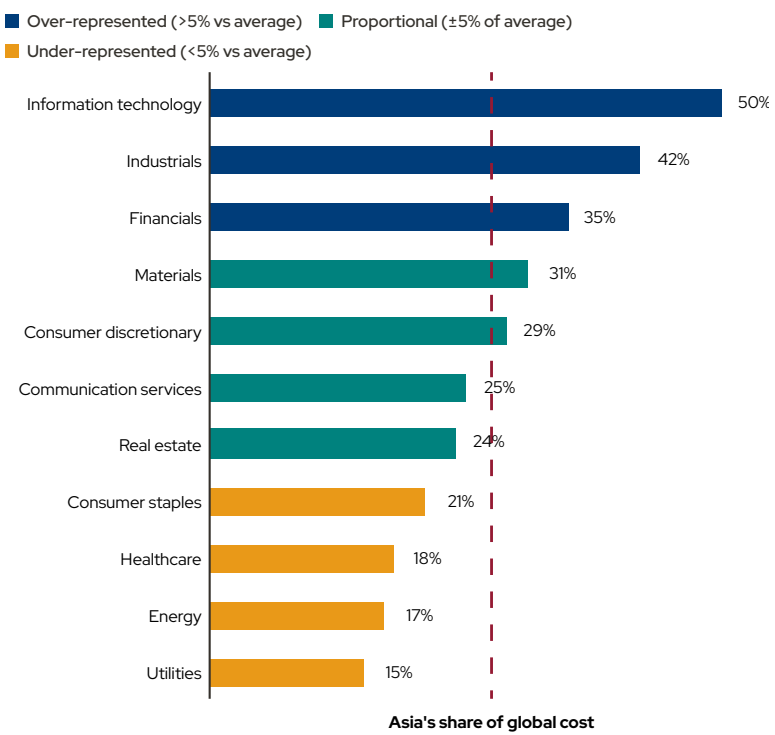
These companies represent:

US$36.0T enterprise value

US$33.5T market capitalisation

US$22.3T annual revenues

Figure 23. Asia share of global physical risk cost



50%
of global physical risk in the IT sector is borne by Asia, concentrated in semiconductor fabrication plants, memory plants, and display facilities, with projected costs rising by 30–80% as a share of Property, Plant, and Equipment (PP&E) by 2050 across the most exposed firms

42%
of global industrials risk is in Asia, concentrated in airlines, railways, ports, shipping, and large construction enterprises, reflecting Asia's development story. Physically fixed assets of such core infrastructure require strong CA&R measures

Asia's lower share in utilities (15%), energy (17%), and healthcare (18%) reflects the scale of US and European megacaps in these sectors' global totals, not lower exposure intensity for Asian firms

Note: a Analysis covers 13,378 companies in the S&P Global Sustainable1 Physical Risk dataset, with data quality of A+ and A. 5,796 are Asia HQ companies. Asia includes Bangladesh, Brunei, Cambodia, China, Chinese Taipei, Hong Kong SAR, India, Indonesia, Japan, Lao PDR, Macao SAR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Thailand, and Vietnam. Material Asian footprint is defined as companies with >10% of asset count within Asia; **b** Modelling is based on a Medium climate change scenario (SSP2-4.5), which sees global temperatures rising by 2.1-3.5 °C by 2100; **c** Physical asset cost is derived as a function of S&P's modelled Financial Impact and a company's property, plant & equipment in today's values; **d** S&P defines financial impact is defined as financial consequences arising from the change in all climate hazard exposure vs a baseline, specific to the asset present at a given location. This is aggregated for all company assets to derive a company-level measure. **Source:** CIIP analyses, S&P Global Sustainable1, Physical Risk dataset.

Yet only a small share of companies are pricing physical risks as part of adaptation planning

> **"Integrating climate risk early into strategy, planning and investment decisions is critical to building resilient cities and infrastructure that remain viable, investable and sustainable over the long term."**
>
> - Farah Naz, Global Climate Advisory Director, SJ Group

Asian companies disclose adaptation plans at **2x** the rate of ROW peers, yet only **1 in 5** Asian companies have estimated the financial implications of physical climate risk, in line with the global average. As a result, Asia's plan-to-estimation gap of **31pp** is the widest of any region globally

Figure 24. Companies with adaptation plans and have also estimated financial implications (Asia vs. Rest-of-world)

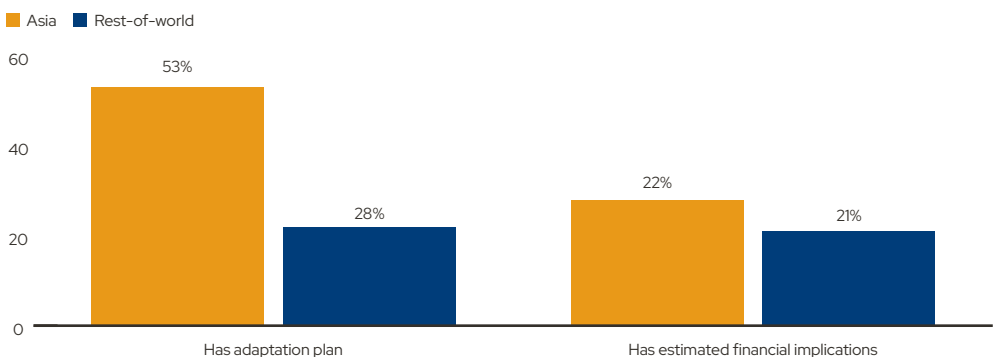
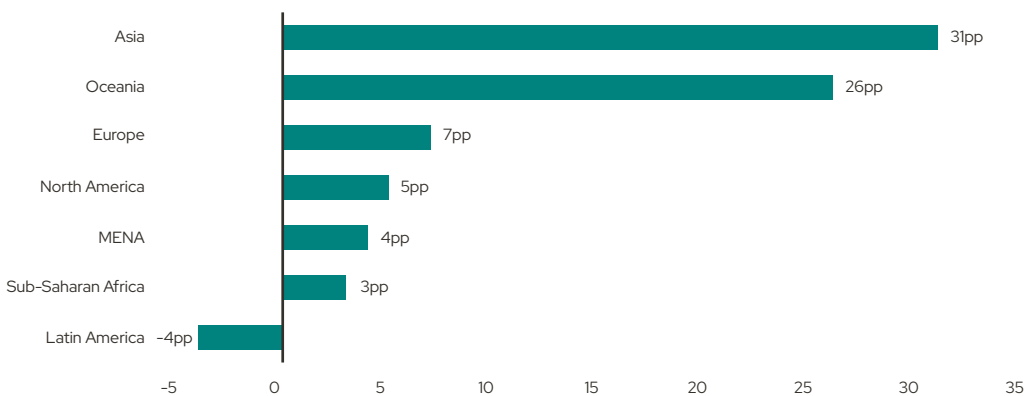


Figure 25. Gap in percentage points (pp) between the share of companies with adaptation plans and those that have also estimated financial impacts[a]



Adaptation plan disclosure and estimation of financial cost of physical risks measure different things:

- Adaptation plans globally may be high-level and **may not adequately price in physical risks,** requiring more work across stakeholders to quantify financial implications of physical climate risks
- The plan-to-estimation gap (adaptation plan rate minus estimation rate) reflects disclosure practice, where **sustainability disclosure frameworks encourage adaptation planning but do not prescribe methods for pricing climate risks**

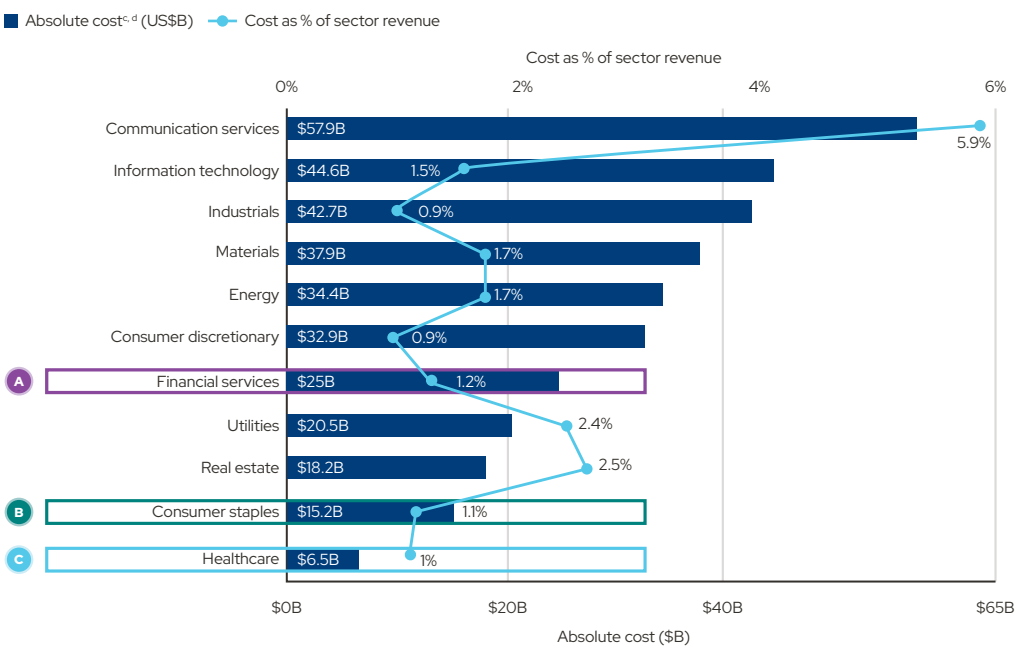
For Asian companies, improved climate risk data, coupled with more robust assessment of the cost of material physical risks, should enable corporates to develop stronger adaptation plans. Capital can support the technical work that makes pricing possible at the company level.

Note: a Gap = % of firms with disclosed adaptation plan minus % of firms with estimated financial implications. Regions with n < 100 omitted (Eastern Europe, n = 51). "Not known" responses included in base. Analysis covers 7,394 of 13,378 companies in the S&P Global Sustainable1 Physical Risk dataset — those for which adaptation plan disclosure data is available, based on a combined questionnaire and public disclosure review. "Not known" responses retained in base. Indicators capture disclosure, not the quality or implementation of plans. Covered companies are not a random sample of the global corporate universe. **Source:** CIIP analyses, S&P Global Sustainable1, ESG Scores Raw Data. Data as of Apr 2026.

Asset damage cost is one physical risk channel; sectors exposed through asset-light channels are likely underpriced, requiring alternative approaches to pricing climate risks

Sector climate cost rankings reflect size of asset base

Figure 26. Annual physical risk cost by sector of Asia HQ companies (2030s),[a] under a Medium climate change scenario[b]



Physical risks are likely underpriced in asset-light sectors

Sectors where **risks run through non asset channels** (i.e., supply chains, inputs, workforce, demand) are likely **systematically under-represented:**

A Financials

Financials face physical risk through their loan and investment portfolios, which is a balance sheet transmission channel. The modelled cost applied to financials' own property underweights this larger, indirect exposure.

B Agriculture and food producers

Agriculture and food producers (embedded within consumer staples in this dataset) face physical risk primarily through input availability, land productivity, and water stress, not through damage to their own corporate assets. An asset-based model is likely to discount underlying production risk, which can translate into revenue shocks that do not appear in the modelled figure.

C Healthcare

Healthcare faces physical risk through demand surges (heat-related admissions, infectious disease patterns), pharmaceutical supply chain disruption, and workforce disruption. Healthcare has the highest mean financial impact (2.4%), reinforcing the relatively high intensity of impact, but a lower absolute cost due to a small asset base.

These sectors require models that incorporate considerations such as demand uplift/destruction, changing input costs, and cost of capital fluctuations, in order to better reflect risk pricing.

Note: a Analysis covers 13,378 companies in the S&P Global Sustainable1 Physical Risk dataset, with data quality of A+ and A. 5,796 are Asia HQ companies; **b** Modelling is based on a Medium climate change scenario (SSP2-4.5), which sees global temperatures rising by 2.1–3.5°C by 2100; **c** Physical asset cost is derived as a function of S&P's modelled Financial Impact and a company's property, plant & equipment in today's values. Examples of assets across sectors include offices, retail buildings, warehouses, power plant, etc; **d** S&P defines financial Impact as financial consequences arising from the change in all climate hazard exposure vs a baseline, specific to the asset present at a given location. This is aggregated for all company assets to derive a company-level measure. **Source:** CIIP analyses, S&P Global Sustainable1, Physical Risk dataset.

Market highlight: Considerations of climate risk in credit quality are nascent but frameworks have already been put in place

Limited impact of climate on ratings today

<1%

of S&P's rating actions since April 2020 globally have **stemmed from physical climate risks,** indicating that such risks have not widely altered the creditworthiness of rated entities.[1]

However, credit rating agencies have identified **key sectors and issuers that face heightened risks,** as well as corresponding **levers and drivers of materiality,** such as issuers' access to **insurance**.

This is expected to grow in future, driven by

- **Increasing frequency of climate events**
- **Inadequate insurance coverage**
- **Limitations of public sector finance**
- **Rising costs of rebuilding**

Market examples

S&P Global Ratings

Framework outlining transmission channels of climate hazards can help navigate credit materiality.[1]

How physical climate risk-related drivers can transmit to potential credit impacts

Credit risk drivers

Physical climate risk	
Chronic climate change	Acute climate hazards

Variation by sector and geography across different climate scenarios

Transmission channels

Invest to upgrade assets	Entry or exit of markets	Tax revenue/ expenses	Standard assets
Changes in pricing/ pass through of costs	Business disruption or downtime	Changes in supply chain	Lost capital

Potential credit impacts

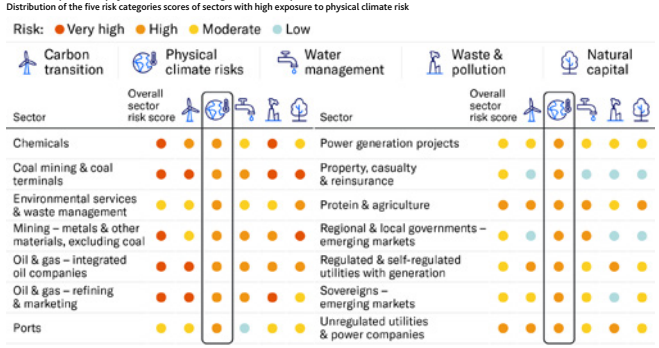
Revenue Demand/volume x price, tariffs/tax revenue, ability to pass on costs	**Costs** Energy, raw materials, carbon taxes, litigations, repairs, subsidies, insurance cover/ premiums	**Capital** Asset valuations	**Funding** Leverage

Source: S&P Global Ratings.

Moody's

14 sectors in rated debt have inherent exposure to physical risks, while considerations pose low risk to credit quality to the remaining 52 sectors.[2]

Inherent exposure to physical climate risk is high across multiple sectors
Distribution of the five risk categories scores of sectors with high exposure to physical climate risk



Source: Moody's Ratings

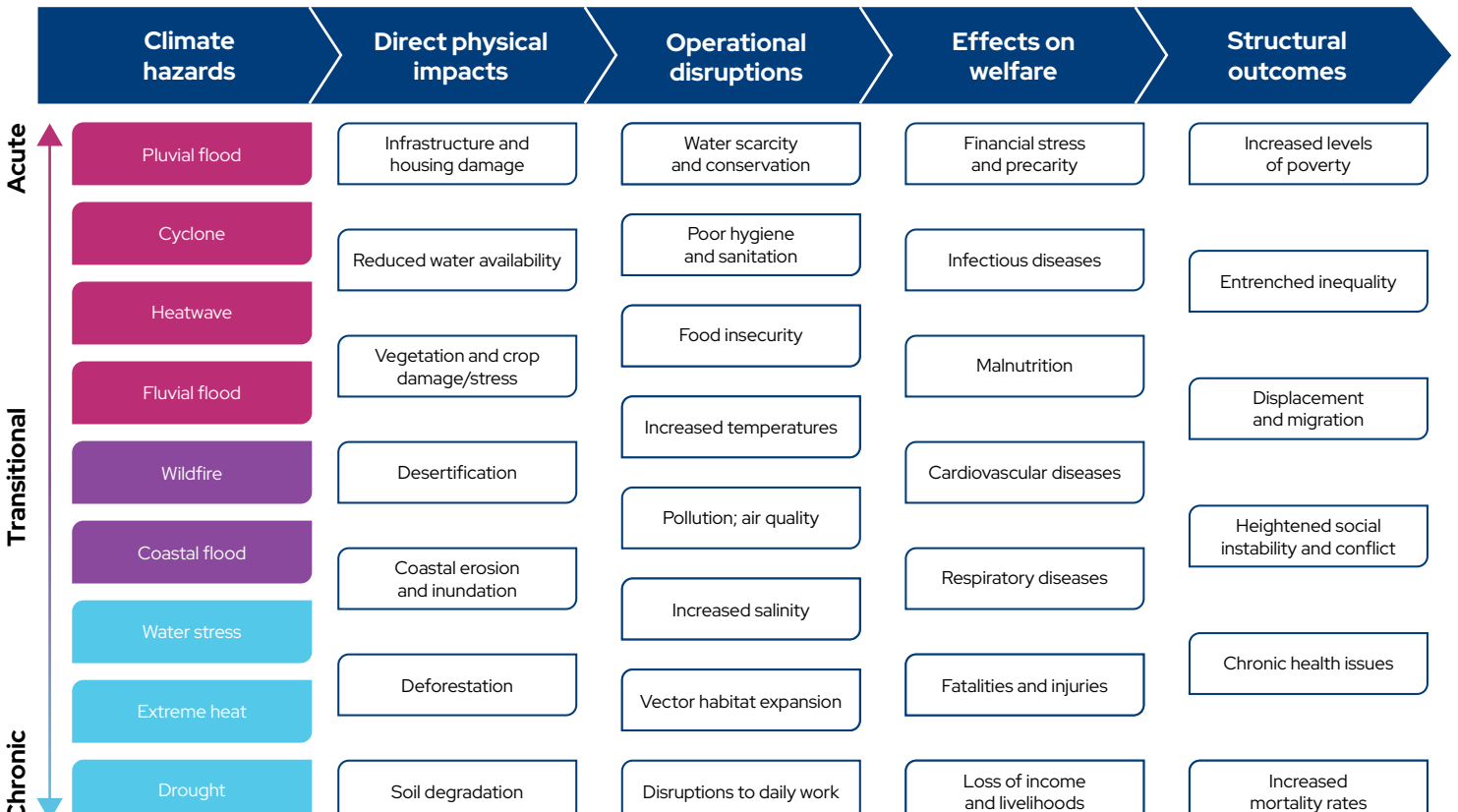
"...in a scenario where extreme weather events become more frequent or severe, limitations on insurance coverage arise, authorities reduce capacity to finance disaster recovery, and rebuilding costs rise, physical climate risks could become more uniformly material to credit ratings."[1]

– S&P Global Ratings Sustainability Insights

Source: 1 S&P Global Ratings. 23 October 2025. Sustainability Insights: The Credit Materiality Of Physical Climate Risks Is Uneven Across Asset Classes; **2** Moody's Ratings.

Ultimately, climate change will have significant human costs...

Illustrative/Non-exhaustive examples



Projected impacts in Asia

467M

people living in acute multidimensional poverty in Asia exposed to concurrent climate hazards, especially in South Asia, as of 2025[2]

88M

internal displacements projected due to climate change across Asia by 2050, a massive scale of climate migration flows[2]

588B

Disability-Adjusted Life Years (DALYs) lost estimated to be from Asia as a result of climate change by 2050[1]

14.5–15.6M

projected deaths in South Asia from climate-sensitive diseases by 2050. These include malnutrition, diarrhoea, and heat-related diseases[4]

Source: 1 Diagram adapted by CIIP from World Economic Forum and Oliver Wyman (2024): Quantifying the Impact of Climate Change on Human Health; DALYs are metrics used by the WHO and other organisations to measure years of life lost to premature mortality associated to a specific cause as well as years of healthy life lost to disability or reduced health; **2** Oxford Poverty & Human Development Initiative and UNDP (2025): Global Multidimensional Poverty Index 2025 – Overlapping Hardships: Poverty and Climate Hazards; Acute multidimensional poverty captures the acute, overlapping deprivations in health, education, and living standards that people in poverty face; **3** World Bank: (2021): Groundswell Part 2: Acting on Internal Climate Migration; **4** World Bank (2024): The Cost of Inaction: Quantifying the Impact of Climate Change on Health in Low- and Middle-Income Countries.

...with disproportionate impact on vulnerable populations

Vulnerability clusters around certain groups of people based on exposure, sensitivity, and adaptive capacity

NAPs in the region consistently identify certain groups as vulnerable based on:

Occupational exposure:
- Smallholder farmers & fishers
- Informal workers & outdoor labourers

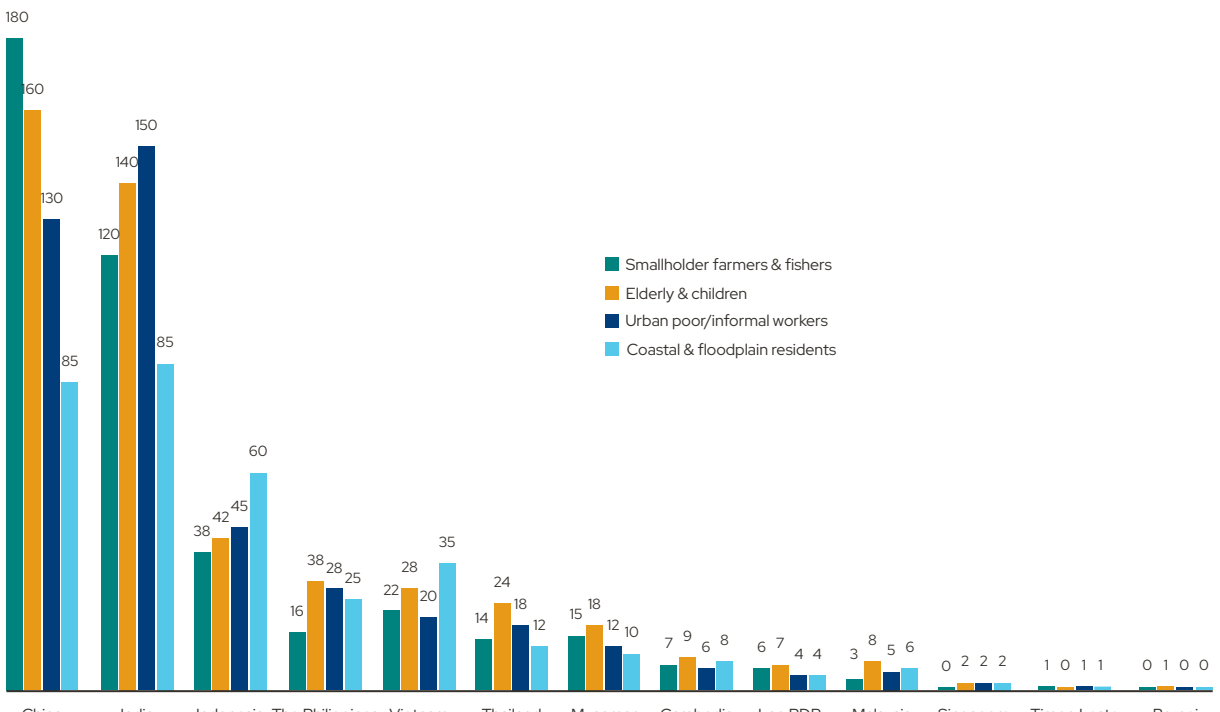
Geographic exposure:
- Drought-prone rural populations
- Coastal and floodplain residents

Socio-economic status:
- Low-income households
- Urban slum communities / poor
- Informal or gig workers

Demographic sensitivity:
- Children and infants
- Elderly populations

Exposure to hazards varies by vulnerable group

Figure 27. Indicative exposure to hazards, by country & vulnerable groups
Million people (2024); groups may overlap, estimates from 2024–2025



Note: Figures are indicative and non-additive. Estimates triangulated from IPCC AR6 WGII, World Bank Climate Knowledge Portal, WRI Aqueduct, World Bank, Statista, FAO, ILO, and UN DESA. **Source:** Dalberg analyses.

This underscores the need to bolster and address financial service gaps faced by many in the region

Financial service gaps remain across Asia

135M

people in Asia still live in extreme poverty

This is an estimated 3.2% of the region's population, based on US$3 a day in 2021 purchasing power parity.[1]

80%

of adults in the region do not have formal credit access

223 million adults in SEA do not have bank or mobile money accounts and 421 million of adults without formal credit access.[2]

3%

insurance penetration rate in SEA

Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam represent 99% of insurance premiums in SEA insurance market.[3]

40M

MSMEs in SEA underbanked

40 million out of 70 million MSMEs in the region face funding issues with huge 'missing middle' needs, estimated to be as much as US$300 billion.[4]

Key challenges to be addressed[5]

Inaccessibility due to geographical spread and infrastructure gaps: Long distances from financial services providers and shallow mobile or data coverage.

Inaccessibility due to data and KYC issues: Resulting from poor coverage from national identification systems and credit bureaus.

High prices and unaffordability of products due to perceived customer risk: Stemming from a lack of or poor credit history, a lack of collateral, and irregular financial record-keeping.

Uneven digital and financial literacy: Lack of basic understanding of bank accounts and mobile usage, cultural barriers to adoption (e.g., reliance on cash, mistrust of financial institutions), lack of familiarity with financial products such as credit and insurance, and susceptibility to fraud and scams.

Gender norms and barriers: Lack of confidence and agency among women customers and lower mobile ownership by women.

Financial exclusion across individuals and MSMEs lead directly to **increased climate exposure and vulnerability,** with constraints in their ability to **prevent, prepare for, respond to, and recover from climate-induced shocks and damages.**

Addressing financial inclusion challenges in the region will require **engagement from across the spectrum of capital,** in addition to ongoing efforts by governments to improve inclusion through improved national identification and credit bureau databases.

Impact investors can help financial service provider investees in developing strategies to reach **rural, women, and low-income customers** and **develop a more holistic suite of financial and business services beyond credit.**

Philanthropists can also play a key role in supporting the development of **targeted financial and digital literacy initiatives,** This can take the form of grants for **educational programmes, technical assistance, and financial inclusion advocacy.**

Source: 1 Asian Development Blog (2025): Your Questions Answered: How Many People in Asia and the Pacific are Poor?; **2** CIIP analysis; data from World Bank (2025): The Global Findex Database 2025: Connectivity and Financial Inclusion in the Digital Economy; **3** Prudential (2025/26): Beyond Coverage: The Social and Economic Impact of Insurance in ASEAN; **4** SME Finance Forum (2025): MSME Finance Gap; **5** CIIP (2023): Financial Inclusion in Post-COVID Southeast Asia: Accelerating Impact beyond Access.

Market highlight: There are already examples of the market starting to price in climate risks

In the United States (US), **insurance prices are rising in high climate risk areas** and **property markets are strongest where climate risks are lowest.**

42% of US counties face high climate risk and increasing insurance rates. **Insurance costs mirror climate exposure,** and higher premiums can eventually dampen property demand and valuations.

4% of counties nationwide qualify as 'hot' markets, of which three-quarters fall below the national median for climate risk. **Emerging climate havens** suggest some homebuyers may already factor in climate exposure when choosing where to live.

This illustrates how climate-related costs ripple across the public sector (municipalities), private sector (private insurers), and societies (homeowners).

Figure 28. Relative natural hazard risk compared to change in insurance prices 2018-2022

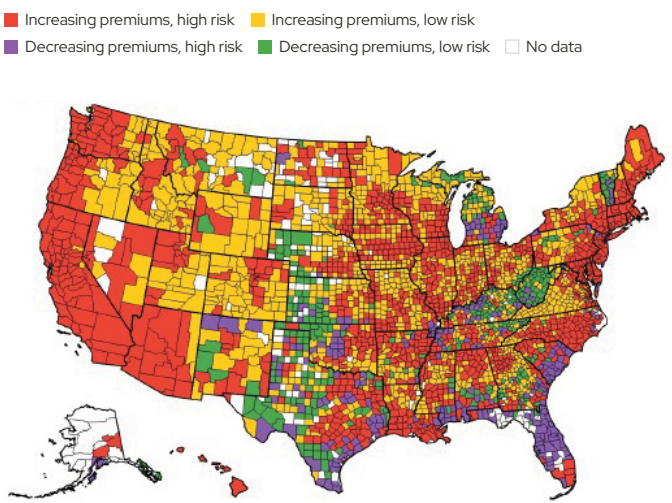
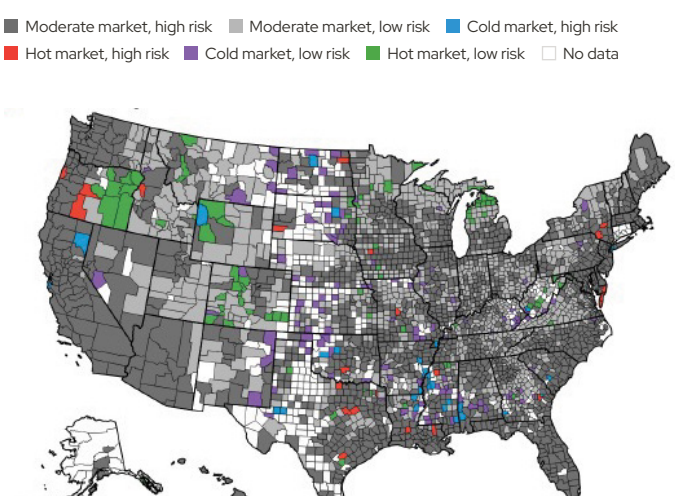


Figure 29. Property value change 2020-2040 compared to relative natural hazard risk



Climate stress can cascade from households to municipal balance sheets through rising insurance costs, fluctuating property values, and real estate-based tax revenues.

City and county finances, therefore, have become more vulnerable to climate risks, which can **ripple through municipal bond markets.**

Downward pressure on **real estate prices** could accumulate where **insurance premiums rise** drastically. California, Florida, and New York have several zip codes where premiums rose 10% or more each year between 2018-2022. These states experience recurrent climate risks and, not coincidentally, have seen some **private insurers exit altogether.**

Note: Hot markets are those with price changes 50% more than the statewide average. Cold markets are those with price changes less than 50% of statewide average. **Source: 1** BloombergNEF (2026): Climate Risk and US Municipal Finances: Storm Ahead? Mapping county-level vulnerability.

The complex journey of climate impacts can result in overlooked and underpriced risks across public and private sectors as well as social and human costs

Transmission mechanisms for physical risks are contextual and specific. It is important for decision makers to understand and identify specific dimensions and scales of costs to effectively price risk. Here we outline an illustrative impact pathway for climate risks and associated costs:

			Indirect impacts		
	Hazard exposure	**Direct physical impacts**	**Operational disruptions**	**Economic and welfare impact**	**Structural outcomes**
	Climate-related hazard events and the economic assets or systems exposed to their effects	First-order damage to physical assets, land, natural systems, and environment caused directly by the hazard	Second-order interruptions resulting in impairment of daily life, workforce, and supply chains across communities, firms, and public institutions	Economic and wellbeing impacts caused by operational and functional disruptions	Macroeconomic instability, dislocations in capital markets, and systemic effects on societies driven by realised or anticipated physical risk
		Examples of associated costs			
Public sector (A)	• Public infrastructure (roads, utilities, flood defences) • Public buildings & facilities • Public service delivery capacity	• Damage to public infrastructure and assets • Immediate rescue and recovery costs • Disruption to essential service delivery	• Replacement and damage control of public infrastructure and services • Relief and livelihood support	• Increased public expenditure on reconstruction • Erosion of tax revenues from affected areas • Rise of national debt levels	• Sovereign credit risk repricing • Rising cost of government borrowing • Long-term drag on productivity
Private industry (B)	• Physical assets and productive capital • Operations, revenue streams and earnings capacity • Supply chain networks	• Physical damage to facilities • Disruption to production • Loss of physical asset value (write downs) • Insurance payouts	• Reduction or loss of productivity • Supply chain disruption • Loss of demand from certain segments of customers	• Earning impairments • Increased input and distribution costs • Balance sheet deterioration • Deteriorating creditworthiness	• Valuation impairment • Stranded asset risk • Rising Weighted Average Cost of Capital (WACC) • Erosion of investor confidence
Communities (C)	• Homes and residential property • Human health and safety • Food and water access	• Physical damage to homes • Direct harm to human health & safety • Loss and damage of shelter	• Loss of access to essential services and livelihoods • Food and water insecurity • Forced displacement and loss of community	• Loss of household income • Out-of-pocket recovery and health costs • Reduction in insurance affordability or availability	• Withdrawal of insurance coverage from high-risk areas • Persistent reduction in human capital and local economic activity

Pricing climate risks: Key challenges and what needs to change

		What can be done today?	
	Challenges pricing climate risks	**Respond now: achieve near-term outcomes**	**Prepare for the future: enable systemic change**
Pricing today's risk: Physical risks are localised and top-down models miss context	**Data gap** Granular, local risk data is scarce. Top-down models rely on averaged assumptions, masking variation in exposure and adaptive capacity.	• **Start with geography and value chain** – define hazard exposure and impact drivers before modelling • **Counterfactuals and empirical data** to ground additionality claims and understand true costs of inaction	• **Localised, open-access physical risk datasets** to enable pricing at country and sub-regional scale *This can be led by local or regional governments, with philanthropic support*
Pricing tomorrow's risks: Scenario tools exist but lack sector and value chain specificity	**Model limitations** Non-linearity of long-run climate change makes forward cost curves very hard to model. Most scenarios use global averages with no sector view. Various available risk pricing models today **lack a convergence in estimated outcomes, dampening market confidence** in underlying climate and market data.	• **Align on impact pathways and scenario assumptions upfront,** rather than defaulting to off-the-shelf temperature scenarios • **Map supply chain concentration vs diversification** as a proxy for resilience before overlaying climate hazards • **Develop and refresh house-views** on forward looking climate risks	• **Sector-specific, value-chain-aware scenario frameworks** that go beyond temperature pathways • **Intentional and purpose-fit modelling** that supports pathfinding for investors, as opposed to predictive forecasts *These will require collaboration across private sector actors (e.g., industry groups), with government support*
Time horizon mismatch: Markets price in months while climate risks play out over decades	**Structural barriers** Market pricing signals are short-term. Long-term physical risks don't register in credit or equity valuations until they become acute. As the frequency and severity of climate events increases, the distinction between long-term and near-term risk narrows, and climate risks can arrive within the investment horizon.	• **Right-priced, right-sized, and right-timed** interventions – matched to the type and tenor of capital deployed • **Patient, concessional capital** directed toward price discovery and proof points that attract commercial investors later	• **Mandatory long-horizon climate disclosure** and regulatory signals to force market repricing of physical risk • **Standardised long-term risk pricing benchmarks** across asset classes *Such interventions can benefit from strong public-private partnerships to build a common understanding of best-practice*

"Physical climate risks are difficult to quantify and price, reflecting uncertainty in hazard pathways, persistent data gaps and inconsistency across modelling approaches. As Chair of the Adaptation Finance Innovation Hub at Standard Chartered and the Climate Financial Risk Forum Adaptation Working Group, we engaged extensively with a broad range of stakeholders to improve the use of data, scenario analysis and practical frameworks for integrating physical climate risks into financial decision-making."

- Alexander Kennedy, Managing Director, Head of Sustainable Finance Solutions and Chair of Adaptation Finance Innovation Hub, Standard Chartered Bank

At the same time, there is a strong business case for investing in CA&R

Direct commercial value drivers of CA&R

Generating upside

- New market opportunities and revenue streams due to evolving resilience needs[1]
- Global annual revenues expected to grow from ~US$1 trillion today to ~US$4 trillion by 2050 under current policies and 2.7°C warming scenario[2]
- Businesses investing in adaptation gain competitive advantage as extreme events intensify and expose less-prepared competitors[3]

Reducing costs

- Adaptation improves operational efficiency[4]
- Optimises resource allocation, enabling cost savings[5]

Mitigating risk

- Climate risk management reduces vulnerability and strengthens operational resilience[6]

Valuing dividends further strengthens the business case for CA&R

3 additional dividends generated from CA&R investments
under the triple dividend framework[5]

Avoided losses: avoided or reduced injuries, illnesses, mortality, and infrastructure damages and losses[5]

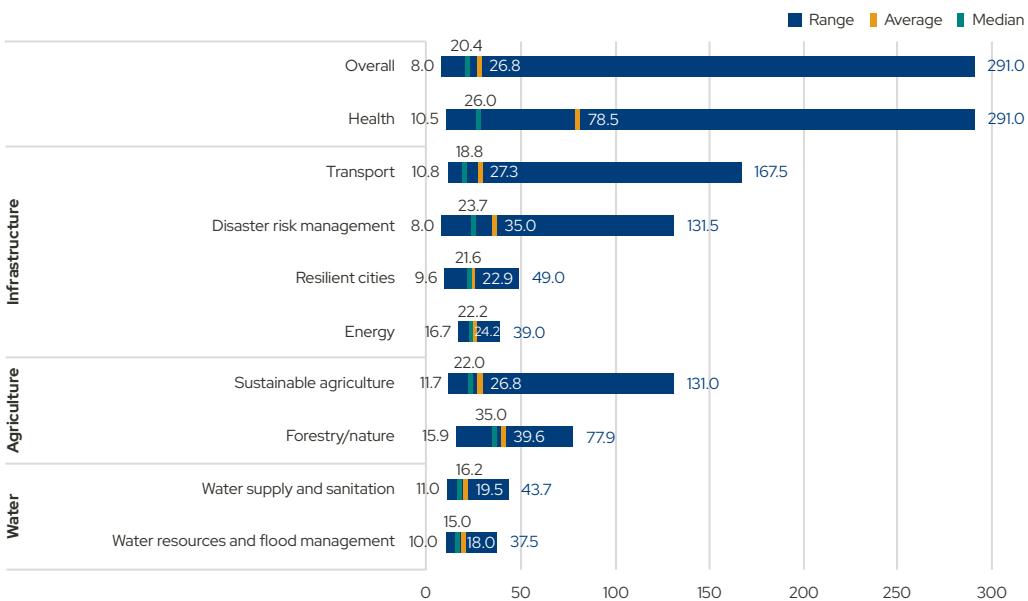
Induced economic benefits: increase in yields, tourism, and reduction of maintenance costs[5]

Social and environmental benefits: reduction of carbon emissions, increase in biodiversity, and improvements in well-being and health outcomes[5]

Realising the full value of CA&R will require both private market innovation and systemic policy reform

26.8% average economic internal rate of return (EIRR)
or 20.3% median across all subsectors based on the triple dividends framework[5]

Figure 30. EIRR (%) of adaptation investments by sector and subsector



EIRRs are calculated using monetised benefits from the three dividends and are likely underestimated, as many of such benefits were not monetised.[5]

Note: a Benefits listed are non-exhaustive. **Source: 1** BCG (2025): The Private Equity Opportunity in Climate Adaptation and Resilience; World Business Council for Sustainable Development (2024): Business Leaders Guide to Climate Adaptation and Resilience; World Business Council for Sustainable Development (2025): Adaptation planning for business: Navigating uncertainty to build long-term resilience; **2** GIC (2025): Sizing the Inevitable Investment Opportunity: Climate Adaptation; **3** World Economic Forum (2024): The Cost of Inaction: A CEO Guide to Navigating Climate Risk; **4** World Economic Forum (2025): Climate Adaptation: Unlocking Value Chains with the Power of Technology; **5** World Resources Institute (2025): Strengthening the Investment Case for Climate Adaptation: A Triple Dividend Approach; **6** World Economic Forum (2024): Business on the Edge: Building Industry Resilience to Climate Hazards; S&P Global (2025): Physical climate risk adaptation: Are businesses doing enough to adapt to physical hazards?; JP Morgan (2025): Climate adaptation: How investors can participate in evolving investment opportunities as cities adapt to climate risks.

Mapping climate impacts to commercial value drivers is a crucial first step to avoiding losses and capturing value

Illustrative

	Commercial driver	Linkage to impact	Project examples
Generating upside	Premium pricing for certified-resilient assets	Rental and valuation uplift, lower vacancy rates, stronger buyer and tenant demand	Climate-smart certified agricultural products, flood-proofed logistics and warehousing
	New market and customer segments	New revenue from resilience-linked products and services	Heat- and flood-tolerant seed varieties, climate risk analytics and advisory, adaptation-focused agritech platforms
Reducing costs	Physical asset protection from acute events	Reduced damage and replacement costs, lower post-event downtime, preserved asset useful life	Asset retrofit and elevation for industrial and logistics facilities, storm-hardened utility infrastructure
	Workforce productivity protection, e.g., under chronic heat	Maintained labour output, reduced heat-related absenteeism and occupational injury, lower turnover costs	On-site cooling and heat safety, shift rescheduling in outdoor-intensive sectors, workplace heat monitoring systems
	Reducing cost of capital	Improved investor confidence and risk perception, tighter credit spreads; access to broader capital pools	CA&R-labelled use-of-proceeds Green, Social, and Sustainability (GSS) bonds, sustainability-linked loans with adaptation KPIs
Mitigating risk	Business continuity and supply chain resilience	Faster post-event recovery, reduced revenue interruption, lower inventory write-offs, and contractual penalties	Parametric weather crop insurance, climate-resilient input sourcing and inventory buffers
	Maintained insurability as the protection gap widens	Continued access to insurance at viable premiums, lower self-insurance burden as underwriters retreat from unprotected exposures	Risk-reduction investment tied to insurance retention, innovative risk-transfer structures in underpenetrated markets
	Regulatory positioning ahead of tightening adaptation mandates	Preserved licence and ability to operate in high-risk zones, reduced unplanned compliance costs	Early alignment with policy shifts in areas such as building codes, land-use planning, labour-heat safety rules, etc.

Source: Invesco analysis.

Case study examples: There is opportunity for existing businesses to address evolving climate risks

	Incumbent businesses and corporates			
Company	**Airport Authority Hong Kong[a]**	**Danone Group**	**ECOM Agroindustrial[a]**	**SJ Group[a]**
Year established	1995	1919	1849	2015
Geography	Hong Kong SAR	France	Global	Singapore
Annual recurring revenue (ARR)	US$2B (HK$16B)	US$32.1B (€27.3B)	Not publicly disclosed	Not publicly disclosed
Sector	Infrastructure	Agriculture and allied sectors	Agriculture and allied sectors	Infrastructure
CA&R business model	A statutory body implementing a comprehensive climate adaptation strategy for resilient infrastructure design, asset hardening, and long-term operational planning for an airport	A global food and beverage (F&B) company focused on essential dairy and plant-based products, waters, and specialised nutrition, promoting farming practices that boost soil health, enhance water management, and foster biodiversity	A global commodity trading and processing company enhancing CA&R through initiatives in agroforestry, climate-resilient crops, soil health, and partnerships	A global urban, infrastructure, and managed services consulting firm providing upstream climate advisory supporting strategy, policy, planning and investment decisions for cities
Commercial driver	Reduced disruption to cargo and passenger traffic, as well as damages to infrastructure and aviation assets	Improved supply chain resilience, access to quality inputs, and adopting practices such as agroforestry, regenerative agriculture, and soil conversation	Farmer income diversification, improved farm resilience, and improved yields for farmers	Addressing climate risks early through climate risk intelligence modelling, providing actionable, investment-grade insights, including by leveraging AI
CA&R impact	• Improved infrastructural and operational resilience against climate risks	• Increased agricultural resilience (yield and output)	• Increased agricultural resilience (yield and output)	• Improved climate resilience across urban and infrastructure systems • More targeted investments to prioritise system-wide resilience
Mitigation impact	• Improved long-term performance	• Reduced carbon and methane emissions by decarbonising sourcing zones and factories	• Increased efficiency, reduced emissions	• Lowered cooling demand and emissions through reducing urban heat island effect • Carbon sequestration and ecological enhancement through nature-based solutions • Enabling progress towards net zero and decarbonisation pathways
Other impact	N/A	• Long-term supply chain resilience and stability	• Long-term supply chain resilience and stability	• Improved long-term social and economic resilience • Enable longer term returns on investment for both climate and people

Note: a These examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP.

Case study examples: Ventures tackling climate risks are also emerging

	New ventures			
Company	**AiDash**	**Epoch**	**GRST and SOLshare[a]**	**Kilimo[a]**
Year established	2019	2023	2015 and 2014	2014
Geography	North America, Europe, ANZ	Global	Asia, expanding globally	North and South America, Asia expansion
Maturity	Series C	Series A	Series A	Series A
Sector	Infrastructure	Agriculture and allied sectors	Energy	Water
Solution category	Remote infrastructure inspection and monitoring software for climate resilience	Real-time supply chain visibility platforms	Off-grid renewable energy/battery energy storage systems (BESS) for critical community services	Water-as-a-Service for efficient water management
CA&R business model	A SaaS company leveraging satellite imagery, AI, and multispectral data, to help the utility, energy, and transportation sectors manage, monitor, and maintain infrastructure in the face of increasing climate-related disasters	A technology company providing first-mile data infrastructure for agricultural and forestry supply chains, including deforestation, carbon emissions, and water usage at the farm plot level	A joint initiative to replace toxic lead-acid batteries with sustainable lithium-ion batteries for rickshaws in Bangladesh, aggregating excess energy in backup grids	A software-based solution improving water efficiency in watersheds through irrigation management, infrastructure upgrades, conservation contracts, and regenerative agriculture
Commercial driver	Improved energy reliability and improved operational efficiency for utilities providers	Improved first-mile intelligence for managing sustainability and supply chain risk	Increase in driver profits through shorter charging times and more efficient charging leading to less electricity consumption	Corporates seeking to invest in water security within their operational watersheds by supporting local farmers capable of saving water
CA&R impact	• Improved supply chain risk management • Improved climate data transparency	• Increased agricultural resilience (yield and output)	• Increased energy stored in backup grids • Improved livelihoods for farmers through increased profits	• Improved water efficiency and management • Direct economic contributions to improve farmer performance
Mitigation impact	• Improved carbon and biodiversity management • Improved operational efficiency	• Carbon emission reductions and removals	• Reduced soil, air, and water pollution through replacing toxic lead batteries • Reduced carbon dioxide emissions	• Promoting sustainable farming practices that reduce GHG emissions and enhance carbon sequestration in the soil
Other impact	• Faster remote inspections	• Carbon premiums for smallholder farmers	• More efficient payments and financing through SOLshare's platform	• Improved access to training for farmers

Note: a These examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP.

CA&R value capture begins with fully pricing risk and valuing resilience

Mitigating climate risk and capturing value in CA&R

Climate risks are escalating and compounding. SEA faces elevated chronic and acute hazards, creating compounding risks and eroding adaptive capacity. Region demographics like increasing rural-to-urban migration and dense coastal megacities create concentrated exposure while hollowing out climate-sensitive sectors like agriculture.

Yet climate risks remain underpriced. Asia faces potential GDP losses of up to 17% by 2050 under a 2°C scenario, and global physical asset costs are expected to exceed US$1.3T annually by the 2030s.[2] Complex transmission pathways leave risks overlooked across both public and private sectors.

The business case for CA&R is growing. The total addressable CA&R market is projected to reach US$4T by 2050,[3] with demand for CA&R spending of US$0.5T–US$1.3T by 2030.[4] However, **data barriers, limited capital, and limited capacity remain core challenges.**

What can be done today?

Respond now: achieve near-term outcomes

Data and knowledge systems can be strengthened. Forward-looking climate hazard modelling can mirror funder-relevant loss transmission channels. This should include health and human costs of climate risks. Addressing data gaps and inconsistencies can lend confidence to private actors and investors in pricing risk and supporting more robust adaptation planning.

Funders should account for the compression of climate risk into investment-relevant timeframes. More frequent and severe extreme climate events mean physical risks are no longer long-term tail risks, but are materialising within standard business cycles and asset holding periods. Embedding these risks into planning can unlock more timely investment into CA&R.

The universe of CA&R solutions can be better mapped and organised in terms of commercial viability, impact potential, and the capital structures needed to bring them to scale. This should include clear entry points for diverse funders and actors. Underpinning this are financial services, which support funding CA&R and building financial resilience.

Prepare for the future: enable systemic change

Public-good data infrastructure to improve risk modelling and pricing. Localised, open-access physical risk datasets are needed to enable pricing at country and sub-regional scale, and to design incentives that properly value resilience outcomes.

Policy and regulatory frameworks that value avoided losses and resilience outcomes. Policy incentives that reward resilience investment, and standards that weight avoided economic, social, and environmental costs alongside direct returns can encourage market repricing of physical risk.

Capital systems can be designed to unlock financing across the capital spectrum. Blended finance and public–private partnerships can be structured to reallocate risk and crowd in private capital for CA&R. Philanthropic capital can work alongside other forms of capital to play a catalytic role in scaling underfunded solutions and enabling innovation in technologies and business models.

"At Danone Ecosystem we have started to undergo a modelisation process of past technical assistance programmes, starting from dairy and expanding to water. We seek to further aggregate data, confirming climate adaptation and resilience plans actually pay off. As data acquisition is sometimes costly, we welcome collaboration on this, as well as all derisking mechanisms that collective actions can unlock."

- Frédérick Pasquier, Director of Operations, Danone Ecosystem

Source: 1 World Economic Forum (2023): Accelerating Asia's Advantage: A Guide to Corporate Climate Action; Swiss Re Institute (2021): The economics of climate change: no action is not an option; **2** CIIP analyses, S&P Global Sustainable1, Physical Risk dataset. **3** GIC and Bain & Company (2025): Sizing the Inevitable Investment Opportunity: Climate Adaptation. **4** BCG and Temasek (2025): The Private Equity Opportunity in Climate Adaptation and Resilience.

Chapter 2
Identifying opportunities

Prioritising solutions for Asia

Written in collaboration with

Dalberg

To address Asia's critical hazards and needs, the universe of CA&R solutions must be prioritised effectively

Our approach to solution prioritisation is demand-driven and anchored in Asia's most material and recurring climate risks. This chapter's Asia scope includes China, India, and SEA. All analysis is directional.

Key hazards across countries in Asia

Acute hazards:

Fluvial flood
Heatwave
Landslide
Pluvial flood
Tropical cyclone

Transitional hazards:

Coastal floods
Wildfire
Saline intrusion

Chronic hazards:

Drought
Extreme heat
Rainfall variability
Sea level rise
Soil degradation
Water stress

Resulting adaptation needs (non-exhaustive)

- Protecting **food security** and **farmer** livelihoods
- Ensuring reliable **water** availability for households, agriculture, and industry
- Reducing **disaster risk** and improving preparedness and response systems
- Maintaining continuity of critical **infrastructure** and services during shocks
- Protecting **vulnerable populations** (e.g., urban poor, coastal communities) from climate impacts
- Strengthening resilience of **industry** supply chains and economic activity
- Safeguarding **natural ecosystems** that underpin livelihoods

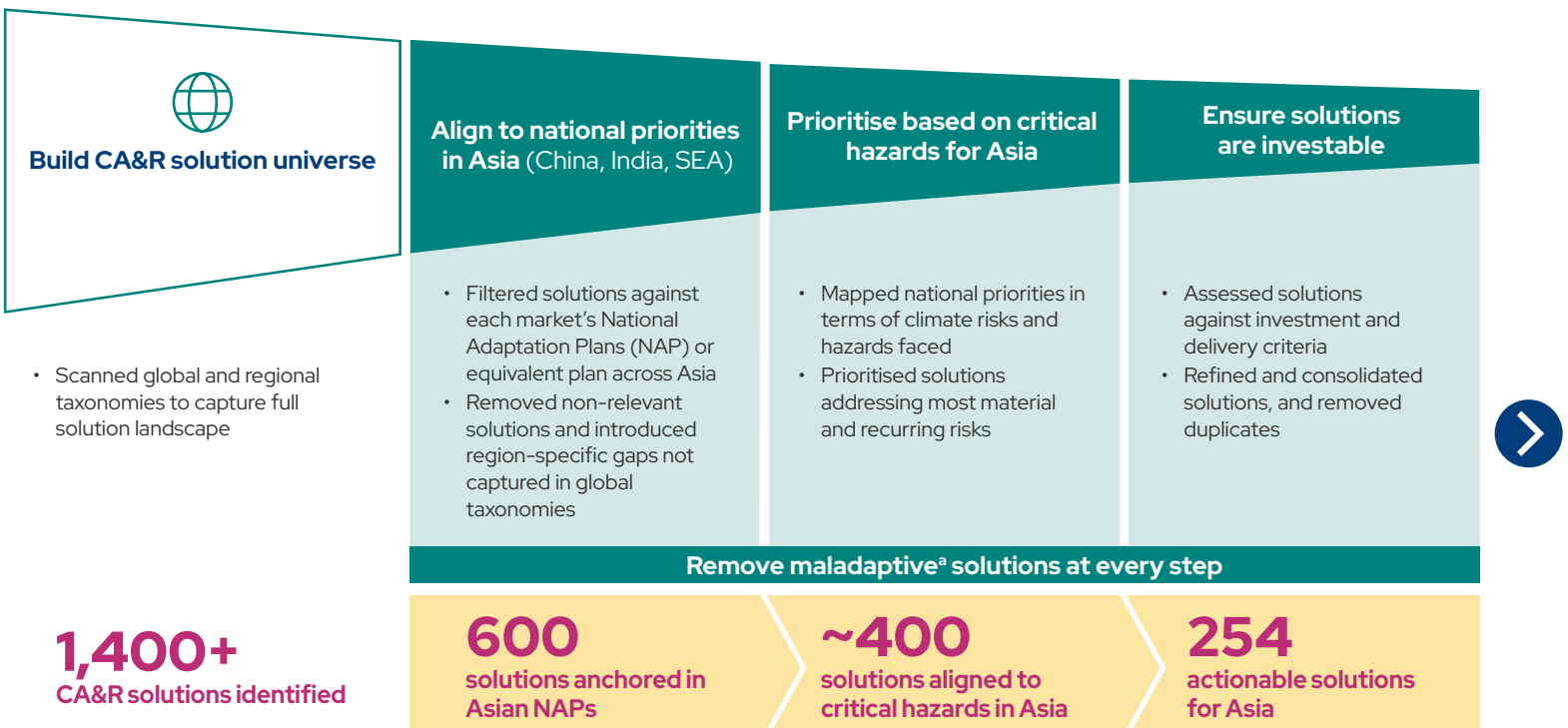
Implications for solution prioritisation

Solutions are prioritised if they:

- Are **relevant for one or more countries** across China, India, and SEA
- Address the region's key **critical hazards and adaptation needs**
- Focus on **top affected sectors** (e.g., infrastructure, agriculture, water)
- Target **vulnerable populations** exposed to these hazards

Source: Dalberg analyses.

Over 1,400 global CA&R solutions assessed based on Asia's climate risks and needs, to identify a set of ~250 priority solutions for the region



Synthesise into an Asian CA&R taxonomy

252

priority CA&R solutions for Asia across 9 key sectors (2 solutions removed from previous stage for maladaptation[a])

- Infrastructure (n=31)
- Agriculture and allied sectors (n=52)
- Water (n=37)
- Ecosystems and biodiversity (n=24)
- Health (n=27)
- Disaster management (n=22)
- Industry and commerce (n=26)
- Social systems (n=20)
- Energy (n=13)[b]

Note: a Maladaptive solutions are interventions that are intended to reduce, prepare for or respond to climate risk but end up increasing vulnerability, shifting risk elsewhere, or creating negative long-term impacts; **b** Energy n=20 if including energy solutions within other sectors. **Source: 1** BCG (2025): The Private Equity Opportunity in Climate Adaptation and Resilience; **2** McKinsey (2025): Climate resilience technology: An inflection point for new investment; **3** Climate Bonds (2025): Resilience Taxonomy; **4** Tailwind (2024): Tailwind Futures Taxonomy for Adaptation and Resilience Investments; **5** UNEP (2025): New white paper lays groundwork for adaptation finance guide supporting ASEAN Taxonomy.

Maladaptive solutions screened out to avoid indirect or unintended risks and harm

Maladaptation: Actions that may lead to increased risk of adverse climate-related outcomes, including via increased GHG emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future. Most often, maladaptation is an unintended consequence[1]

Why screen for maladaptive solutions?

Assessing solutions for maladaptation helps avoid solutions that:

- **Lock in future risk** through short-term fixes
- **Shift exposure** to other geographies or groups
- **Damage ecosystems** that support resilience
- **Create negative long-term resilience,** especially for vulnerable groups

How does maladaptation typically show up?

Common forms of maladaptation include:

- **Risk transfer:** Reducing risk in one place while increasing it elsewhere
- **Lock-in:** Reinforcing systems that are unsustainable under future climate conditions
- **Environmental harm:** Degrading natural systems that buffer climate risks
- **Social exclusion:** Protecting assets or populations unevenly while leaving vulnerable groups exposed

Which solutions were screened out?

Examples of solutions screened out include:

- **Large-scale seawalls for coastal megacities** can increase erosion, damage ecosystems, and lock in hard infrastructure pathways
- **Energy-intensive cooling expansion** reduces heat stress but can increase emissions and system strain
- **Low-cost debt for post-disaster rehabilitation** enables rapid rebuilding but can lock vulnerable populations into debt cycles and recreate exposure to the same risks if rebuilding is not climate-resilient
- **Diesel-powered backup systems** improve continuity but worsen emissions and local air pollution
- **Groundwater for drought response** supports short-term access but undermines long-term water security

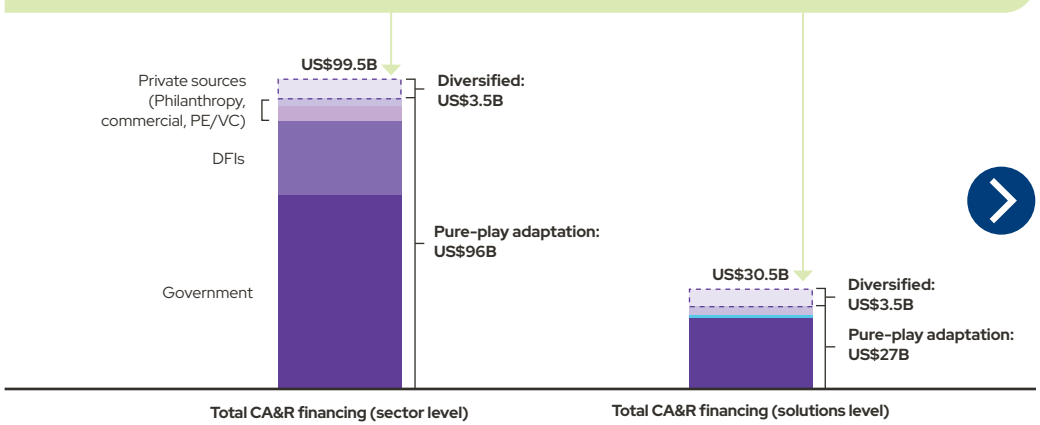
Source: 1 IPCC (2022): AR6 Synthesis Report Glossary: An Introduction; **2** Dalberg analyses.

CA&R financing over the past 5 years was tracked, and each solution was assessed for its impact potential and commercial viability

US$96B in pure-play CA&R finance was tracked between 2021 and 2025 at the sector level; of this US$27B was tracked at the solution level

Figure 31. Global CA&R (tracked) fund flow to Asia
US$B, cumulative between 2021-2025 (Note: 2025 data is partial)

In addition to pure-play funding, **US$3.5B in diversified funding was tracked**[d], i.e., transactions where solutions were provided as part of a portfolio of products not exclusively classified under CA&R. To ensure analytical consistency and minimise attribution challenges, **only pure-play transactions have been used for analyses in this report**



Each of the 250+ solutions was assessed for commercial viability and impact potential, leveraging tracked funding data

Impact potential assesses magnitude and equity of benefits based on four dimensions:[a]

1. **Scale of people impacted based on hazard addressed:**
   - Top ranking solutions address most critical hazards and reach large populations across Asia
2. **Breadth of vulnerable populations impacted**[b]
   - Higher scoring solutions benefit ≥5 vulnerable groups
3. **Depth of change**
   - Higher scores reflect long-term transformational system change[c]
   - Lower scores reflect incremental improvements
4. **Co-benefits**
   - Additional gains/benefits towards other areas (e.g. mitigation, livelihoods) increase impact

Commercial viability refers to a solution's ability to operate sustainably based on market demand or attract commercial capital over time, and is assessed across 3 dimensions:

1. **Technical readiness**
   - High: clear signals of technological maturity and proven deployment
   - Low: early-stage innovation or persistent technical barriers
2. **Operational feasibility**
   - High: supportive policy environment with enabling regulatory and infrastructural conditions for implementation
   - Low: significant policy, regulatory, or infrastructural constraints that hinder deployment
3. **Business model viability**
   - Strong: evidence of market traction with identifiable repeat buyers
   - Weak: reliance on grants or subsidies rather than market-based commercial demand

Note: a Impact potential methodology, built upon the IMP 5 Dimensions of Impact; approach is based on needs identified by markets across Asia and therefore all solutions identified have some significant impact either in terms of scale of impact or positive impact on vulnerable groups; **b** Breadth of coverage was prioritised over depth in this exercise; while some cases may warrant deeper review, overall conclusions have been sense-checked against third-party data and authoritative secondary sources for directional robustness. Vulnerable groups include climate-induced migrants, smallholder and marginal farmers, indigenous populations, informal and gig workers, women, children etc.; **c** Systems change is structural changes that transform systems to reduce or adapt to climate risk over the long-term; **d** If a funded project or deal was predominantly CA&R, all funding was allocated as 'pure-play CA&R' whereas if CA&R formed a minor portion of overall funding or financing, it was tagged as diversified and a 6.4% allocation was taken as CA&R based on CPI (global climate finance flows were US$1.93 trillion, of which US$67 billion is pure-play adaptation, and US$57 billion is dual use; hence assume ~6.4% of diversified is relevant); **Source: 1** Pitchbook (2021-2025); **2** Dalberg analyses.

9 sectors and 33 subsectors with ~250 priority solutions were identified for Asia, with financial services cutting across sectors

Key CA&R sectors in Asia

Solution sub-sectors *(non-exhaustive solution examples)*

Infrastructure	Agriculture & allied sectors	Water	Ecosystems & biodiversity	Health	Disaster management	Industry & commerce	Social systems	Energy
1. **Buildings and settlements** *Climate-resilient building materials* 2. **Transportation** *Climate-adapted rail systems* 3. **Waste** *Climate-resilient landfill leachate management systems* 4. **Information and communications technology (ICT)** *Disaster-resilient telecommunication towers*	5. **Crop production** *Solar-powered irrigation pumps* 6. **Animal production** *Livestock disease surveillance* 7. **Forestry** *Climate-resilient plantations* 8. **Fishing and aquaculture** *Real-time water quality monitoring* 9. **Food systems** *RE-cold rooms*	10. **Water supply infrastructure** *LiDAR-based flood risk and damage mapping systems* 11. **Sanitation infrastructure** *Faecal sludge management (FSM) systems* 12. **Water resource management** *Flood retention basins and detention ponds*	13. **Terrestrial** *Community-based forest fire early warning* 14. **Marine** *Artificial reef creation* 15. **Freshwater** *Wetland restoration* 16. **Coastal** *Mangrove-based community ecotourism*	17. **Healthcare delivery for climate-related diseases** *Telemedicine platforms* 18. **Healthcare facilities** *Modular mobile treatment units* 19. **Pharmaceuticals and biotechnologies** *Warehouses with climate control and strategic reserves*	20. **Risk reduction** *AI- and big-data-enabled multi-hazard prediction* 21. **Relief and emergency response** *Satellite-based rapid damage assessment platforms* 22. **Social safety nets** *Real-time vulnerability mapping*	23. **Manufacturing** *AI-based predictive maintenance* 24. **Supply chain logistics** *Disaster-resilient warehouse design and retrofits* 25. **IT and financial services** *Climate-risk disclosure and reporting software*	26. **Employment and livelihoods** *Climate-resilient livelihood diversification* 27. **Education** *Climate-focused vocational certification* 28. **Traditional and indigenous knowledge** *Indigenous knowledge networks* 29. **Cultural heritage** *Climate vulnerability assessment of heritage sites*	30. **Power generation** *Climate-integrated generation planning* 31. **Transmission and distribution networks** *Flood-elevated distribution substations* 32. **Distributed energy access and mini-grids** *Off-grid RE systems for critical services* 33. **Fuels, storage and clean cooking** *Community clean-cooking kitchens*
n solutions[a] =31	**n=52**	**n=37**	**n=24**	**n=27**	**n=22**	**n=26**	**n=20**	**n=13[b]**

Financial services solutions for Asia *(non-exhaustive solution examples)* n=27[b]

	For private industry e.g., investors, businesses...	...and communities
Funding CA&R: Improving access to capital to build physical adaptation and social resilience		
Access to finance and investment capital **Ecosystem financing**	*Loans for retrofits* *Water trading markets and round-the-clock (RTC) renewable energy microgrids*	*Microfinance for climate-resilient enterprises* *Payment for ecosystem services*
Building financial resilience[c]: Improving ability to manage and absorb the financial impact of climate events better		
Risk transfer/insurance **Social protection and livelihoods**	*Parametric insurance for livestock* *Warehouse-receipt and value-chain financing*	*Parametric insurance for gig workers* *Post-disaster relief support*

Note: a n represents the number of solutions identified for each sector; **b** Energy n=20 if including energy solutions within other sectors; **c** Financial services solutions are embedded within each sector and are not additive to overall n. **Source: 1** Dalberg analyses.

CA&R solutions for Asia sit across key impact pathways to help prepare for, respond to, and recover from climate risks

Key CA&R sectors and impact pathways in Asia

Sectors	Description	Key impact of climate risks	Example of solutions		
			Prepare for	Respond to	Recover from climate risks
Infrastructure	Climate-proof physical assets to reduce long-term economic losses and service disruption	• Flood-prone transport links • Heat stress on building & asset depreciation	Flood proofing critical road infrastructure	Digital infrastructure twins for asset monitoring, climate scenario analysis	Climate-resilient housing retrofits with elevated and reinforced structures
Agriculture & allied sectors	Protect food systems, farmer livelihoods, and agri-value chains	• Yield volatility • Livestock mortality, disease outbreaks, and market disruptions	Technical assistance hubs for MSMEs on climate-resilient production /supply	Real-time supply chain visibility platforms with GPS, IoT, and AI	Parametric business interruption insurance for climate hazards
Water	Secure water availability, quality, and system resilience under increasing climate variability	• Flooding, stormwater overload • Water shortages and unsafe water	Flood-elevated distribution substations	Off-grid renewable energy (RE) /battery energy storage systems (BESS) for critical community services	Insurance for mini-grid and solar home systems (SHS) assets against climate hazards
Ecosystems & biodiversity	Protect natural systems that buffer climate risks and sustain livelihoods	• Coastal erosion • Coral reef bleaching • Watershed degradation • Biodiversity loss	Community-managed wetland and pond restoration	AI-enabled wildfire and smoke detection networks	Mangrove-based community ecotourism enterprises
Health	Reduce climate-related health risks and strengthening system preparedness	• Heat-related deaths • Vector-borne diseases • Cold chain failures and health facility disruptions	Heatwave early warning systems	Portable rapid diagnostic and treatment tools	Climate- and disaster-resilient healthcare retrofits
Disaster management	Strengthen preparedness, response, and recovery to reduce economic and livelihood losses	• Delayed emergency response • Liquidity gaps post-disaster • Weak risk information systems	National multi-hazard risk registries with hazard and exposure mapping	Drone-based delivery of essential relief supplies	Sovereign contingent disaster credit lines
Industry & commerce	Protect businesses, supply chains, and employment from disruption	• Business interruptions, asset damage, and supply chain fragility	Flood & drought forecasting / early warning systems (EWS)	Decentralised wastewater treatment systems (DEWATS)	Water treatment plant upgrades and resilience retrofits
Social systems	Strengthen household-level resilience and social protection	• Income shocks, missed schooling, poverty traps	Climate integration in school curricula and teacher training	Digital learning platform for learning continuity during climate shocks	Microfinance for women self-help groups (SHGs) in climate-resilient enterprises
Energy	Ensure reliable, climate-resilient power supply to critical services	• Grid instability, power outages / infrastructure failure, and high energy costs • Rising cooling demand	Renewable energy powered irrigation pumps	Sensor-based pest and disease early-warning systems	Phygital marketplaces for climate-resilient produce
Financial services (cross-cutting)	Strengthen ability to anticipate, absorb, and recover from climate-related shocks	• Distress sales, income shocks, business continuity risks	Risk-monitoring data analytics systems	Parametric insurance	Credit lines

Source: 1 Dalberg analyses.

As a cross-cutting enabler, financial services contribute to CA&R impact pathways for both private industry and communities

Financial services enables

	Preparing for...	Responding to...	Recovery from...
			climate shocks
Private industry			
Key challenges	Lack of access to **CA&R financing and investment capital**	Lack of **financial buffer and protection** from climate events	Limited **access to capital / liquidity to recover** from climate shocks
Role of financial services	• Invest in hardening of assets and operations to improve climate resilience of portfolio/value chain • Capture growth opportunity by investing in CA&R technology and solutions	• Improve ability to manage shocks with access to liquidity • Enable risk transfer to manage business and value chain disruptions	• Enable faster restoration of business operations • Stabilise revenues and markets
Key impacts	Improved **business continuity planning** in the face of increasing climate risks	**Downside protection and mitigating business disruptions** amidst climate shocks	Improved **ability to rebuild or restore** business operations, systems; safeguard incomes
Communities			
Key challenges	Lack of access to formal financial services, e.g., **credit, investments,** limiting ability to prepare for climate shocks	Limited **savings and protection** from climate events	**Limited savings and unstable livelihoods/income sources** to recover from climate shocks
	Low financial and digital literacy		
Role of financial services	• Invest in adaptation solutions to enable individuals and households to reduce impact of climate shocks	• Provide liquidity in the form of emergency payouts to manage shocks • Enable risk transfer from most vulnerable communities	• Enable household recovery and income restoration • Provide financial stabilisation for communities
Key impacts	Improved **adaptive capacity** at the community level	Improved ability to **cope with negative shocks**, with resources to **cover unexpected expenses**	Improved **financial control** and reduced **financial stress** or worry, and confidence in **long term financial outlook**

Source: 1 World Bank (2023): Financial Resilience against Climate Shocks and Disasters; **2** CDRI (n.d.): Mainstreaming Disaster Resilience into Infrastructure Projects; **3** Dalberg analyses.

CA&R solutions target Asia's most critical hazards, but financing is uneven across risks, with more focus on flooding

Figure 32. Number of CA&R solutions, by hazard addressed[a]
Count of solutions and % of total CA&R solutions identified for Asia

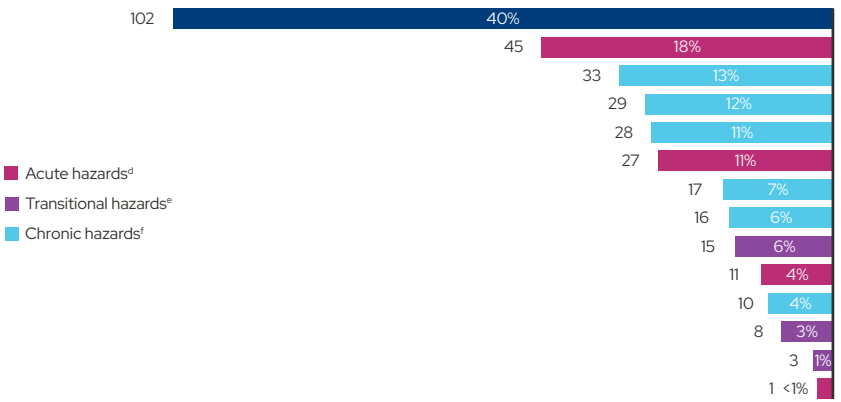
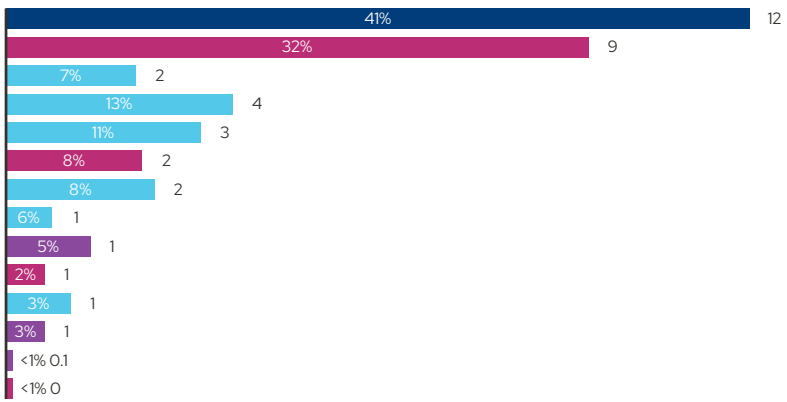


Figure 33. Funding for CA&R solutions, by hazard addressed[b]
% of total and in US$B

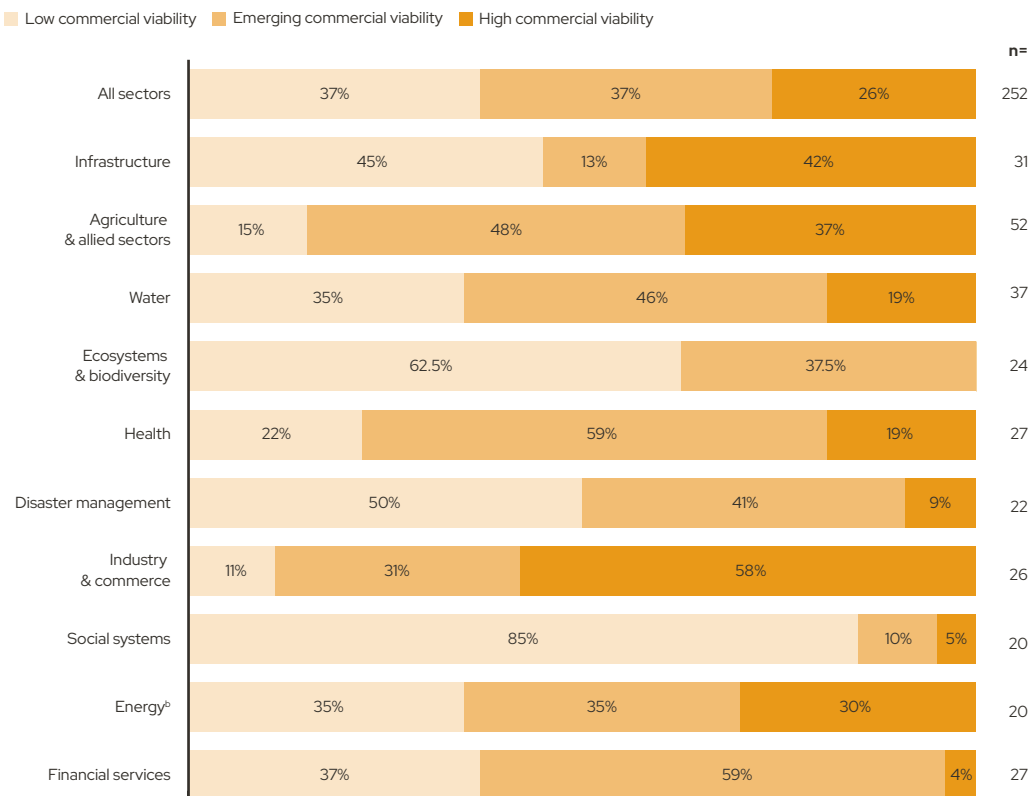


- **All of the CA&R solutions analysed deliver co-benefits,** with ~40% of them also supporting mitigation
- **~40% of solutions provide general resilience** that strengthen resilience across hazards
- **Impact is inclusive,** with all solutions targeting at least 1 vulnerable group, and 1 in 3 solutions addressing multiple vulnerable groups
- **Current funding is skewed towards flooding,** in line with today's key climate risks in the region
- **Heat-related stress** is expected to increase significantly in the region, but currently only accounts for **~15% of overall funding**
- **Limited funding has been identified for cyclones and wildfires** yet some countries in Asia have significant GDP exposure
- **Solutions that address landslides** may receive indirect funding as a part of broader infrastructure resilience, which have not been captured in this analysis

Note: a Solutions may be counted more than once if it addresses multiple hazards; **b** Funding may be counted more than once if a solution addresses multiple hazards; **c** 'General resilience' refers to solutions that do not address one specific hazard directly but deliver cross-hazard resilience benefits (e.g., multi-hazard risk registries, multi-hazard insurance, farmer-to-farmer extension networks); **d** 'Acute' hazards refer to short-term, event-driven climate risks (e.g., floods, cyclones); **e** 'Transitional' hazards refer to hazards that begin as discrete, but are moving towards chronic; **f** 'Chronic' hazards refer to longer-term, gradual climate shifts (e.g., water stress, sea level rise). **Source: 1** Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard; **2** Pitchbook 2021-2025 data; **3** World Resources Institute (2025): Strengthening the Investment Case for Climate Adaptation: A Triple Dividend Approach; **4** Dalberg analyses.

There is a range of commercial viability for solutions

Figure 34. CA&R solutions for Asia by commercial readiness and sector[a, b]
% of total number of solutions in each sector



Assessment of commercial viability across all 250+ solutions

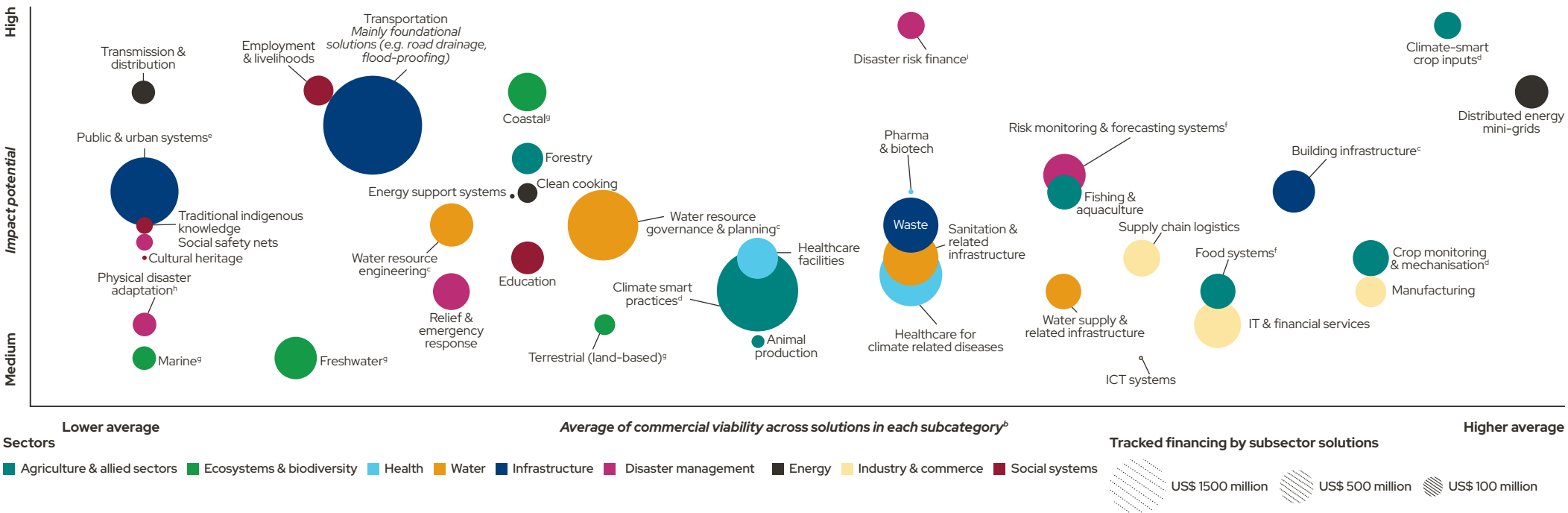
	Count of solutions and funding (2021-2025 cumulative)[c, d]	Definition	Key sectors (with highest concentration of solutions by count across commercial viability)
Low commercial viability	**94** (~US$14B)	No clear revenue pathways in the short term, typically involving shared public goods or very early-stage technology	• Social systems • Ecosystems and biodiversity • Disaster management
Emerging commercial viability	**93** (~US$6B)	Clear use case and demand but not yet consistently scalable or profitable	• Health • Financial services • Agriculture and allied sectors • Water
High commercial viability	**65** (~US$7B)	Proven, repeatable revenue and scalable unit economics across markets	• Industry and commerce • Infrastructure • Agriculture and allied sectors • Energy

Note: a n represents the total number of solutions in each sector; **b** Sector-level n for energy and financial services are not additive to the overall solution n of 252, as cross-sector solutions are included within both sectors (7 in energy and 27 in financial services); **c** Funding for 2025 is partial; **d** Sectors reflect concentration, not exclusivity; solutions within each sector may span multiple commercial viability categories. **Source: 1** Dalberg analyses.

Directional

There is a diverse landscape of opportunities for private actors, based on impact potential and commercial viability

Figure 35. Indicative commercial viability, impact potential, and tracked financing for solutions across CA&R sub-sectors[a, j]
US$M (2021-2025 cumulative); data for 2025 is partial

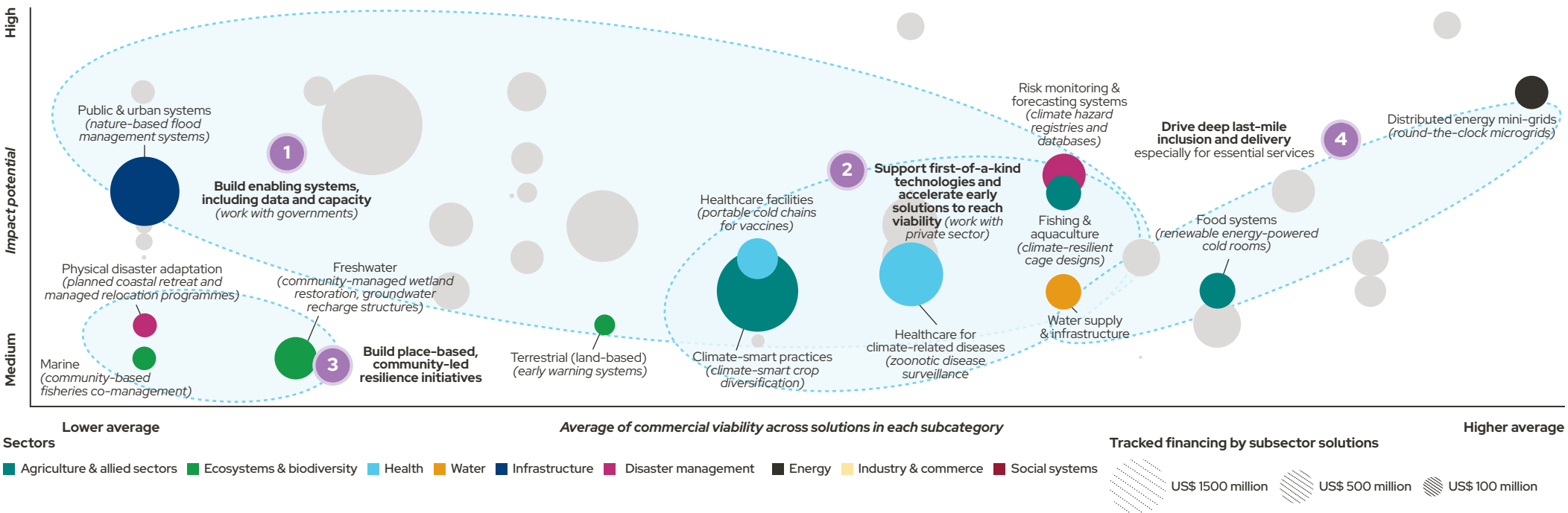


Note: a This is an indicative and directional mapping that is not to be read as an assessment of investment viability, but as an estimation of average commercial viability of all 252 solutions within each sub-sector, **b** Placement of sub-categories is based on average of commercial viability and impact potential across individual solution that range from low to high, **c** Water resource engineering and water resource governance and planning are subsets of water resource management; **d** Climate-smart agri practices, climate-smart crop inputs, and crop monitoring & mechanisation are subsets of crop production; **e** Public & urban systems and building infrastructure are subsets of buildings & settlements; **f** Food systems refers to post-farmgate handling, storage, aggregation, transport, processing (primary to mid-level), and distribution of food commodities, with a focus on ensuring food availability, quality, and affordability; **g** Ecosystems subsectors (marine, freshwater, terrestrial, coastal) refer to interventions for the related ecosystem; **h** Risk monitoring & forecasting and physical disaster adaptation are subsets of risk reduction; **i** Disaster risk finance is a subset of both risk reduction and relief & emergency response; **j** For further details and examples of solutions in each sub-sector please refer to taxonomy; **Source: 1** Pitchbook data (2021-2025); **2** Dalberg analyses.

Directional

4 entry points for philanthropic capital providers in CA&R in Asia (1/2)

Figure 36. Indicative commercial viability, impact potential, and tracked financing for solutions across CA&R sub-sectors (example solutions)
US$M (2021-2025 cumulative); data for 2025 is partial



Source: 1 Pitchbook data (2021-2025); **2** Dalberg analyses.

Directional

4 entry points for philanthropic capital providers in CA&R in Asia (2/2)

Philanthropy

Current focus

<1%
of total CA&R financing tracked between 2021-2025 is from **philanthropic capital**

~80%
of philanthropic funding is concentrated in three sectors-**health, agriculture, and energy**

~90%
of **funding goes to India,** predominantly in the form of **grants**

Top solutions funded by philanthropy today

- Portable cold chain systems for vaccines
- Backups for health facilities
- Energy storage systems
- Round-the-clock microgrids
- Climate-smart disease surveillance platforms

CA&R opportunities[a] in Asia

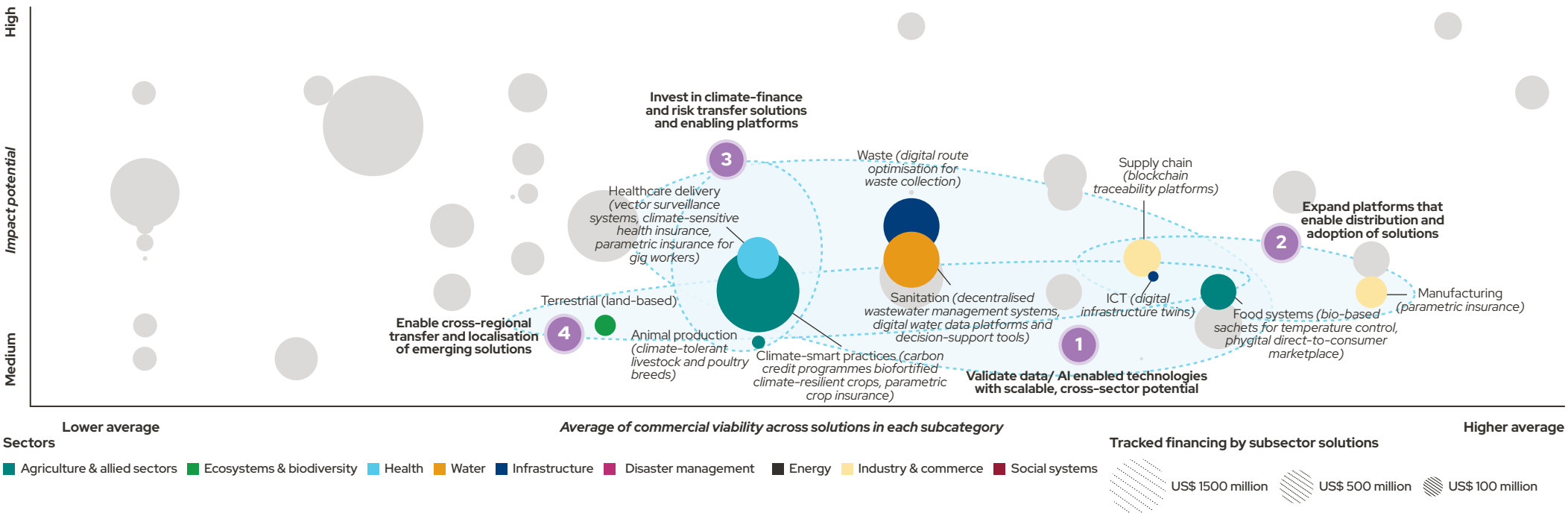
Entry points	Number of solutions[a]	Non-exhaustive: Key sectors	Non-exhaustive: Key subsectors	Non-exhaustive: Example solutions
1 **Build enabling systems, including data and capacity** (work with governments) Build institutional capacity where market-based delivery is not viable	10+	• Infrastructure • Ecosystems and biodiversity • Disaster management	• Public and urban systems • Terrestrial (land-based) • Risk monitoring and forecasting systems	• Nature-based flood management systems • Early warning systems • Climate hazard registries and databases
2 **Support first-of-a-kind technologies and accelerate early solutions to reach viability** (work with private sector) Pilot, prototype, and enable proof-of-concept deployment for adaptation solutions that have yet to establish commercial viability	15+	• Agriculture and allied sectors • Health	• Climate-smart practices • Fishing and aquaculture • Healthcare facilities • Healthcare delivery	• Climate-smart crop diversification • Climate-resilient cage designs • Healthcare for climate-related diseases
3 **Enable place-based, community-led resilience initiatives** Enable community preparedness, ecosystem restoration, and behavioural or trust-based interventions that require non-market delivery channels such as NGOs, public systems, and community networks	20+	• Disaster management • Ecosystems and biodiversity	• Physical disaster adaptation • Marine • Freshwater	• Planned coastal retreat and managed relocation programmes • Community-based fisheries co-management • Community-managed wetland restoration • Groundwater recharge structures
4 **Drive deep last-mile inclusion and delivery** especially for essential services Support scaling and delivery of critical financial and community services to vulnerable groups	10+	• Energy • Water • Agriculture and allied sectors	• Distributed energy mini-grids • Water supply and infrastructure • Food systems	• Round-the-clock microgrids • Renewable energy-powered cold rooms

Note: a Solutions and entry points listed are indicative and directional rather than comprehensive and does not replace formal due diligence. **Source: 1** ClimateWorks Foundation (2025): Foundation funding for climate change adaptation and resilience 2025; **2** Dalberg analyses.

Directional

4 entry points for early-stage capital providers in CA&R in Asia (1/2)

Figure 37. Indicative commercial viability, impact potential, and tracked financing for solutions across CA&R sub-sectors (example solutions)
US$M (2021-2025 cumulative); data for 2025 is partial



Source: 1 Pitchbook data (2021-2025); **2** Dalberg analyses.

Directional

4 entry points for early-stage capital providers in CA&R in Asia (2/2)

Early-stage investors

Current focus

<3%
of CA&R financing tracked between 2021-2025 is from **early-stage capital**

~70%
of early-stage funding[a] is concentrated in two sectors - **agriculture and allied sectors, and water**

~40%
of this funding goes to India, followed by SEA and China

Top funded solutions today

- Integrated digital farm management and record-keeping platforms
- Blockchain-based traceability platforms for climate-resilient procurement
- Carbon and ecosystem credit programmes for climate-smart agriculture
- Decentralised wastewater treatment systems
- Climate-resilient landfill leachate management systems

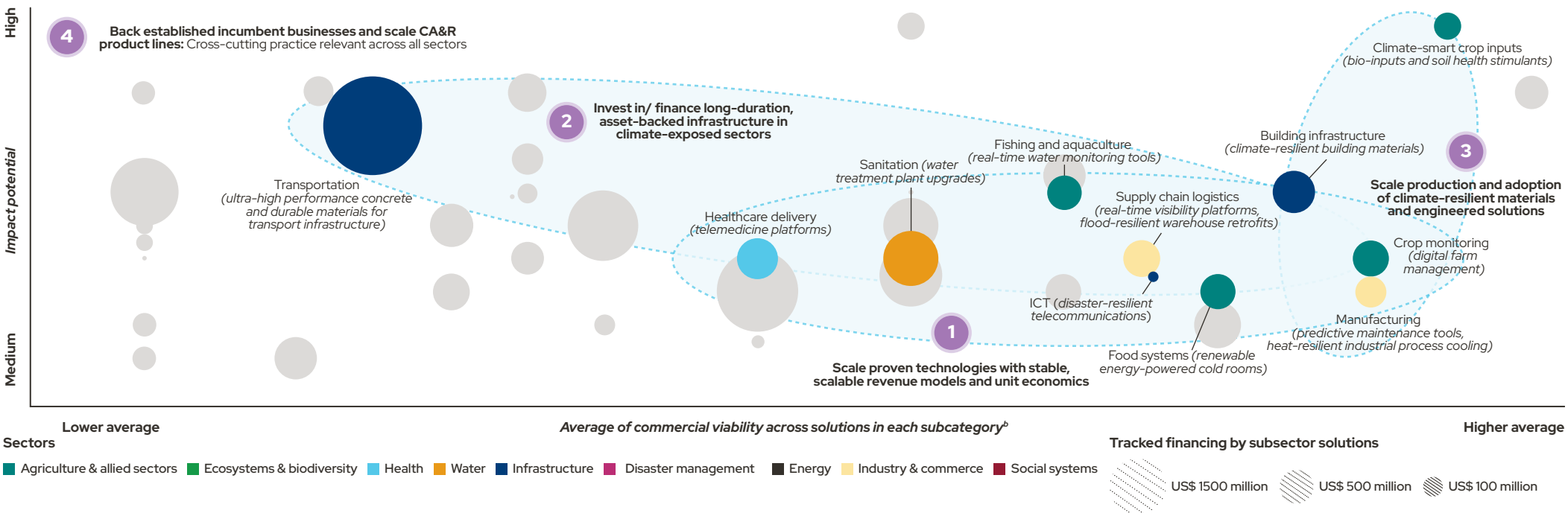
CA&R opportunities[b] in Asia

Entry points	Number of solutions[b]	Non-exhaustive: Key sectors	Non-exhaustive: Key subsectors	Non-exhaustive: Example solutions
1 **Validate data/AI enabled technologies with scalable, cross-sector potential** Support development of asset-light digital solutions and hybrid digital-physical resilience systems with emerging scalability	20+	• Agriculture and allied sectors • Water • Infrastructure	• Food systems • Sanitation • Waste • ICT	• Blockchain-based traceability platforms • Digital route optimisation for waste collection • Digital twins for infrastructure
2 **Expand platforms that enable distribution and adoption of solutions** Scale distribution pathways to improve access to existing but under-adopted solutions	25+	• Agriculture and allied sectors • Industry and commerce	• Food systems • Manufacturing • Supply chain	• Phygital direct-to-consumer marketplace
3 **Invest in climate-finance and risk transfer solutions** and enabling platforms Expand access to critical financial services to help vulnerable groups better manage the financial impacts of climate hazards	20+	• Agriculture and allied sectors • Health • Ecosystems and biodiversity • Financial services	• Climate-smart practices • Animal production • Healthcare delivery • Risk transfer and insurance	• Carbon credit programmes • Parametric crop insurance • Livestock insurance • Health insurance
4 **Enable cross-regional transfer and localisation of emerging solutions** Identify and scale the adoption and localisation of CA&R technologies across geographies, tailored to local climate conditions, infrastructure systems, regulatory environments, and user behaviour	15+	• Agriculture and allied sectors • Ecosystems and biodiversity	• Climate-smart practices • Terrestrial (land-based)	• Biofortified climate-resilient crops • Climate-tolerant breeds

Note: a Early-stage funding includes private equity and venture capital finance; **b** Solutions and entry points listed are indicative and directional rather than comprehensive and does not replace formal due diligence. **Source: 1** Pitchbook data (2021-2025); **2** Dalberg analyses.

4 entry points for late-stage capital providers in CA&R in Asia (1/2)

Figure 38. Indicative commercial viability, impact potential, and tracked financing for solutions across CA&R sub-sectors (example solutions)
US$M (2021-2025 cumulative); data for 2025 is partial



Source: 1 Pitchbook data (2021-2025); **2** Dalberg analyses.

Directional

4 entry points for late-stage capital providers in CA&R in Asia (2/2)

Late-stage investors

Current focus

<5%
of total **CA&R financing tracked** between 2021–2025 was from late-stage capital

~55%
of late-stage funding[a] is concentrated in two sectors – **agriculture and allied sectors, and health**

~50%
of this funding goes to SEA, followed by China and India

Top funded solutions today

- Utility-scale anaerobic digesters for organic waste
- Digital market-linkage and e-trading platforms
- Real-time water quality monitoring tools for aquaculture
- Circular wastewater reuse and zero-liquid-discharge systems
- Telemedicine platforms

CA&R opportunities[b] in Asia

			Non-exhaustive		
	Entry points	**Number of solutions[b]**	**Key sectors**	**Key subsectors**	**Example solutions**
1	**Scale proven technologies with stable, scalable revenue models and unit economics** Channel funding into solutions which are already seeing traction in Asia but have significant headroom to grow	20+	• Agriculture and allied sectors • Health • Industry and commerce	• Food systems • Healthcare delivery • Supply chain logistics	• Real-time water monitoring tools • Renewable energy-powered cold rooms • Telemedicine platforms • Real-time visibility platforms
2	**Invest in / finance long-duration, asset-backed infrastructure in climate-exposed sectors** Invest in solutions that enable climate-resilient retrofitting of infrastructure	10+	• Infrastructure • Water • Agriculture and allied sectors • Industry and commerce	• Transportation • Sanitation • Fishing and aquaculture • ICT	• Ultra-high performance concrete and durable materials for transport infrastructure • Water treatment plant upgrades • Disaster-resilient telecommunications tower with hybrid backup
3	**Scale production and adoption of climate-resilient materials and engineered solutions** Support solutions which offer climate-resilient alternatives to existing materials/technologies	10+	• Infrastructure • Agriculture and allied sectors • Industry and commerce	• Building infrastructure • Climate-smart crop inputs • Crop monitoring • Manufacturing	• Climate-resilient building materials • Bio-inputs and soil health stimulants • Heat-resilient industrial process cooling
4	**Back established incumbent businesses and scale CA&R product lines** Enable diversified corporates to expand and institutionalise CA&R products, services, and embedded resilience offerings across portfolios	All	*Cross-cutting practice relevant across all sectors, especially utilities, infrastructure, and financial services*		

Note: a Late-stage funding includes corporate and commercial institutions finance, **b** Solutions and entry points listed are indicative and directional rather than comprehensive and does not replace formal due diligence; **Source:** **1** Pitchbook data (2021–2025); **2** Dalberg analyses.

There are examples of CA&R solutions that have progressed across the commercial viability spectrum across time

Solution spotlight: Round-the-clock renewable energy microgrid system with smart switching capability

Distributed microgrid systems combining solar PV batteries and, where relevant, supplemental clean generation (e.g., small wind, pico-hydro, biomass hybrids) configured to deliver firm, round-the-clock renewable power and smart capabilities to switch power sources depending on weather conditions (e.g., wind, solar etc.) to provide uninterrupted power supply for households, livelihood applications, community services, local enterprises, and emergency response

Not commercial → **Commercially proven**

	2015-2020 Market building	2021-2023 Scale up	2024 –today Commercialisation
Key funders	**DFI[a] and philanthropy** • IFC-World Bank Group • Rockefeller Foundation, Ceniarth, DOEN Foundation, Shell Foundation, UK Aid	**DFI, government, and blended finance investors** • IFC, ARCH (private equity/growth investment firm), Bank of America • Microsoft Climate Innovation Fund and Sustainable Energy Fund for Africa	**Commercial and impact investors** • Shell Ventures • STOA Infra & Energy, Swedfund, FMO (Dutch Development Bank), ElectriFI (impact capital)
What was funded / supported	• **Market design** and project preparation • Advisory support and **templates** • **Policy and regulation** alignment	• **Demand** and **evidence** studies • **Public private partnership (PPP)** mini-grid structuring	• **Portfolio expansion** • **Large scale deployment** and operations
What was unlocked	• Established **bankable structures** to finance mini-grid as portfolio vs one-off project	• Blended finance and **risk-mitigation instruments** helped crowd in private investors	• **Falling costs and stronger unit economics:** mini-grid power costs fell by ~30% in 5 years with further decline expected
Private sector investment	**<US$100M** globally	**US$400M** for IFC's program in Democratic Republic of Congo alone	**>US$600M** tracked, with **>US$2.5B in committed funding**

Note: a DFI stands for development finance institute; **Source: 1** SEforALL (2024): State of the Global Mini-Grids Market Report 2024; **2** Husk Power Systems (2023): Husk Power secures $100+ million equity and debt to supercharge growth of community solar minigrids in Sub-Saharan Africa and South Asia; **3** IFC (2022): IFC Launches Work on Scaling Mini-Grid Program to Increase Clean Electricity Access in the DRC; **4** World Bank Group (2022): Solar Mini Grids Could Power Half a Billion People by 2030 - if Action is Taken Now; **5** Dalberg analyses.

Case study examples: Solutions across the commercial viability spectrum

	Non-commercial	Emerging			Commercial
Company	**Revitalising Informal Settlements and their Environments (RISE)**	**Cropin**	**Oceanfarmr[a]**	**Tive[a]**	**FrieslandCampina**
Year established	2017	2010	2017	2015	Formed 1871, merger 2008
Geography	Indonesia and Fiji	Global	Australia, New Zealand, UK, US	North America, Europe, Asia	Global
Maturity / ARR	N/A	Pre-Series D	Pre-Series A	Series C	€13.4B (US$15.5B) in 2025
Sector	Water	Agriculture and allied sectors	Agriculture and allied sectors	Industry and commerce	Agriculture and allied sectors
Solution type	Decentralised wastewater treatment systems (DEWATS)	Integrated digital climate advisory services (DCAS) for farmers	Integrated digital farm management	Real-time supply chain visibility platforms	Bio-inputs and soil health stimulants for climate-resilient farming
CA&R business model	A research programme anchored at Monash University co-designing location-specific solutions integrating green infrastructure to strengthen the whole-of-life water and sanitation cycle	AI-powered agriculture cloud platform for smart farming and agricultural intelligence	A shellfish and seaweed farm management software designed to help optimise operations, providing real-time operational efficiency that can also help de-risk lending	A technology company that provides real-time, end-to-end supply chain and logistics visibility, supporting shippers, retailers, and logistics service providers	A dairy cooperative processing raw milk into consumer products and B2B ingredients while fostering regenerative agriculture, climate-target tracking, and climate risk management
Commercial driver	Creating green space for water cleansing and food cultivation, improved food production, improved quality of life	Rising demand for food, unpredictable weather conditions, and rising cost for agricultural inputs	Improving farm efficiency and strengthening credit assessments for shellfish and seaweed farmers	Actionable data with real-time insights, proactive intervention in supply chain risks, reduction in in-transit spoilage, damage, and theft	Improved farm and value chain efficiency, stable supply of high-quality ingredients
CA&R impact	• Increased ability to recycle wastewater and harvest rainwater • Reduced vulnerability to flooding and climate change	• Reductions in crop loss due to pest and disease incidence • Improved adoption of climate resilient practices • Improved yields and farmer incomes	• Improved ability to manage climate risks (e.g., heat, freshwater surges) • Improved access to credit	• Improved supply chain resilience • Improved risk management from extreme weather and temperature fluctuations	• Improved soil health • Improved water and energy efficiency
Mitigation impact	• Restored natural waterways	• Efficient agri-practices, improved yields and farm-level emissions monitoring enable reduction of carbon emissions[b]	• Improved adoption of regenerative ocean farming	• Improved carbon footprint monitoring and management	• GHG and methane reduction • Improved carbon sequestration
Other impact	• Improved community health • Fewer infections • Better child intestinal health	• Improved farmer awareness through localised, data-driven advisories	• Improved access to markets • Development of financing for unrealised ESG benefits	• Improved asset utilisation and waste reduction	• Improved animal health

Note: **a** These examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP; **b** ABC Impact monitors farmer income uplift as a directly attributable impact KPI; farm-level emissions reduction is not currently tracked given the absence of standardised attribution methodologies and project-level baselines required to credibly quantify emissions outcomes for a SaaS enabler. That said, Cropin's platform contributes to on-farm carbon emissions reduction by enabling the monitoring and adoption of climate-smart practices - including input management - independently evidenced to reduce agricultural GHG emissions.

There are opportunities for private and philanthropic capital across all key CA&R sectors

Focus for next pages

Entry points and investment opportunities[d]	Infrastructure	Water	Agriculture & allied sectors	Energy	Industry & commerce	Disaster management	Health	Ecosystems & biodiversity	Social systems
Indicative maturity of solution technology within each sector[a, b, c]	 Mature to scaling	 Mature to scaling	 Scaling	 Scaling	 Scaling	 Scaling	 Emerging to scaling	 Emerging to scaling	 Mixed
Total addressable market in Asia (US$B, till 2030)	200-250	60-70	80-110	80-90	80-90	45-50	50-60	20	N/A
Opportunity for philanthropy	**Limited:** Mainly **large-scale public sector** projects available, philanthropy can help to support underlying data/ risk analytics	**Significant:** Support **last-mile delivery** through development of asset-light solutions, hybrid digital-physical resilience systems	**Significant:** Build **capacity and knowledge,** support development of **climate-smart inputs and practices**	**Moderate:** Support **last mile delivery** of energy services, ensure inclusive access	**Limited:** Mainly driven by **commercial private** sector, philanthropy can support start-ups that are establishing proof of concept or value	**Significant:** Support **community disaster preparedness** and response **systems**	**Significant:** Strengthen **preparedness**, disease **surveillance** for vulnerable populations, **train health workers** on response to climate hazards	**Significant:** Support **ecosystem restoration and conservation,** establish **early warning systems**	**Significant:** Strengthen **social protection systems** and **livelihood diversification enablers** (awareness, knowledge, access) for vulnerable groups
Opportunity for early-stage investors	**Moderate:** De-risk early innovations such as **new materials, process digitalisation** such as waste optimisation	**Moderate:** Scale emerging technology such as **water ATMs, digital monitoring solutions, water harvesting** and **water markets**	**Significant:** Implement **digital** solutions; **platforms** linking farmers to advisory & inputs; **risk transfer mechanisms** such as insurance to reduce cost of access to finance	**Moderate:** Support new technology such as **decentralised energy systems** and **bio-digesters**	**Significant:** Support early-stage **retrofitting and monitoring technology** to identify a profitable business model	**Significant:** Test scalability and replicability of **digital risk intelligence & early-warning systems,** innovative response solutions such as **drones & satellite-based systems**	**Significant:** Support **early, innovative solutions** such as climate-sensitive diagnostics, monitoring platforms, and resilient health delivery models	**Significant:** Catalyse solutions such as **monitoring, verification,** and enabling systems such as **market infrastructure** for nature-based revenue streams	**Moderate:** Pilot platforms and mechanisms that **help to protect indigenous communities and cultures against climate risks**
Opportunity for late-stage investors	**Significant:** Scale viable **resilient construction materials, engineering** solutions, climate-resilient **infrastructure upgrades**	**Moderate:** Scale revenue-generating urban and industrial **water services** through **utility upgrades** and **efficiency solutions**	**Moderate:** Scale resilient enablers such as **precision agritech,** climate-resilient irrigation systems, bio-inputs, water conservation solutions	**Moderate:** Scale **distributed energy resilience solutions and storage** infrastructure	**Moderate:** Scale **retrofitting, supply-chain resilience** and climate-proof industrial **infrastructure** as well as **monitoring** systems	**Limited:** Solutions currently subscale, possible to scale select digital or tech based solutions such as **drone-based delivery** of relief supplies	**Limited:** Select opportunities to scale climate-resilient healthcare infrastructure and **digital health service delivery / telemedicine**	**Limited:** Few proven revenue-generating business models, beyond select e.g., **eco-tourism services**	**Limited:** Solutions currently subscale, potentially scale **digital platforms** enabling access to finance, services, and education

Note: a Assessment of average maturity of the technologies in each sector is adapted from McKinsey's climate resilience technology analysis, see source 1; **b** Mature to scaling means widely proven solutions, scaling means mainly commercially viable solutions with growing adoption and mixed means sector contains both mature and early-stage technology; **c** Maturity is informed by McKinsey, BCG and Temasek's definition of 'mature solutions' and their categorisation (where available), maturity levels are Dalberg's interpretation, and individual solutions may vary in maturity relative to overall sector maturity level; **d** Opportunities listed are indicative and directional rather than comprehensive and does not replace due diligence. **Source: 1** McKinsey Sustainability (2025): Climate resilience technology: An inflection point for new investment; **2** World Resources Institute (2025): Strengthening the Investment Case for Climate Adaptation: A Triple Dividend Approach; **3** BCG and Temasek (2025): The Private Equity Opportunity in Climate Adaptation and Resilience; **4** Dalberg analyses.

Building agri-food resilience in SEA: Key issues today

Agriculture is a crucial sector for SEA, with a significant portion of food production hinging on smallholder farmers

9.8%
of contribution by agriculture to SEA's GDP in 2022. This is equivalent to US$354.3 billion[1]

↓ 25%
Narrowing of the trade balance for agriculture in SEA from 2020 to 2024, implying higher dependency on imports for food and feed[2]

30%
of SEA's food commodities produced by smallholder farmers[3]

100M
Smallholder farmers in SEA, with most living on <US$2 a day, below global poverty line[4,5]

Climate change poses significant threat

Key hazards affecting agriculture in SEA

- Heat
- Pests
- Disease
- Humidity
- Drought
- Storms
- Water stress (includes rising salinity)
- Flooding

11 out of 11
National adaptation priorities of SEA countries include **agri-food** as key priority area[6]

6 to 7%
Decrease in rice grain yields **for every 1°C increase in temperatures**[7]

SEA's shrinking and ageing farmer populations lack access to financing and are not well equipped to handle climate threats

↓ 50%
Reduction in proportion of those employed in agriculture in Cambodia, Thailand, and Vietnam; over the last two decades[8]

> 50 years
Average age of farmers in major agricultural countries in SEA, with many working past statutory retirement age[9]

US$189B
Smallholder climate adaptation financing needs for SEA[10]

Agri-production is stagnating amidst unsustainable practices, ageing farmer communities, degrading land, and climate change. Re-industrialisation and mechanisation of the sector needed to reduce reliance on manual labour and maintain, or increase, production levels

<1.3%
Average annual production growth of staples, such as rice, maize, soybean, sugarcane, cassava, over the past decade[1]

Up to 41%
In yield loss for key value chains in SEA, given medium-to-high climate stress, in long-term projection scenarios[11]

Intensified and exacerbated by **Climate change**

Systemic challenges faced by agri-food in SEA

- Regional food security
- Livelihood loss
- Economic stability

Source: **1** ISEAS Yusof Ishak Institute(2025): Outlook for Agriculture and ASEAN's Role in Southeast Asia's Food Security; **2** FAO (n.d.): FAOSTAT, and CIIP analysis; **3** Australian Centre for International Agricultural Research (2024): Defining the future of smallholder farmers in Southeast Asia; **4** FAO Regional Office for Asia and the Pacific (2025): Southeast Asian countries advance climate-smart agriculture through regional cooperation; **5** World Bank Group (2016): A Year in the Lives of Smallholder Farmers; **6** CIIP analysis, see Chapter 1; **7** ISEAS Yusof Ishak Institute (2025): The Critical Impact of Extreme Heat on Rice Production in Southeast Asia; **8** Fulcrum (2025): Migrant Agriculture Workers: Potential Resource for Southeast Asia's Food-resilient Future; **9** Asian Development Bank (2025): Mechanisation and Financing Can Extend Older Farmers' Working Lives; **10** Family Farmers for Climate Action (2025): Feeding the World in a Changing Climate; **11** ImpactSF analyses.

Building agri-food resilience in SEA: Path forward and opportunities

A suite of solutions and opportunities exists

1 Technical solutions

On-farm and value chain innovations that improve productivity, resource efficiency, resilience to climate-related risks

Examples include:

- Climate-smart inputs
- Monitoring and traceability systems

2 Ecosystem and business model enablers

Nodes and platforms that aggregate and connect producers to inputs, services, and markets

Examples include:

- Contracting/ partnership structures with traders and processors

3 Access to finance (OpEx and CapEx)

Solutions that address capital constraints across the agricultural cycle, ensuring that financing flows through to producers

Examples include:

- Working capital for inputs
- CapEx loans for equipment

4 Financial resilience

Instruments that stabilise and diversify farmer incomes while protecting against shocks, especially climate-related risks

Examples include:

- Climate and crop insurance
- Flexible credit structures

Supported by:

Public infrastructure (e.g., community fodder banks)
Capacity building and training (e.g., education and technical assistance)

Read more at our agriculture sector deep dive, "Building a climate adapted and resilient agri-food system in Southeast Asia"

To help transform agri-value chains from traditional to resilient

Traditional value chains

e.g., maize, rice, sugarcane in the Philippines; livestock in Indonesia and Vietnam

- Small, fragmented smallholder farmer production
- Manual practices affected by weather hazards and climate shocks

Transitional value chains

e.g., oil palm in Malaysia and Indonesia; coffee in Vietnam

- Co-operatives and farmer organisations start to emerge, but are subjected to price risks and market fluctuations
- Limited end-to-end traceability
- Gradual shift towards (re)industrialisation

Resilient (mature) value chains

- Mechanised production
- Automated processing/ logistics
- Corporate & co-operative partnership structures
- Integrated climate-risk financing

Note: Diagram developed by ImpactSF.

Ultimately, a step-change in thinking, and increased collaboration across public, private, and philanthropic sectors, is needed to unlock financing and encourage transformation

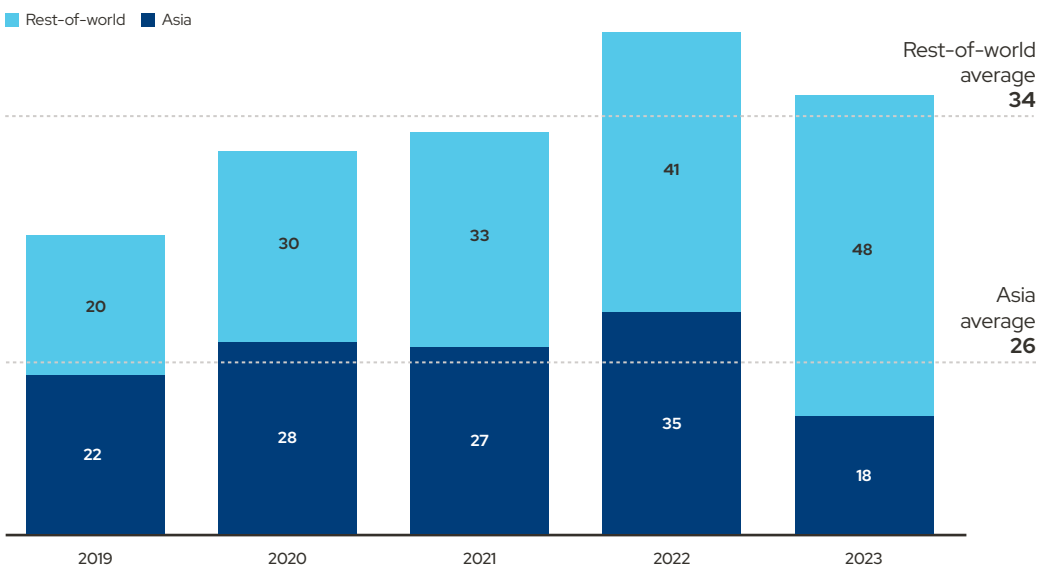
Action	Philanthropy	Private industry	Public sector
1 Improve the day-to-day for farmers	Pilot new initiatives, deliver training	Provide discounts for practice adoption, develop relevant financing products	Provide subsidies and incentives
2 Identify and address key leverage points for upsized impact	Improve market access, and value chain bankability	Implement value chain financing, adopt digital tools for data collection	
3 Scale sustainable impact through de-risking and blending capital	De-risk initiatives, establish data infrastructure		Create supportive regulatory and data environments
4 Strengthen the agricultural ecosystem	Build farmer and farmer producer organisation (FPO) capacity	Implement guidelines and education for producers	Create conducive policy ecosystem

Source: ImpactSF analyses.

Today, CA&R funding in Asia is uneven and meets a small fraction of estimated funding needs

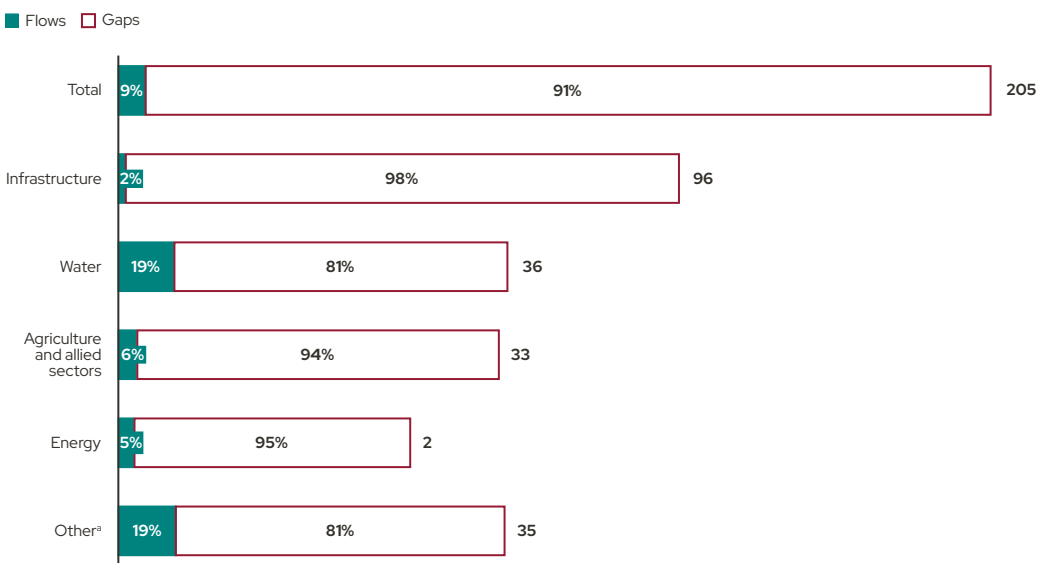
Current CA&R fund flows to Asia are uneven and not on a sustained growth trajectory

Figure 39. Total CA&R fund flow in Asia, by year
US$B; 2019-2023



In 2023, CA&R funding accounted for 2% to 20% of annual estimated need (US$205B total) across sectors

Figure 40. CA&R fund flow vs needs across Asia, by sector
US$B, annual flows (2023 data) vs needs (annual till 2030)

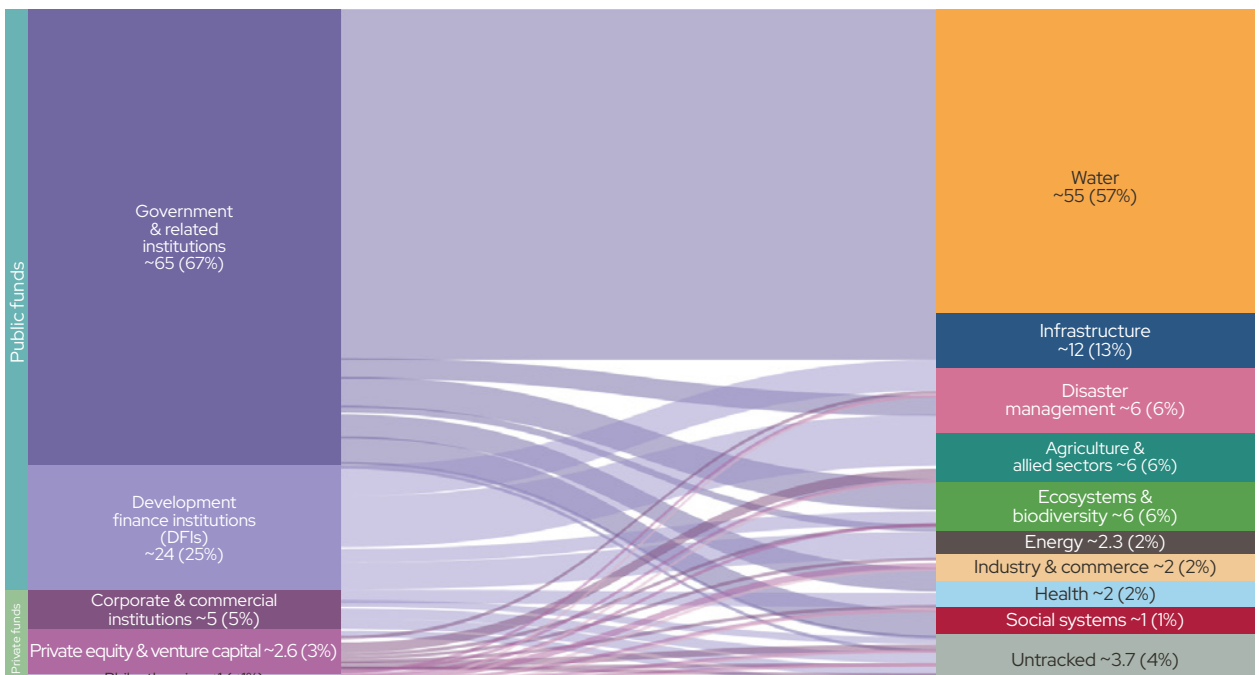


Note: a 'Other' includes the following sectors: health, industry & commerce, social systems, ecosystems & biodiversity, disaster management; **b** Funding gap is based on CPI adaptation finance needs for East Asia & Pacific and South Asia; **c** Sectoral split based on UNFCC data (annual adaptation needs by sector for developing countries for 2021-2030 vs latest tracked fund flows by sector from CPI (2023); **d** Where sector splits are not available they have been grouped cumulatively under "Other" as tracked by CPI databases; **e** As government funding data is reported only at the regional level (East Asia & Pacific; South Asia) as per CPI data, all such funding has been attributed to China and India respectively, assuming the majority flows to these economies due to their size; **f** Asia includes all countries in East Asia, South Asia and Southeast Asia. **Source: 1** Climate Policy Initiative (2025): Bridging the Adaptation Finance Gap in Asia; **2** Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard; **3** UN Environment Programme (2023): Adaptation Finance Gap Update 2023; **4** Dalberg analyses.

Directional

Private and philanthropic capital has been a small portion of CA&R funding in the last 5 years

Figure 41. Global flow of CA&R funds tracked across Asia, by funder type and sector
Total: ~US$96B, cumulative 2021-2025; 2025 data is partial[1, 2, 3]



More than 90% of tracked CA&R funding stems from public sources, such as governments and DFIs

- Public and DFI financing has primarily been driven by **public spending on infrastructure in China**, towards projects such as nature-based flood management systems, road drainage upgrades, and green space expansion for heat mitigation
- DFIs have supported government investments in **infrastructure and disaster readiness**
- Note that **public spending is underestimated,** as data is only captured for 2021-2023, with 2024-2025 not yet available

In line with global trends, tracked private & philanthropy sector accounts for a small share of adaptation spend to date

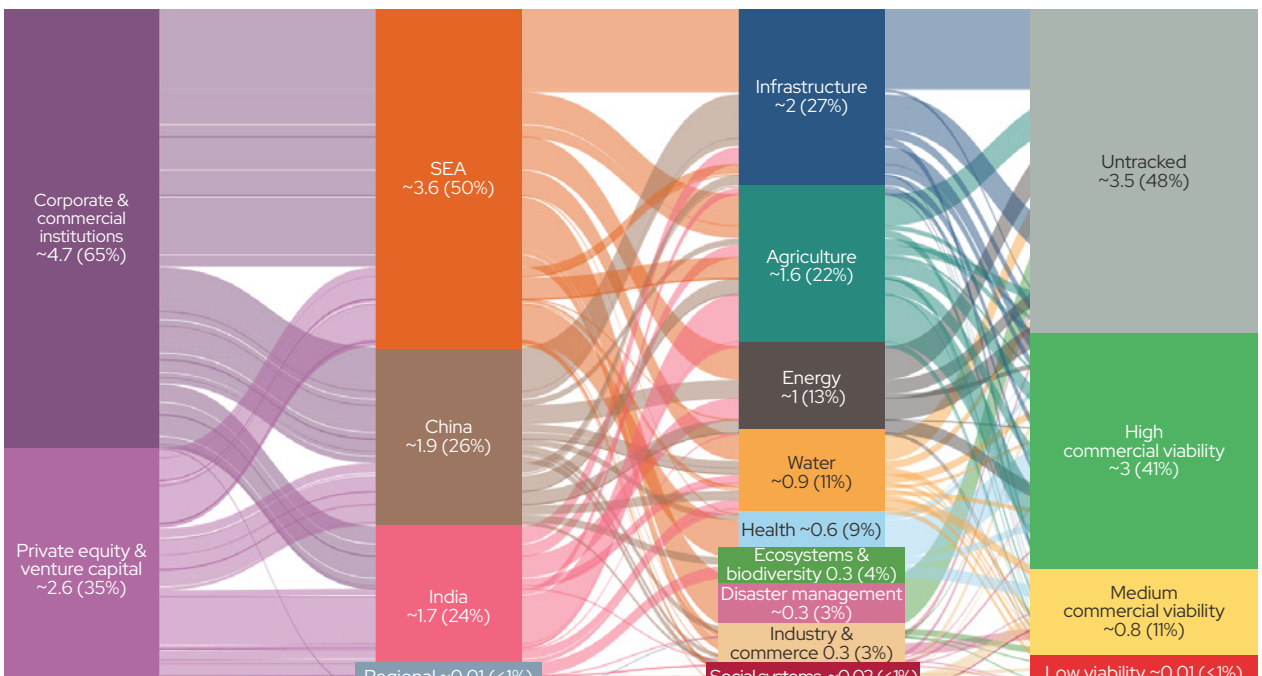
- Private and philanthropic capital accounts for ~6% of total tracked fund flows between 2021-2023
- **Tracked flows here are also likely underestimated,** as adaptation spending is often embedded within broader resilience investments (e.g., in infrastructure, utilities) and may not be publicly disclosed or tagged as such

Source: **1** Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard; **2** Pitchbook data (2021-2025); **3** Dalberg analyses.

Directional

~70% of private investment is driven by corporate and commercial investors, concentrated across 5 key sectors

Figure 42. Global CA&R funds to Asia from private sources excluding philanthropy
Total: ~US$7.2B, 2021-2025 cumulative; 2025 data is partial[1, 2, 3]



Note: a Data should be interpreted directionally, **b** 'Regional' includes transactions where funding data is only at a regional level (e.g. Asia) and the split between countries is not given, **c** Total volume of funds may differ from other external sources, **d** As government funding data is reported only at the regional level (East Asia & Pacific; South Asia), all such funding has been attributed to China and India respectively, assuming the majority flows to these economies due to their size; **e** Due to data limitations, private bond transactions are tagged only at the sector level (not solution level) and their commercial viability is therefore classified as "untracked"; **f** "Private bonds" are defined as green or sustainability bonds issued by financial institutions, corporations, or other entities where the largest shareholder is a private entity, and where bond proceeds include commitments toward climate adaptation use cases and only includes publicly traded bonds, **g** Debt issued directly to a company without public disclosure cannot be tracked due to limited visibility and is therefore excluded, **h** There is some PE/VC funding for 4 solutions with low commercial viability – typically as a part of investment in the broader company's operations;
Source: 1 Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard; **2** Pitchbook data (2021-2025); **3** Dalberg analyses.

Scale: ~US$ 7.2 billion in CA&R private capital has flowed to Asia (2021-2025), primarily from corporate and commercial institutions

Geographic distribution: Private capital appears to be concentrated in SEA, with smaller visible flows towards China and India. Specifically, SEA shows higher private capital due to a more active (Singapore-led) bond market, while India and China rely more on DFI and state-linked funding respectively.

Sector focus: 5 sectors account for ~85% of current private financing

- In infrastructure, **large-ticket, infrastructure-led investments** dominate private financing, although these flows are likely undercounted
- In agriculture and allied sectors, investments are driven by **climate-resilient infrastructure,** seeds, inputs, and digital services that help adapt to a changing climate
- In energy, **commercially viable distributed and resilient systems** account for the bulk of current private financing
- In water, mature **models that generate consistent revenue** attract significant private capital
- In health, **digital-first solutions** drive most private investment, while physical infrastructure remains relatively underfunded
- The most-funded solutions are telemedicine platforms, digital market linkage platforms, water quality monitoring tools, and anaerobic digesters, which account for ~16% of total private funding (except philanthropies)

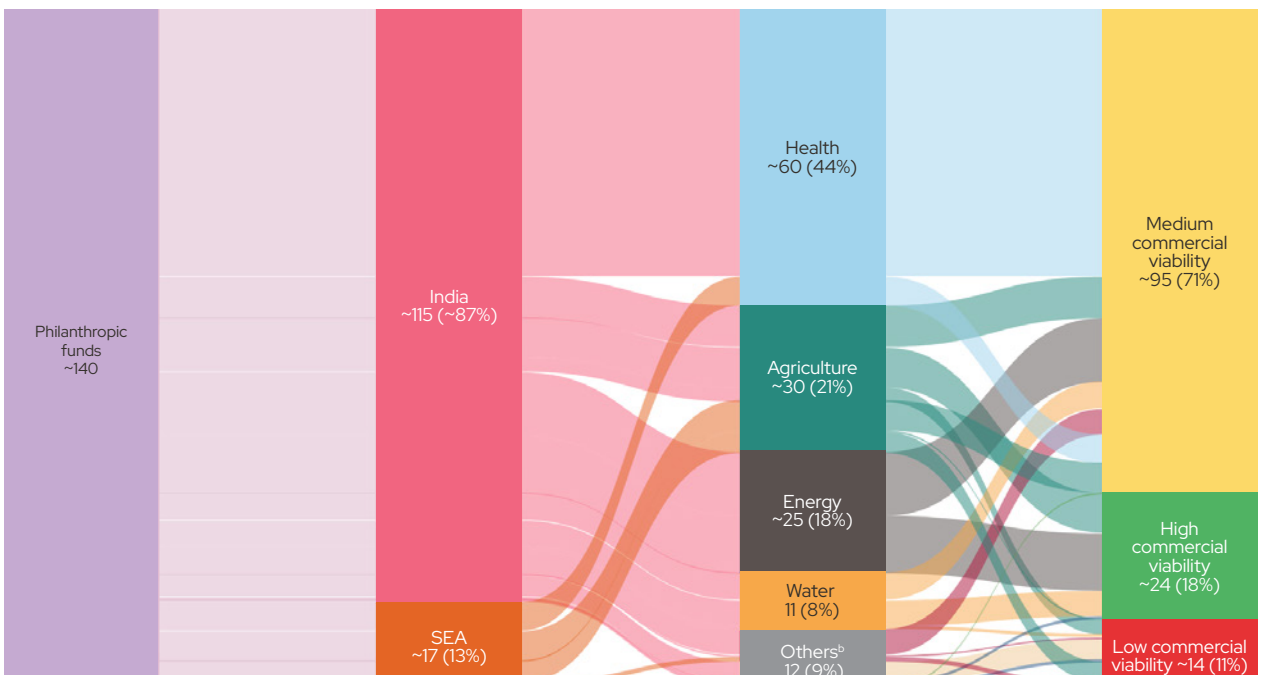
Current focus across commercial viability

- **Private capital is concentrated in high commercial viability solutions,** particularly infrastructure, energy systems, and industrial retrofits where **revenue streams are clear and risk is lower**
- **Limited private capital flows to low commercial viability solutions,** given weak monetisation pathways but may be included as a part of broader financing
- Coordinated financing, where the **right type of capital is injected at the right stage of technology development**, will help to move the solution further down the commercial viability pathway

Directional

Philanthropy has focused on scaling viable but under invested solutions, de-risking high potential ones, and funding public goods

Figure 43. Global CA&R philanthropic funds to Asia
Total: ~US$140M, 2021-2025 cumulative; 2025 data is partial[1, 2]



Note: a "Others" include ecosystem and biodiversity, infrastructure, social systems, industry and commerce and disaster management; **Source: 1** ClimateWorks Foundation (2025): Foundation funding for climate adaptation and resilience; **2** Dalberg analyses; **3** The Guardian (2016): Indian law requires companies to give 2% of profits to charity. Is it working?; **4** IKEA Foundation (2021): Climate Smart Agriculture Program; **5** IKEA Foundation (2023): Restoring Land and Prosperity for people, nature and climate in Central India; **6** IKEA Foundation (2023): Shokla Nath, India Climate Collaborative: "It's not just about the planet, it's about us."

Philanthropic capital remains limited in Asia, but plays a complementary role across the commercial viability spectrum

Scale: ~US$ 200 million in CA&R philanthropic funding in Asia was identified over 2021-2025, of which ~US$ 140 million can be tracked to specific CA&R solutions – this is far below the quantum of private and DFI investing

Geographic distribution: Philanthropic CA&R flows identified are concentrated in India, with smaller visible flows in SEA and China, which may be driven by limited public disclosure. India's philanthropic flows may be influenced by the 2013 Companies Act, which requires companies meeting specific financial thresholds to contribute 2% of their net profit to Corporate Social Responsibility (CSR).[3] For example, IKEA Foundation is among the top contributor to tracked philanthropic fund flows in India from our analysis, where they have supported projects in climate smart agriculture programmes, land restoration, and climate resilience[4, 5, 6]

Sector focus: 90% of philanthropic capital flows into **health, agriculture, energy and water**

- **In health, philanthropy is supporting delivery-enabling solutions** (off-grid battery backup for facilities; RE-powered portable cold-chain), critical infrastructure that keeps health delivery functioning under climate stress but has not yet scaled
- **In agriculture and allied sectors,** philanthropy is focused on piloting promising technology or models through **farm advisory, demonstration of sustainable practices and resilient models,** especially those relevant to smallholder adaptation. There is a long tail of smaller-ticket solutions primarily around water management (micro, solar powered irrigation, harvesting)
- **In energy:** philanthropy focuses on **distributed energy access for resilience-critical services**
- **In water,** philanthropy has supported commercially viable solutions that can enable broader systemic resilience such as smart water metering and AI driven leak detection
- The most-funded solutions are portable cold chain systems for vaccines, backup systems for health facilities, off-grid renewable energy battery energy storage systems, round-the-clock renewable energy microgrids, and climate-smart disease surveillance platforms, which account for **~60%** of total philanthropic funding

Current focus across commercial viability

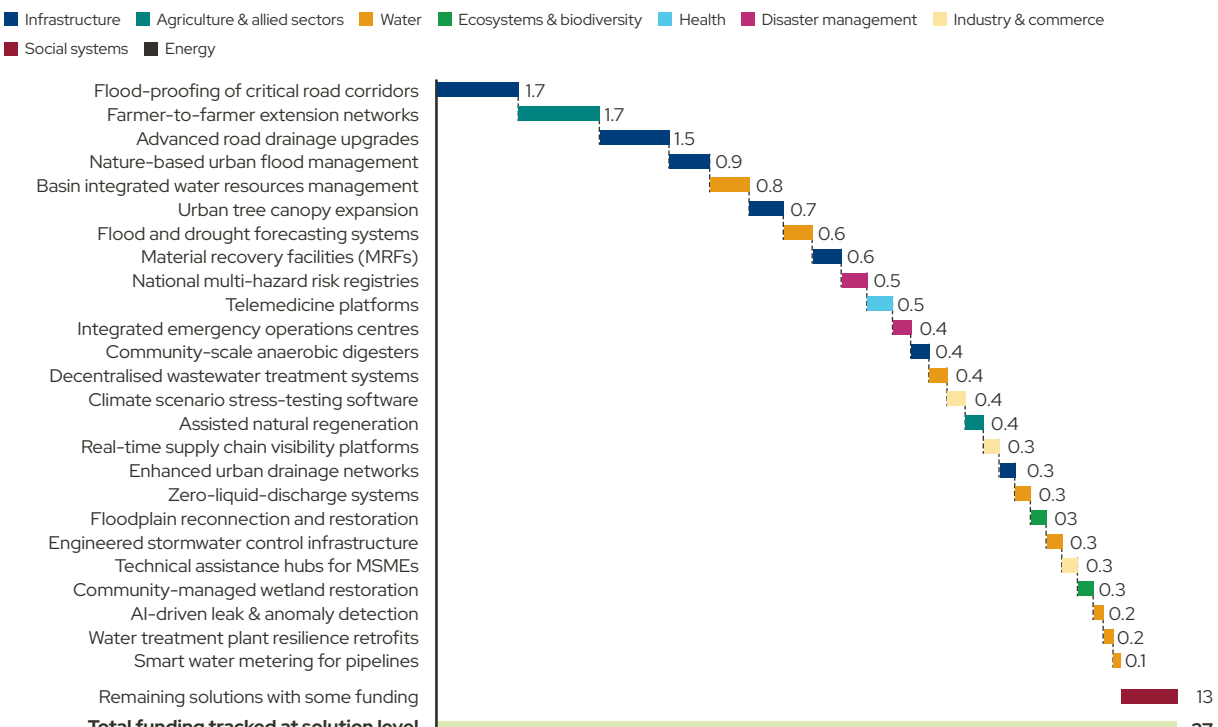
- Philanthropy has funded some **foundational public goods** (e.g., ecosystem protection, early warning systems) where benefits are diffuse and unlikely to generate market return, but support broader community resilience
- Philanthropy has mostly invested in solutions with **medium commercial viability,** backing solutions that require de-risking or supporting a new technology where commercial investors have not yet stepped in. For e.g., disease surveillance and analytics platforms have potential, but fragmented demand and limited willingness to pay constrain scale
- Philanthropy also supports **solutions with high commercial viability** where market failures prevent viable technologies from **scaling to underserved populations.** For instance, smallholder farmers often cannot afford new bio-inputs or soil health stimulants, or lack access to distribution channels, hence philanthropy funds last-mile distribution to scale adoption

Directional

A small subset of CA&R solutions capture the lion's share of funding leaving significant gaps across the broader solution landscape

~25 of 250+ identified CA&R solutions for Asia capture 50% of total CA&R funds

Figure 44. Distribution of CA&R funds across solutions
Total: US$27B, 2021-2025 cumulative



CA&R financing is highly concentrated today. ~20% (50 solutions) of solutions capture ~50% of funding tracked to a solutions level

Solutions with highest funding identified are primarily large-scale infrastructure and water-related, but even these remain underfunded relative to need . Of the 25 most funded solutions, 15 belong to these two sectors and include capital intensive solutions such as roads, flood management, etc. Together these sectors account for ~50% of CA&R financing, yet they require ~10x–15x more funding to meet underlying need

Other large investments identified include **large disaster readiness solutions** such as risk registries and operations centers; **software solutions** across sectors such as climate stress testing or supply chain platforms

No funding has been identified for ~25% of solutions, likely because they are financed through internal budgets or embedded as practices/ sub-components within broader initiatives, making funding difficult to isolate

Source: 1 Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard; **2** Pitchbook data (2021-2025); **3** Dalberg analyses.

Unlocking full potential requires both private market innovation and policy intervention to address key gaps

Today's CA&R opportunity landscape

CA&R solutions for Asia sit across key impact pathways to help customers and beneficiaries prepare for, respond to, and recover from climate risks. While these solutions target Asia's most critical climate hazards, financing is uneven across risks, with funding for solutions tackling heat-related stress underweight.

CA&R solutions span a broad spectrum of commercial viability today, with 94 classified as low, 93 as emerging, and 65 as high. This underscores the need for capital from across the spectrum to work in concert to scale these solutions.

Private and philanthropic capital flows account for a smaller share of CA&R financing to date, which reflect investor hesitance in investing into CA&R given uncertain returns and business models. Further, CA&R financing may be embedded within broader resilience investments, which may not be publicly disclosed.

Philanthropic capital is concentrated mainly in health, agriculture, energy, and water, primarily supporting delivery, access, or tech-based models, investments, which may not be publicly disclosed.

What can be done today?

Respond now: achieve near-term outcomes

For philanthropic capital, there is opportunity to work with local governments to build ecosystem capacity; partner with private sector to support first-of-a-kind technologies and accelerate early solutions to reach scalability, and support place-based, community-led resilience initiatives, and enable last-mile delivery of proven technologies.

For early-stage capital, there is opportunity to validate scalable digital technologies with cross-sector potential; scale platforms that enable distribution and adoption of solutions; and enable the cross-regional transfer and localisation of promising solutions.

For late-stage growth capital, there is opportunity to fund proven technologies with stable, scalable revenue models; invest in long-duration, asset-backed infrastructure systems and climate-exposed sectors; and back established incumbent businesses and scale CA&R product lines.

Public-private-philanthropic funders can collaborate through blended finance. Philanthropic capital can help to seed new ideas and build the market, before handing these solutions over to public funders for scale up through larger pilots and demand and evidence studies. Finally, once commercial viability is proven, these solutions can be handed over to private sector for larger scale deployment.

Prepare for the future: enable systemic change

Valuing resilience dividends and avoided losses to improve commercial viability and bankability of CA&R solutions. This requires standardised and harmonised regulatory frameworks and standards to enable accurate valuation and pricing of climate risks and resilience benefits. Making these benefits visible strengthens the investment case for CA&R solutions, improves risk-adjusted returns, and reduces uncertainty—thereby helping to unlock private capital.

Clear demand signals and sustained public sector commitment. There continues to be a key role for public sector to play in building CA&R. Strong policy incentives, mandates, and long-term public sector commitments create predictable demand for CA&R solutions. This demand visibility reduces market uncertainty, strengthens revenue certainty for solution providers, and improves the investability of CA&R offerings—thereby crowding in private capital by signalling durable future cash flows and scaling opportunities.

Enabling policy environment for blended and long-horizon capital deployment. A supportive regulatory framework for blended and innovative finance helps align risk-return profiles across public, philanthropic, and private capital. By enabling effective risk-sharing and patient capital structures, such policies improve the commercial viability of early-stage and longer-gestation CA&R solutions, making them investable for private capital that would otherwise be constrained by return timelines and risk exposure.

Financial services underpin the full climate risk journey for private industry and communities

"Credit is not only capital but a tool for resilience."

- Aria Widyanto, President Commissioner, Amartha

Figure 45. Illustration of climate risk journey[a]

Objective	Reduce emissions and enable transition to low-carbon systems	Reduce exposure and vulnerability to shocks	Manage risk that is not efficient or effective to avoid	Enable rapid response and recovery after climate shocks
Clusters	**Access to finance and investment capital:** Financing of climate-resilient productive assets, infrastructure, or CA&R businesses		**Risk transfer and insurance:** Risk transfer mechanisms that shift climate-induced risks away from vulnerable populations and help smooth expenditure shocks, thereby improving financial resilience and stability	
	Ecosystem financing: Incentivise nature-based climate resilient practices and projects		**Social protection and livelihoods:** Access to liquidity such as saving to support recovery and long-term financial health	
Example solutions	**For private industry** • Loans or blended finance for renewable energy	• Loans and credit for resilience infrastructure upgrades/retrofits	• Parametric business insurance, insurance for mini-grid and solar home system assets	• Warehouse receipt and value chain finance
	For societies and communities • Financing for clean cooking or solar home systems	• Microfinance for women Self-Help Groups in climate resilient enterprises • Coastal payments for ecosystem services	• Parametric crop and livestock insurance for smallholder farmers	• Combination social protection programmes • Post-disaster recovery

Note a Diagram adapted from The Loss and Damage Collaboration (2022). **Source: 1** Dalberg analyses.

Opportunities in financial services sit across 4 main clusters for both private industry and communities

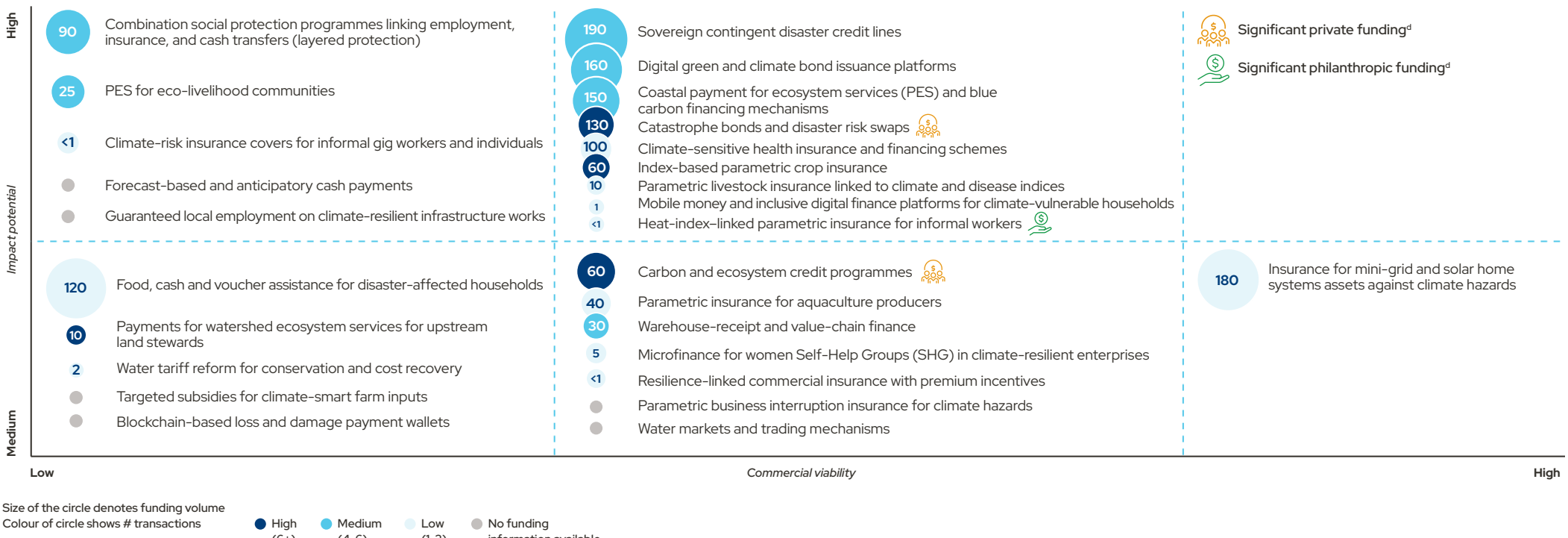
Clusters		Private industry	Communities
Funding CA&R		**Providing access to adequate capital and financing to support investments into physical climate adaptation and resilience**	
	**Access to finance and investment capital**	Connect climate-vulnerable businesses and producers to structured capital, enabling investment in CA&R assets and solutions, supply chain continuity, and market access before shocks materialise	Lower barriers to financial access for climate-vulnerable households by building digital payment rails and mobile money infrastructure that enable rapid, low-cost disbursement of funds
	**Ecosystem financing**	Enables private landowners, producers, and project developers to protect or restore natural assets that buffer climate risk, monetising ecosystem services through carbon and PES markets	Enable smallholders, upstream communities, and eco-livelihood groups to steward natural assets, linking conservation to income security and long-term climate resilience for vulnerable communities
Building financial resilience		**Improving ability to manage and absorb the financial impact of climate events better**	
	**Risk transfer and insurance**	Transfer climate-related financial risks and shocks from businesses to capital markets or insurance pools via pre-agreed index triggers, protecting balance sheets against catastrophic shocks	Provide vulnerable communities including low-income households, informal workers, and individuals with affordable insurance products that pay out rapidly when a climate hazard threshold is crossed, protecting livelihoods and health
	**Social protection and livelihoods**	Improve income stability and liquidity, and reduce vulnerability to price shocks and climate-induced production or operational losses, especially for small businesses and climate-exposed producers	Enable access to liquidity, such as savings, income, or livelihood support for climate-vulnerable households through employment, cash transfers, and in-kind assistance before, during, and after shocks

Source: **1** CDRI (2025): Mainstreaming disaster resilience into infrastructure projects; **2** Dalberg analyses.

Directional

Majority of financial services solutions have emerging commercial viability; catalytic capital required for scale

Figure 46. Global CA&R financing towards financial services solutions in Asia (US$M, 2021-2025)

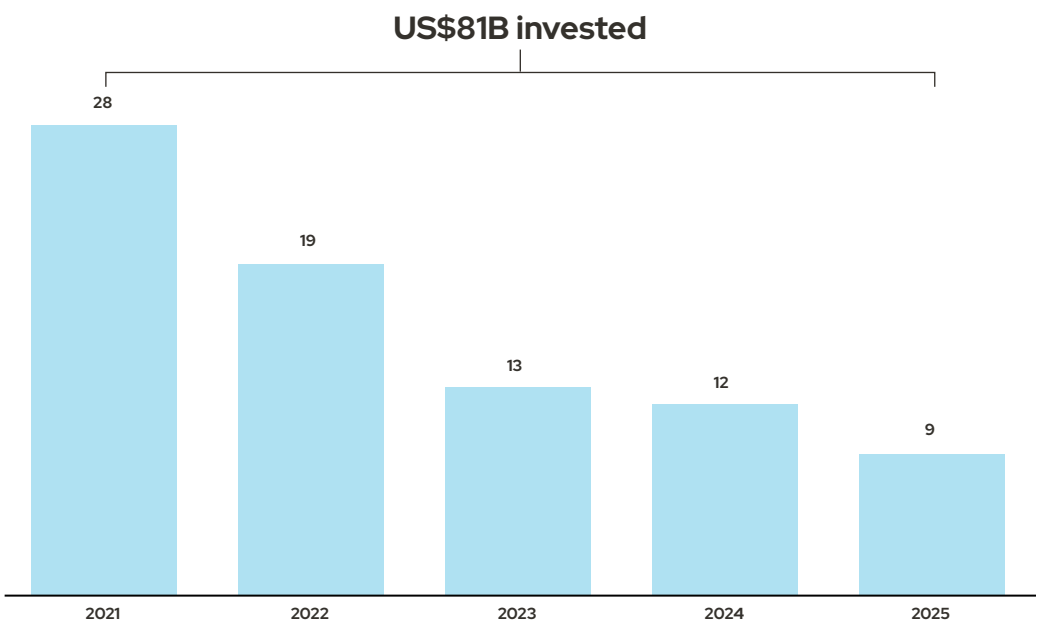


Note: a Total includes all financing tagged at solution level, and may not add up to overall financing for the sector; **b** The taxonomy includes three types of insurance solutions, based on beneficiaries - livestock, individuals, and businesses. As these solutions address multiple outcomes and hazards, they are treated as cross-cutting, with 9 solutions mapped across agriculture and allied sectors, energy, health, industry and commerce, and social systems; **c** Funding consists of pure-play adaptation only, where half or more of the programme or offering is clearly relevant to the respective CA&R solution; **d** "Significant" funding directionally defined as >60% of total.
Source: 1 Pitchbook data (2021-2025), **2** Dalberg analyses.

Climate-related financial services remain underfunded, with some players already emerging

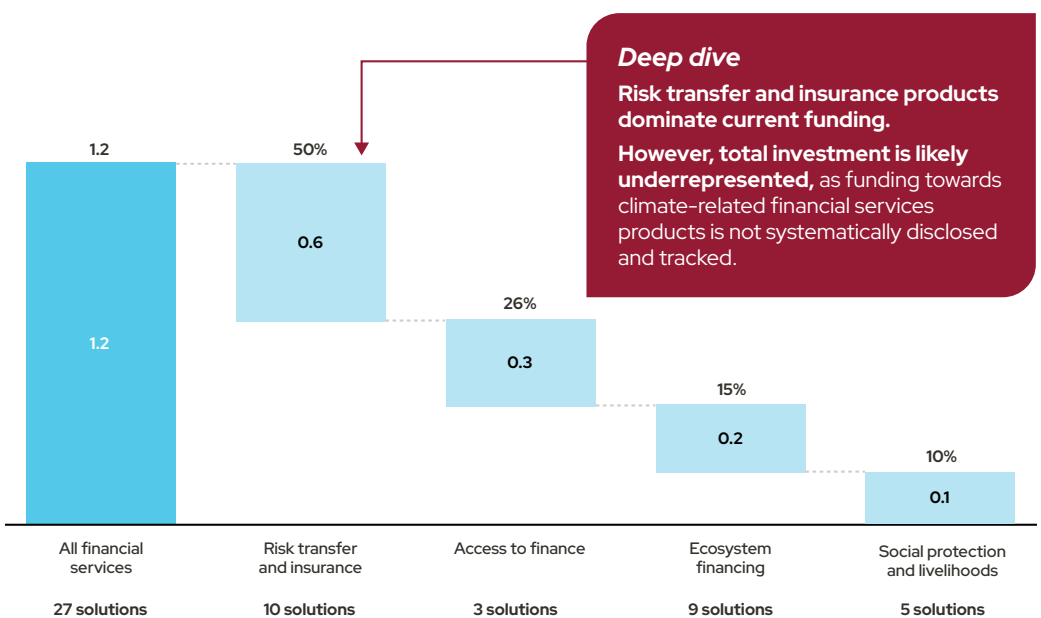
>US$80B has been flowing into finance and fintech-related investments in the region over the past 5 years

Figure 47. Total deal value (VC, PE, and M&A) in fintech in Asia[1]
US$B, 2021–2025



Financial services for CA&R remain underfunded despite market size

Figure 48. Total deal value for financial resilience solutions in Asia, by type[a, b, c, 2]
US$B, 2021-2025 cumulative



Deep dive

Risk transfer and insurance products dominate current funding.

However, total investment is likely underrepresented, as funding towards climate-related financial services products is not systematically disclosed and tracked.

Note: a Overall fintech funding includes all countries in Asia and Asia Pacific, although the Pacific countries account for a small (<5%) portion of all fund flows; **b** Tracked funding towards financial resilience solutions is likely under-represented due to lack of disclosure around internal corporate spends (e.g. for parametric insurance); **c** Climate-related financial resilience solutions' include insurance/risk transfer, resilience-oriented lending, and ecosystem/social financing which are not all classified as fintech, **d** Fintech is shown as a market-size reference point only. **Source: 1** KPMG (2026), Pulse of Fintech 2025; **2** Dalberg analyses.

Case study examples: Financial services solutions including credit, resilience financing, and access to markets

	Amartha	Arukah Capital	HDBank	Mayani
Year established	2010	2021	1989	2019
Geography	Indonesia	Asia	Vietnam	The Philippines
Maturity	Series C	N.A.	Listed	Seed
Sector	Financial services	Agriculture and allied sectors	Financial services	Agriculture and allied sectors
Solution category	Mobile money and inclusive digital finance platforms for climate-vulnerable households	Carbon and ecosystem credit programmes	Project financing in green buildings, energy-efficiency, and sustainable water and wastewater management	Digital market-linkage platforms with integrated climate info, climate-resilient seed varieties for commercial crops
CA&R business model	Tailored working capital loans and digital financial products for rural women entrepreneurs and MSMEs in Indonesia, augmented by climate risk assessments	Blended finance model co-funding biogas and biochar projects, using carbon revenues to finance infrastructure and provide performance-linked payments to farmers	Access to credit for Vietnam's emerging consumers and MSMEs; green transition financing for MSMEs and projects	Agri-ecommerce platform connecting smallholder farmers in the Philippines to commercial and household buyers and providing access to quality agri-inputs and climate-smart financing options such as credit and insurance
Commercial driver	Widespread rural reach, proprietary credit scoring model, hybrid lending model	Proprietary digital MRV for carbon credits, combined with performance-linked payments and 50% revenue sharing to align farmer incentives and ensure supply resilience	Ability to provide financing to individuals and MSMEs across the bulk of Vietnam	Strengthened and disintermediated supply chains and market access, improved farming yields
CA&R impact	• Improved financial inclusion for rural individuals and MSMEs across Indonesia, strengthening financial resilience • Less severe impacts from climate-related disasters after receiving financial assistance	• Improved crop yields and nutrient absorption through biochar integration • Increased and diversified farmer incomes from carbon credits and waste circularity • Cost savings from reduced fertiliser and fuel use	• Improved financial inclusion for individuals and MSMEs across Vietnam, strengthening financial resilience • Access to emergency financing amidst crises such as floods • Improved access to finance for climate-resilient practices for MSMEs	• Improved access to markets and customer bases, bolstering livelihoods • Improved adoption of climate-resilient agri-inputs and regenerative agricultural practices • Improved access to financing to strengthen business resilience
Other impact	• Improved savings enabling transition to the formal financial system • Improved financial literacy through customer education	• Reduced super-pollutant emissions (including black carbon) from avoided residue burning • Strengthened fertiliser supply resilience and improved soil health through the transition to sustainable farming practices	• Emissions reductions from renewable energy projects	• Improved adoption of technology to capture grassroots production data collection

Note: All examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP.

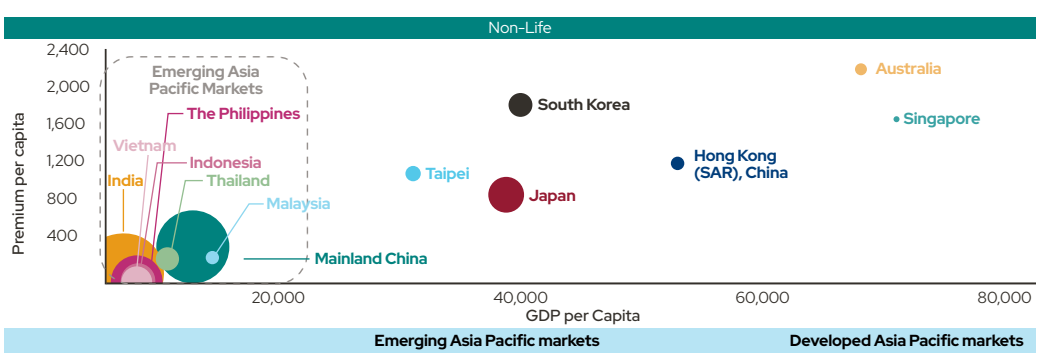
Insurance also plays a key role in building financial resilience

Both non-life and life insurance are key solutions to strengthen resilience in the face of climate shocks, with each having a different role

	Non-life insurance		Life insurance
	Indemnity	Parametric	
Coverage	Damages and losses due to unexpected events	Damages and losses due to specific index triggers	Financial protection for the family or beneficiaries in absence of the insured
Payout	Specific peril covered, payout against loss assessment	Various, depending on contingency stated in policy design (e.g., climate shock)	Death, terminal illness, permanent disability, or policy maturity
Product types	Property & Casualty (P&C), other health	Climate insurance, crop insurance	Whole life insurance, investment-based policies

However, there is still low insurance density and penetration in emerging Asia[a, 1]

Figure 49. Asia Pacific non-life insurance density vs GDP per capita (2021, US$)



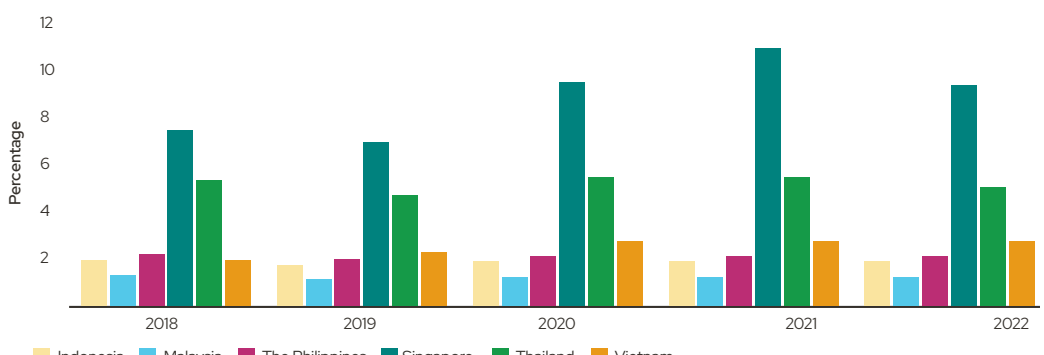
While there is rising demand for insurance, Asia still lags

7.5% Expected annual growth for insurance market in Asia (ex-Japan), which is higher compared to 5.3% expected for the global market. **Most of this growth is attributed to growth in life insurance, which takes up 63% of total premiums**[2]

1.2% Penetration of **Property & Casualty (P&C) insurance** in Asia (ex-Japan), lower than the rest of the world. Global market share of P&C insurance from Asia is <15%. In addition, **health insurance remains the smallest segment** for the region[2]

The life and general insurance penetration rate in SEA is around 3% on average, significantly lower than the global average of 6.7%[3]

Figure 50. Insurance penetration rate in SEA

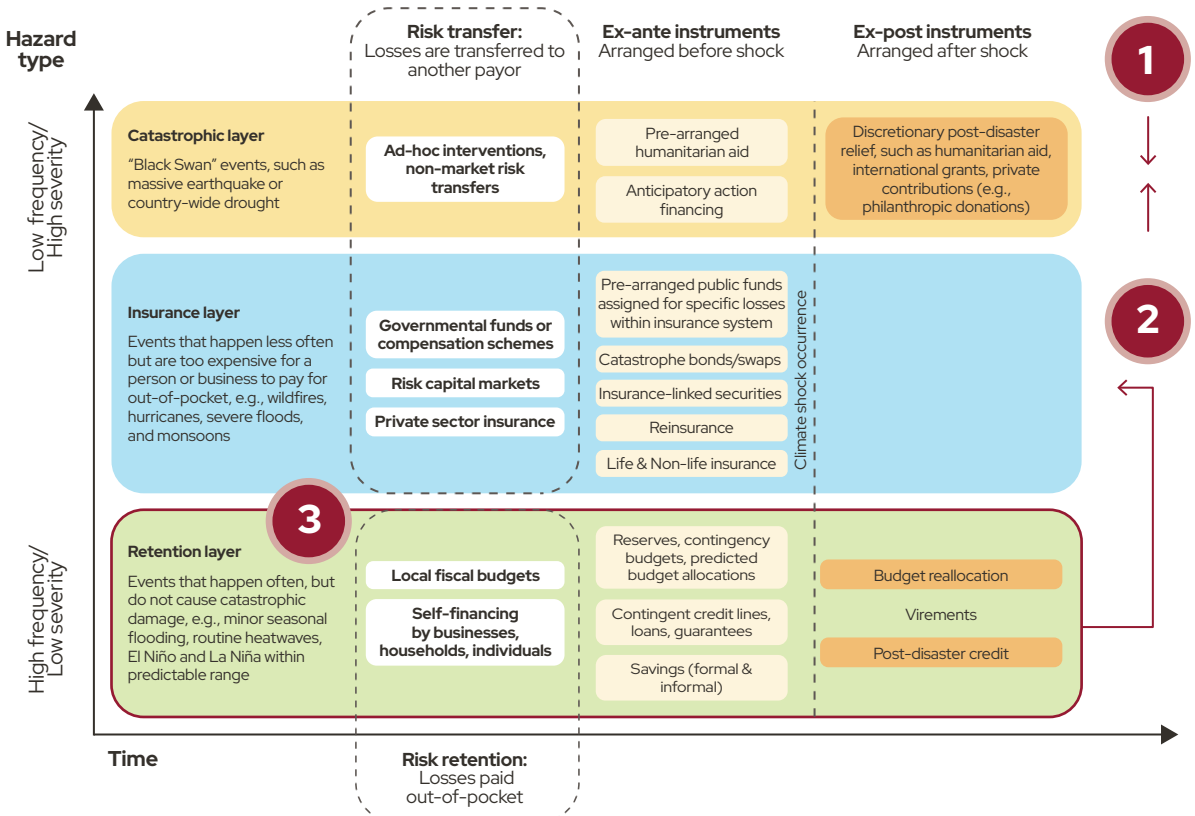


- Singapore has the most mature insurance market at 9.2% penetration, while other markets generally see penetration rates below 3%[3]
- These 6 countries in the graph above represent 99% of insurance premiums in the SEA insurance market[3]

Note: Penetration rate is calculated as premium divided by GDP. Bubble sizes represent the size of the population of each market. **Source:** **1** KPMG (2022): Asia Pacific Insurance Sector Opportunities; **2** Allianz (2025): Allianz Global Insurance Report 2025: Rising demand for protection; **3** Prudential (2025/26): Beyond Coverage: The Social and Economic Impact of Insurance in ASEAN.

Insurance supports risk transfer, complementing other adaptation measures to strengthen overall resilience

Figure 51. Risk layering mechanism against climate shocks[1, 2]



"While protection gaps persist, climate risks push insurance premiums beyond affordability thresholds, which can cause originally insurable markets into uninsurable ones. A lack of adaptation measures lead to a "slow walk into uninsurability" – insurance is available, until it suddenly is not."

- Coenraad Vrolijk, CEO and Co-founder, CarbonPool

1 Shrinking the catastrophic layer

- Climate adaptation measures should be implemented promptly and at scale to prevent avoidable losses due to devastation to infrastructure and livelihoods
- Preventive measures such as better inputs for agriculture or the adoption of electric vehicles can help to reduce emissions and the increasing frequency of climate shocks

2 Transferring risk to the insurance layer

- Risk can be shifted from the individual, organisational, company, or local levels to insurance, leveraging pooling mechanisms to spread risks across this layer
- Risk reduction measures should also be implemented here to ensure that insurance can be viable, where the risk to be absorbed is not outsized

3 Reinforcing the retention layer

- Inherent financial resilience can be built and strengthened, wherein people have sufficient financial safety nets to buffer against climate shocks
- Adaptation measures at the household, enterprise, and individual level can provide basic forms of protection

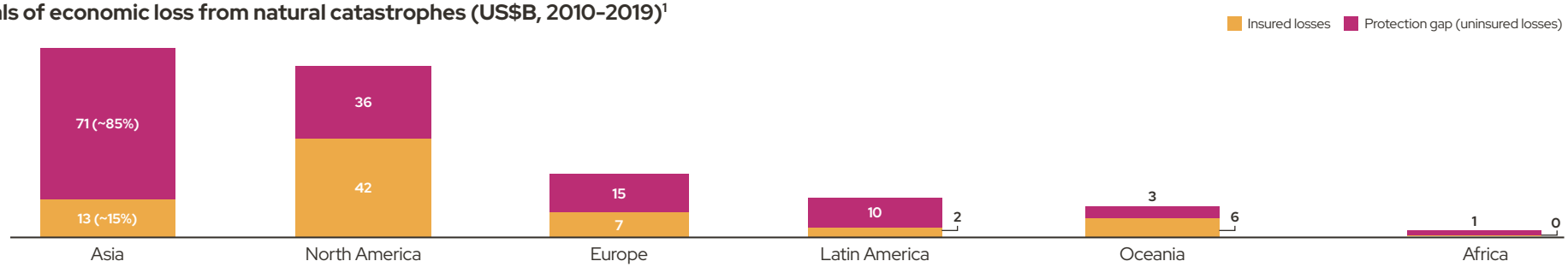
Source: Figure adapted from **1** UNDP IRFF (2025), Climate and Disaster Risk Finance and Insurance (CDRFI) Analytical Report; **2** FI-Compass (2025), Insurance and Risk Management Tools for Agriculture in the EU.

The current protection gap, driven by demand-side challenges, will be further exacerbated by climate change...

Asia experienced US$84 billion overall economic loss from natural disasters between 2010-2019, the highest region globally

Figure 52. 10-year totals of economic loss from natural catastrophes (US$B, 2010-2019)[1]

85%
Uninsured losses for Asia, the second highest among all the regions after Africa.[1]

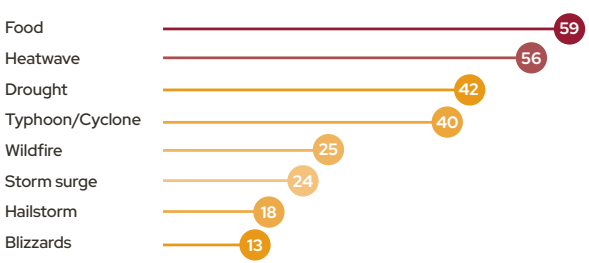


Moreover, the protection gap is hampered by demand side challenges

Lack of awareness

There is some level of consumer awareness of climate change impact

43%
Middle class consumers expect climate change to significantly impact their lives in next three years[2]



Yet, there is a notable difference between perceived and actual protection gaps[2]

Perceived protection gap by middle-class consumers in Emerging Asia

Estimated actual insurance protection gap (2024)

Property 35% → 95%

Health 27% → 64%

Inaccessibility and unaffordability

223M
Adults do not have a financial account in SEA, 45% of the region's population[3]

421M
Adults do not access formal credit in SEA, 70% of the region's population[3]

Source: 1 Swiss Re (n.d.), Natural Catastrophes: Tracking the protection gap (2010-2019); **2** PeakRe (2025): Risk and Resilience: Mindset of Emerging Asia's Middle Class on Climate, Economy and Protection Gaps; **3** CIIP analysis; data from World Bank (2025): The Global Findex Database 2025: Connectivity and Financial Inclusion in the Digital Economy.

...as well as supply side challenges such as lack of data, prohibitive costs, and limited innovation and effectiveness in distribution

Lack of data

Lack of data as well as legacy technology continue to limit insurance product development and decision making

93%

of APAC insurers admit that **legacy technology constrains their business growth**[1]

2 in 5

insurers say **poor data quality is the biggest barrier to sound decision-making**, with **more than 40% of claims decisions relying on judgement rather than detailed analytics**[2]

High cost of product development and servicing

- Premiums that are **set purely by assessing risk and cost are often unaffordable to those who need the insurance most**, such as smallholder farmers, climate-exposed and vulnerable communities, and households at the lowest income levels[3]
- Yet, insurers should not be made to bear the full cost of providing inclusive insurance at low premiums, as this is not commercially viable
- Governments have stepped up support for insurance globally, particularly for solutions such as agricultural insurance.[3] However, macro conditions differ across markets, resulting in uneven affordability and scalability of inclusive insurance products

Market	Premium subsidies (%) for crop insurance[4]
Cambodia	50%
Indonesia	80%
Malaysia	No data available
The Philippines	55-100%
Thailand	60-100%
Vietnam	20-100%
India	98%
China	80%

Challenges in distribution

- While Asia Pacific has the largest number of people reached by microinsurance, the **average premium per person covered is the lowest of all regions**[a, 5]
- The region also has the **largest potential**
- The effectiveness of alternative channels (e.g., social protection systems) is **further curtailed by weak public-private collaboration and lack of adapted incentives**, which prevents these efforts from reaching scale[6]

Estimated proportion of the population and market captured in the countries studied in each region[5]

Region	Number of people reached by microinsurance	Share of the target population covered	Weighted average premium per person covered	Estimated value of the microinsurance opportunity in target markets (US$)	Proportion of the estimated microinsurance market value captured
Focus countries in Africa	Up to 44.1 million	Up to 9.4%	28	6.9 billion	6%
Focus countries in Asia Pacific	Up to 238 million	Up to 11.9%	13	25.1 billion	21%
Focus countries in Latin America and the Caribbean	Up to 48.4 million	Up to 11.9%	25	9.3 billion	8%
Focus countries in all regions	Up to 330 million	Up to 11.5%	17	41.4 billion	15%

Source: 1 Asia Insurance Review (2026): APAC: Majority of insurers admit legacy technology holds back growth; **2** Insurance Asia (2025): Insurers lag in analytics adoption amidst constrained budgets; **3** Center for Financial Inclusion (2025): The Moment for Inclusive Insurance: Why Protection Must Become the Next Frontier; **4** Japan-ASEAN Cooperation (2025): A Practical Guide to Introducing and Scaling Up Agricultural Insurance in ASEAN Member States; **5** Micro Insurance Network (2023): The Landscape of Microinsurance; **6** CGAP (2025) Inclusive Insurance: Scaling for Resilience and Impact.

Note: a Countries covered under Asia Pacific for this analysis included Bangladesh, Cambodia, Fiji, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Thailand.

Leverage points across the value chain can help to unlock adoption and scale of insurance, and opportunities exist for philanthropy and private industry

Partnership development

- Align interests between diverse stakeholders (public, private, philanthropic, insurance) to kickstart the development of inclusive insurance
- Provide more incentives to motivate the establishment of such partnerships

Identification of gaps, risks, and cohort(s) for coverage

- Increase understanding of the protection gap through better climate and population data, especially at local level
- Build comprehensive data on low-income populations to allow for better and more accurate risk assessment

Product design, pricing, and underwriting

- Provide grants and incentives to support innovation
- Improve data and risk modelling resources and capabilities, such as actuarial capacities
- Improve data infrastructure and availability on risk and asset exposure, and vulnerability
- Enable tailored risk assessments and development of appropriate insurance products

Regulatory filing, approval and piloting

- Create favourable regulatory environment for new models of insurance
- Allow for streamlined capital flows and hedging for foreign exchange (FX) risks through policy provisions
- Reduce administrative burdens

Product launch and marketing

- Provide subsidies to support early adoption and promote behavioural change
- Increase financial literacy and enhance population awareness towards climate risk and need for protection
- Establish more channels to reach the most vulnerable (e.g., microfinance, embedded insurance, mobile insurance)
- Improve inclusion into formal financial systems to streamline premium collection; ensuring distribution through accredited channels

Distribution and premium collection

- Build capacity of meso-level organisations to act as policyholders on behalf of individuals (and allow risk pooling)

Claims assessment and payment

- Improve data accuracy, reliability, and timeliness to allow for better claims verification
- Implement consistent data collection methodology within and between countries
- Build capacity of meso-level organisations to be able to distribute payments to individual members (e.g., enforce good governance)
- Improve transparency of claims process
- Ensure that insured individuals receive payouts on time and through proper channels

Portfolio monitoring

- Implement system to address consumer complaints and improve client servicing
- Build feedback loop through collecting data on customer satisfaction and needs, and overall portfolio performance

Role for:

Public sector | Philanthropy | Private industry (insurance)

Source: Developed with reference to **1** CGAP (2025): Inclusive Insurance: Scaling for Resilience and Impact; **2** International Actuarial Association (2023): IAA Risk Book – Introduction to Inclusive Insurance.

There are distinct opportunities for philanthropy to play a role in scaling the development and adoption of insurance

Philanthropy is shifting from reactive disaster response to upstream prevention. By supporting risk transfer mechanisms such as insurance, philanthropy can improve communities' ability to prepare for, respond to, and recover from climate shocks. This delivers more durable impact, extending the reach of each philanthropic dollar over time beyond repeated rebuilding efforts. As patient and impact-oriented capital, philanthropy can play:

1 A fundamental role in addressing demand challenges

Increase awareness
- Running education campaigns and roadshows on climate risks and the need for protection
- Encouraging behavioural change among community towards risk protection and transfer

Ensure affordability
- Supporting insurance premiums for end customers (at least in the pilot phase, to wean off as adoption increases)

Enable accessibility
- Improving financial inclusion by supporting unserved and underserved communities in opening or re-activating bank accounts, improving access to formal financial systems

Improve product relevance
- Gathering quantitative data and qualitative feedback from communities served, and providing this information to insurers to improve product development

2 A catalytic role in easing supply-side bottlenecks

Establish distribution channels through embedding
- Supporting the embedding of insurance into existing products and channels, such as microfinance, telco services, e-commerce
- Placing risk transfer into products that have already been built, funded, or implemented, so that purchase of insurance is not a standalone decision

Alleviate trade-off between adaptation investment and insurance costs
- Climate adaptation requires high upfront costs, while insurance savings are gradual and uncertain due to annual policy and reporting cycles
- Philanthropy can guarantee premium reductions over a period of time, backstopping insurers and converting uncertain savings into credible returns, thereby making adaptation investments financially viable

Add a different layer of protection
- Reducing barriers to entry by absorbing first loss, enable insurers to price lower, and crowd in private capital to make risk insurable. An example could be in piloting wider thresholds for parametric payouts, to test feasibility and to build product buy-in

3 An enabling role in building the insurance ecosystem for climate resilience

Cross-sector partnerships
- Leveraging philanthropic capital to mobilise private and public capital into insurance and climate resilience initiatives

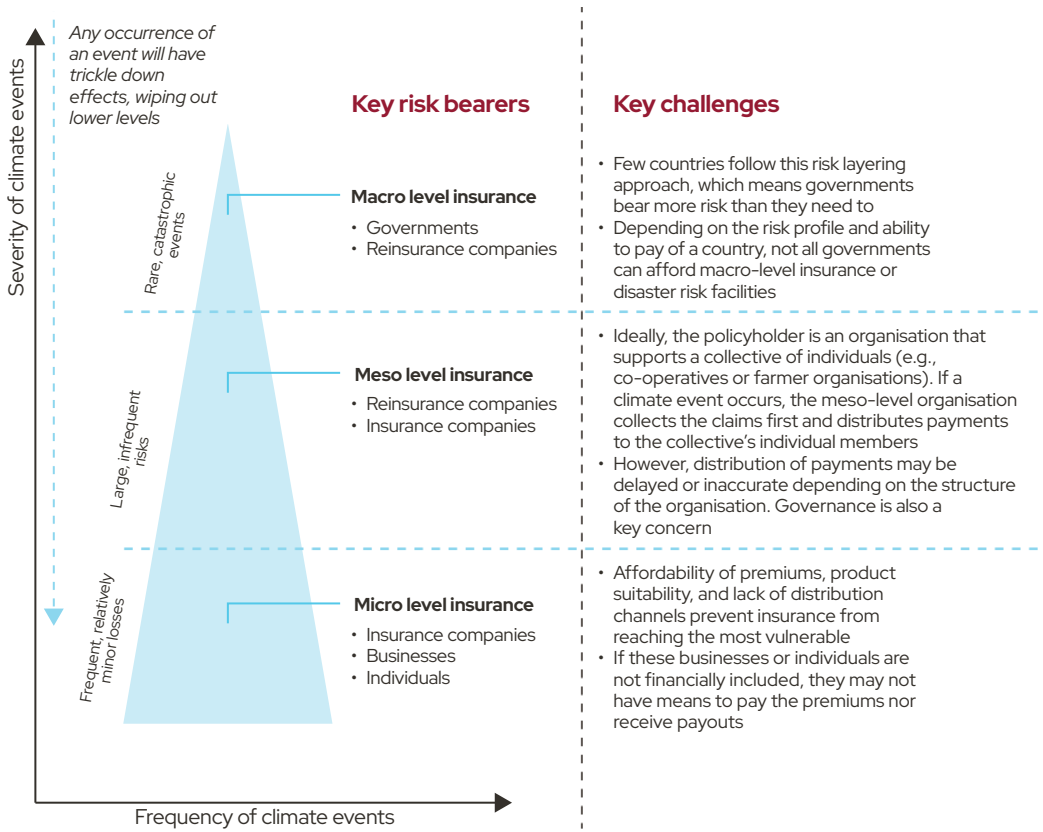
Demand aggregation
- Funding the establishment or capacity strengthening of intermediaries/ aggregators for target customers. These could be NGOs or co-operatives, who could act as policyholders on behalf of large groups

Data infrastructure
- Setting up data collection capabilities in emerging markets for climate and insurance data, enabling better understanding & aggregation of demand
- Ensuring data quality, interoperability, and access for all stakeholders

Adaptation
- Increasing adoption of climate adaptation measures to shrink overall risk levels
- Increasing insurability of climate-vulnerable and exposed communities

Also, systemic challenges can be augmented to enable the efforts by private industry and philanthropy to be more effective

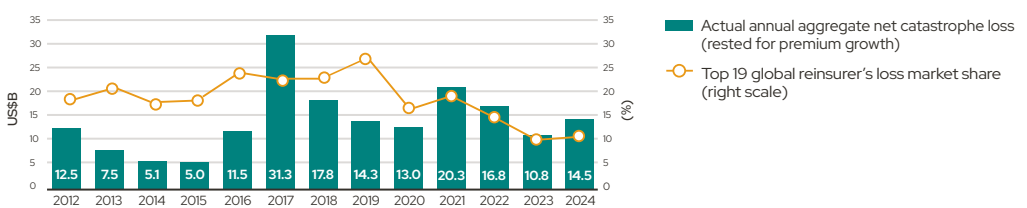
Figure 53. Risks and challenges across all levels of insurance[1]



The role of reinsurers

Reinsurance is insurance for insurance companies. As risks are transferred from individuals and companies to the primary insurer, **reinsurance allow these insurers to reduce their risk exposure by absorbing some of their losses.** Reinsurance companies then diversify their portfolio of risks by geography and type of risk, as well as pass on the risk to other reinsurers or to capital markets through securitisation.[2]

Figure 54. Coverage of the top 19 global reinsurers, as percentage of total insured industry catastrophe losses in 2024[3]



- Improved terms have reduced top global reinsurers' loss share (~11%), with capital adequacy expected to hold even under a 1-in-50-year loss scenario—indicating sufficient capacity to support climate risk[3]
- Reinsurers across South Asia and SEA reported strong earnings, but rising competition is likely to compress margins. This may make these regions less attractive to reinsurers should the situation persist[4]
- Additionally, regulatory (e.g., foreign ownership limits, mandatory cessions, capital localisation) and administrative challenges continue to constrain cross-border reinsurance, limiting regional risk pooling and adaptation financing[5]

Source: 1 Adapted from ISF (2022), State of the Sector: Agri-Insurance for Smallholder Farmers; **2** Swiss Re (2015): The essential guide to reinsurance; **3** The Insurer (2025): S&P says reinsurers' loss shares historically low but cat appetite stabilises; **4** Insurance Asia News (2025): Full Capacity: Shifting tides of Asian reinsurance; **5** Insurance Asia (2026): Trade barriers limit cross-border ASEAN reinsurance flows.

Governments play a significant role in building enabling conditions for the private sector to leverage opportunities effectively

Fiscal incentives (e.g., subsidies, tax deductions, premium credits)

- Tax deductions or exemptions (e.g. Value-added Tax (VAT) or Goods and Services Tax (GST)) for insurance premiums can help to make insurance more affordable and attractive, therefore increasing adoption
- Subsidies can also help to promote the adoption of insurance protection, especially by making insurance accessible and inclusive for vulnerable groups.[1] For example, in Thailand's Rice Insurance Top Up Scheme (introduced in 2011), the **government subsidies 60% of the premiums**, with the rest of the 40% subsidized by Bank for Agricultural Cooperatives (BAAC) for farmers who avail of loans. **By 2021, more than 13.5 million farmers were covered, representing 76% of the total rice plantation area in Thailand**[2]
- On the supply side, grants/credits can also incentivise insurers to engage in more product innovation and service enhancement

Supportive and responsive regulatory frameworks

- In response to the growing volatility of climate change, parametric insurance is emerging as an innovative approach in response. However, the **adoption of parametric insurance remains limited in Asia as there are differing regulatory views**, due to the product's non-indemnity characteristics[3]
- Programmes like the UNDP-BMZ-Generali-ICMIF Foundation's inclusive insurance innovation programme seeks to enhance policy and regulatory environments across 30 countries, including countries in Asia[4]

Capacity building and raising awareness

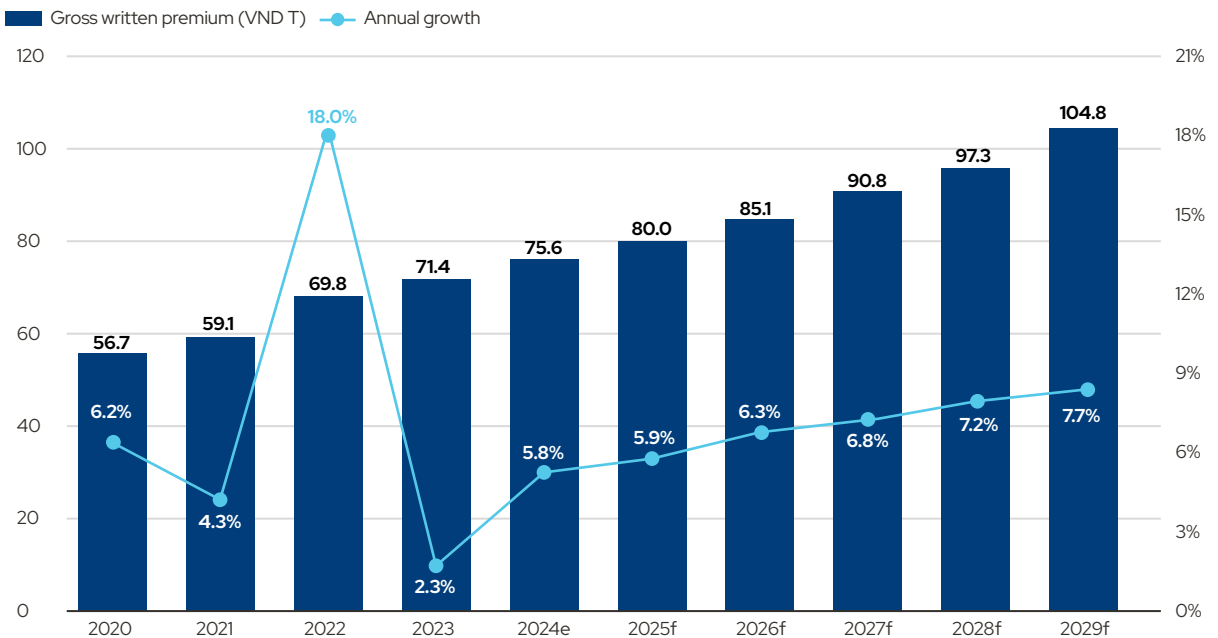
- Public sector can support **public awareness campaigns aimed at educating individuals and businesses about the importance of insurance**. Initiatives that complement efforts in promoting financial literacy and the benefits of insurance coverage are usually more effective at increasing awareness, which can help to drive industry growth[1]

Source: 1 Prudential (2025/26): Beyond Coverage: The Social and Economic Impact of Insurance in ASEAN; **2** ASEAN Insurance Council (2022): What can ASEAN learn from Thailand's Rice Insurance?; **3** Monetary Authority of Singapore (2025): [Speech] Strengthening Risk Resilience Through Innovation and Collaboration; **4** UNDP IRFF (2025): UNDP, BMZ, Generali and ICMIF Foundation deliver world's largest inclusive insurance innovation programme across 30 countries.

Market highlight: Growth of the non-life insurance sector in Vietnam

- In **2022**, Vietnam introduced the **Insurance Business Law**, allowing **100% ownership by foreign investors of the shares of an insurance company in Vietnam**[2]
- This attracted significant foreign direct investment, **streamlined licensing requirements, and made it easier for new insurance players to enter the market**, promoting the development of the insurance sector[1]
- However, today, the insurance market is **highly fragmented**, with over 40 players but dominated by a few major ones, including both local and foreign. There is **intense competition and tight underwriting profit margins**, **especially in traditional non-life segments** like motor and health insurance[3]
- Lower interest rates are **affecting investment returns**, while tightening regulatory compliance and heightened climate risk are **concurrently raising operational burdens**[4]

Figure 55. Vietnam general insurance – Gross written premiums (VND trillion) and annual growth, 2020 – 2029[a, 1]

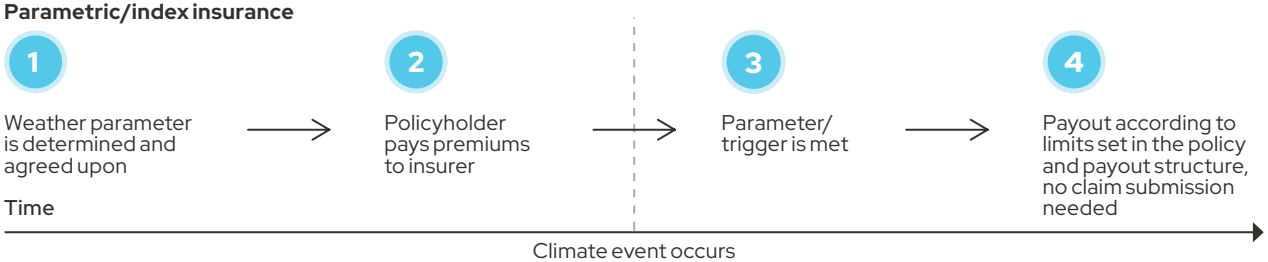


Legend: e - estimated, f - forecast. Information retrieved from GlobalData Insurance Intelligence Centre

Note: a Growth continues to be driven by rising natural disaster risks, broader health insurance coverage, increased demand for microinsurance, and supportive regulatory reforms. **Source: 1** InsuranceAsia (2025): Vietnam general insurance market to grow 7% annually through 2029; **2** UNCTAD (2022): Allows foreign investors 100% ownership in insurance sector; **3** MSIG (2025): The "X Factor" in Unlocking Insurance Growth in Emerging Markets: A case study of Vietnam; **4** Vietnam Investment Review (2025): Non-life insurance market sees bright spots in H1 despite rising challenges.

Market highlight: Parametric insurance for immediate response

Parametric/index insurance



Global market size	**Valued at US$16.2 billion in 2024 and projected to grow at a CAGR of 12.6% between 2025-2034.** Asia Pacific has been identified as the fastest-growing region due to high exposure to climate risks and rising awareness of alternative risk transfer options.[1]
Advantages	• Pre-defined triggers and parameters improve transparency, accelerate payouts, and reduce administrative costs[2] • Policyholders can utilise payouts at their own discretion, providing support for immediate post-hazard cash flow needs[2] • Better-suited for data-scarce environments with limited asset risk information
Points to note	• Basis risk, where trigger and payout does not match the actual loss experienced by the policyholder, can erode consumer trust • Positive basis risk (where payout is implemented when there is no damage) and negative basis risk (no or insufficient payout after damage occurred) would need to be minimised through product design • Evolving regulations may slow product approval and deployment • Timely, reliable climate data is required but often difficult to obtain and verify
Applicability to CA&R	Suitable for situations where the insured is not looking for extensive amounts of payouts for reconstruction of assets, but rather for funds to **respond immediately to a climate shock or catastrophic event**[3]

igloo

CA&R SECTOR
Agriculture and allied sectors

GEO OF OPERATIONS
Singapore, Thailand, The Philippines, Indonesia, Malaysia, Vietnam

MATURITY
Series C

HQ
Singapore

YEAR ESTABLISHED
2016

TOTAL RAISED
> US$100M (2026)

Solution and impact thesis

Igloo offers parametric weather index insurance in Vietnam. Parametric insurance eliminates the need for manual verification of crop loss, with smart contracts making payouts almost automatic.

Igloo directly addresses the challenge of manual processing in crop-loss verification by offering parametric weather index insurance tied mainly to excessive rainfall.

Under Igloo's Weather Index Insurance coverage, premiums start from US$8 (for rice) and US$42 (for coffee) per hectare, with a minimum coverage area of 0.1 hectare to accommodate small-scale farmers.

Business model

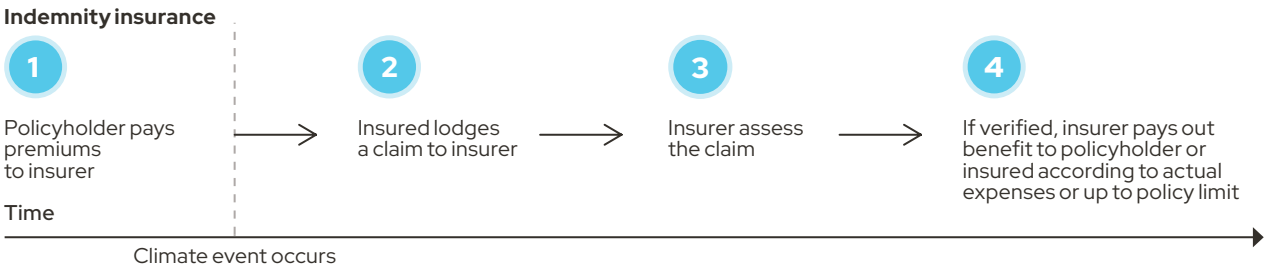
Claim payouts are triggered automatically based on a predefined index of rainfall levels instead of crop damage, eliminating the and costs of individually verifying claims.

The elimination of manual processes is also achieved through smart contracts, which allows claim payouts to be automated. Parametric weather index insurance and smart contracts also increases the transparency of payout eligibility.

More information can be found in Igloo's case study in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP

Source: 1 Insurance Asia (2025): Parametric insurance market set to hit $51.3b by 2034; **2** World Economic Forum (2025): What is parametric insurance and how is it building climate resilience? **3** Climate Policy Initiative (n.d.): Parametric Insurance.

Market highlight: Indemnity insurance for longer-term response



Global market size	**Premiums increased by US$441 billion in 2024, bringing total premium income to US$5.5 trillion.** Total premium income for Asia was around US$1.6 trillion, which means that one in five global premiums are written in this region[1]
Advantages	• Tends to be welfare superior, as the coverage provided to the insured who underestimate the event probability is larger than with parametric cover[2] • Common for low-severity, high-frequency events; cover against a range of potential losses that may not affect society but are still critical to the financial stability of policyholders[3] • Better matches the actual loss experienced by policyholders
Points to note	• A known value for reconstruction (life, asset, etc.) is required to develop an indemnified insurance product, where the price of the product will to be based on the cost of repairing the property and the likelihood of partial or full loss[3] • For a payout to be released, the loss needs to be assessed and verified. This increases administration costs and processing times • In areas of high risk, indemnity insurance products can be priced out of the affordable range for the people affected
Applicability to CA&R	Suitable for medium- and longer-term responses involving the rebuilding of physical assets, such as the expensive reconstruction phase of post-disaster management[3]

PIONEER
YOUR INSURANCE

CA&R SECTOR
Financial services

GEO OF OPERATIONS
The Philippines

HQ
The Philippines

YEAR ESTABLISHED
1954

PORTFOLIO
US$67 million worth of microinsurance policies (2025)

Solution and impact thesis

Pioneer is a leading insurance player in the Philippines and has operated for more than 70 years.

With the aim of becoming the insurer of choice for the country, Pioneer decided to venture into microinsurance back in 2007 to avail protection to unserved and underserved markets.

With the growth of microfinance in the Philippines, Pioneer saw an opportunity to leverage distribution channels and address unserved and underserved segments. Microinsurance helps to ensure that people nearer the bottom of the pyramid are cushioned against climate shocks and have enough to rebuild and restart much faster and sooner.

Business model

Pioneer partnered with credible, trusted institutions patronised by their target market to build awareness of and trust in insurance. These included microfinance institutions, NGO.

For example, MFIs who are able to provide the low income population with financial access. Similarly, NGOs and money remittance agencies are other key partners for Pioneer due to their ability to reach the target market.

More information can be found in Pioneer's case study in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP

Source: 1 Allianz (2025): Allianz Global Insurance Report 2025: Rising demand for protection; **2** CESinfo Working Paper (2022): Insurance for Catastrophes – Indemnity vs Parametric Insurance with Imperfect Information; **3** Jarzabkowski et al., (2019): Insurance for Climate Adaptation: Opportunities and Limitations.

Case study examples: Risk transfer and insurance

	Commercial			Philanthropy		Public
Organisation	**Igloo:** Launched the first parametric insurance for rice in Vietnam	**Pioneer Inc.:** Leading microinsurance company in the Philippines	**BlueOrchard:** Emerging Market private and listed debt and private equity funds, with dedicated climate adaptation strategies supporting the growth of the climate insurance industry	**Prudential and Prudence Foundation:** Global insurer with a community investment arm working to drive inclusive insurance	**The Rockefeller Foundation:** Global philanthropy that is leading the way in innovative partnerships for climate resilience	**SEADRIF:** Development insurer transforming how ASEAN governments manage climate risk
Year established	2016	1954	2001	1848/2011	1913	2019
Geography	SEA	The Philippines	Emerging markets	Global/Asia, Africa	Global	SEA
Revenue/AUM	Total raised >US$100M (2026)	Portfolio of US$67M worth of microinsurance policies (2025)	US$ 5.6B	US$278B (FY2025)	US$6B	N.A.
Type	Insurance company		Funder	Insurance company & funder	Funder	Reinsurance & risk transfer
Business model innovation	Using predefined rainfall index to trigger claim payouts; embedding product into existing distribution channels	Building microinsurance products that are simple, relevant, affordable, accessible, and pays claims	Improving insurance delivery through enabling an end-to-end insurance ecosystem	Stewarding climate resilience through the flywheel of insurer-investor-philanthropy	Leveraging philanthropic capital to mobilise more private sector finance towards climate	Using blended finance to unlock climate risk transfer and resilience at scale for SEA
CA&R impact	• Elimination of manual process with automated claim payouts • Increase reach of insurance to the underserved	• Cushion vulnerable communities from climate hazards and shocks • Protect livelihoods and ensure that people are able to recover post-hazard	• Increase in uptake of climate insurance by low-income households and SMEs • Enhance protection and resilience against climate shocks	• Increase awareness towards climate and health risks and opportunities • Enhance protection and resilience against climate shocks	• Demonstrated the feasibility of a parametric insurance in Nepal • Increased protection of the climate-vulnerable and underserved	• Enable faster, more predictable disaster response through pre-arranged financing • Reduce fiscal volatility and protect public service continuity
Other impact	• Potential to expand parametric weather index insurance to other crops and countries	• Encourage behavioural change in people's perception of climate risks and need for protection • Develop new insurance products for farmers and fisherfolk	• Encourage usage of technology to help with distribution and claims processing • Build trust in insurance as a product	• Gather feedback from community to inform insurance product development and refinement • De-risking of investment portfolio	• Improved financial inclusion as the insured opened or reactivated bank accounts • Enabled private sector insurer to provide coverage	• Transfer disaster risk from public budgets to international re/insurance markets • Enable regional collaboration and risk pooling to build climate resilience across SEA

Note: All examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP.

Turning promising CA&R solutions into system-level impact requires moving beyond identifying opportunities, to mobilising capital across the spectrum; aligning risk, incentives, and long-term impact

Financial services as CA&R enabler

Financial services are a core enabler of CA&R spanning all sectors and impact pathways ranging from preparedness to response and recovery

Financial resilience is the cornerstone necessary to ensure communities can recover smoothly and promptly in the aftermath of a climate shock.

Climate risk can, and should be, distributed to other layers such as insurance and reinsurance, through this does not entail a full transfer of risk from climate change

What can be done today?

Take individual action

Adaptation measures must be implemented upstream to reduce the impact of climate events, while individual resilience should also be strengthened so that climate risk is not disproportionately concentrated at any single layer

Adaptation measures and risk transfer mechanisms should be implemented in tandem to strengthen resilience across the full life cycle of exposure to climate shocks

Funders will need to adjust financing timelines and cycles and rethink traditional approaches to better align with climate risks and solutions

Collaboration across the capital spectrum is needed to unlock innovative financing structures that enable climate solutions to be funded at a sufficient scale and in a sustainable manner

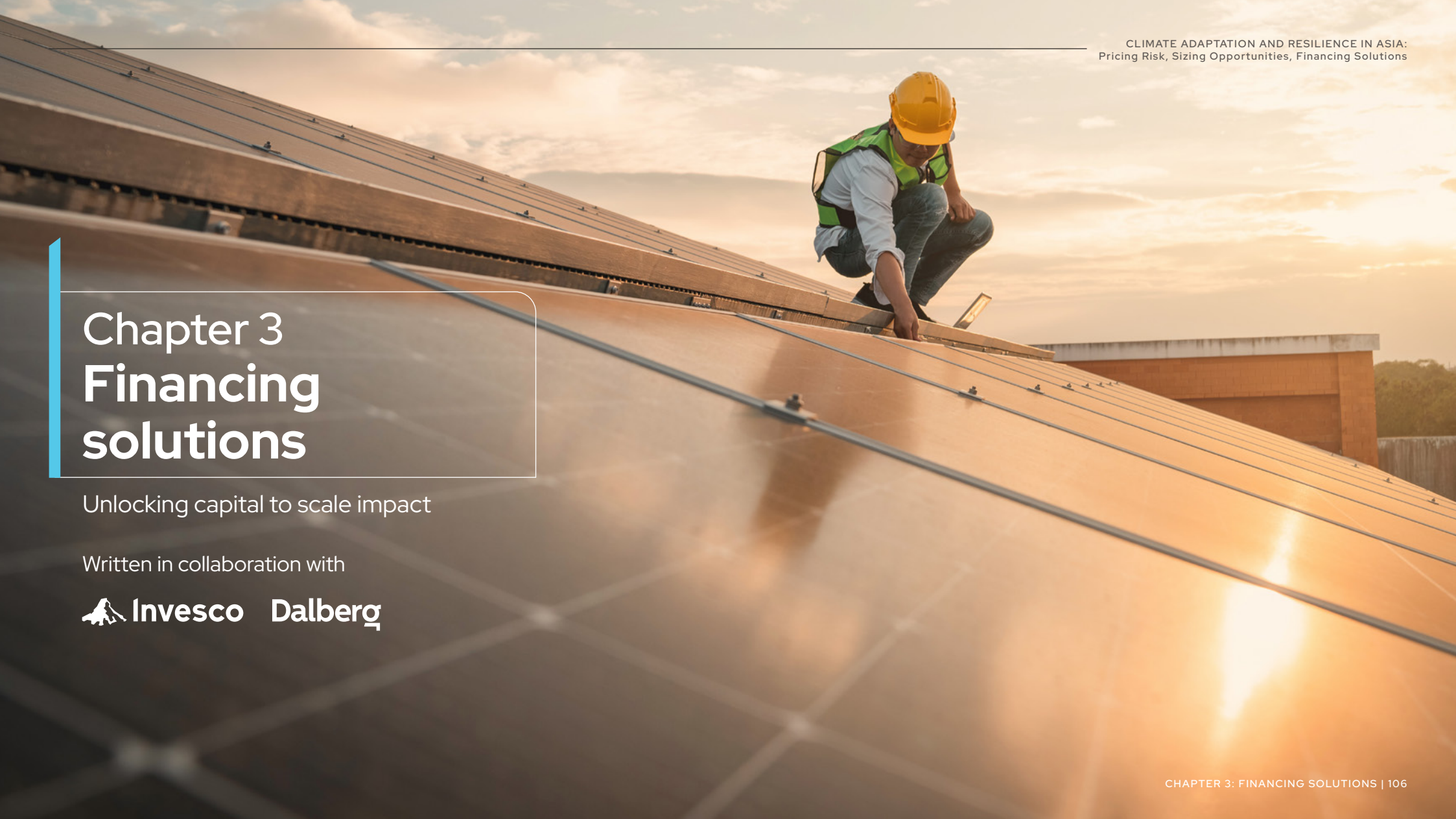
Enable systemic change

Coherent policy approaches to improve financial inclusion are necessary to build fundamental financial resilience, including improved financial and digital literacy, robust national ID systems, strengthened credit bureaus, and stronger consumer protection and grievance mechanisms

Responsive regulatory frameworks can enable financial innovation, including digital financial services such as e-wallets and mobile payments, as well as parametric insurance

Fiscal incentives play a key role in ensuring the affordability of insurance, including subsidies and tax deductions that can help make insurance accessible for vulnerable and underserved groups

Comprehensive capacity building and awareness-raising are critical to strengthen financial inclusion and community-wide financial resilience, particularly through education on holistic financial services



Chapter 3
Financing solutions

Unlocking capital to scale impact

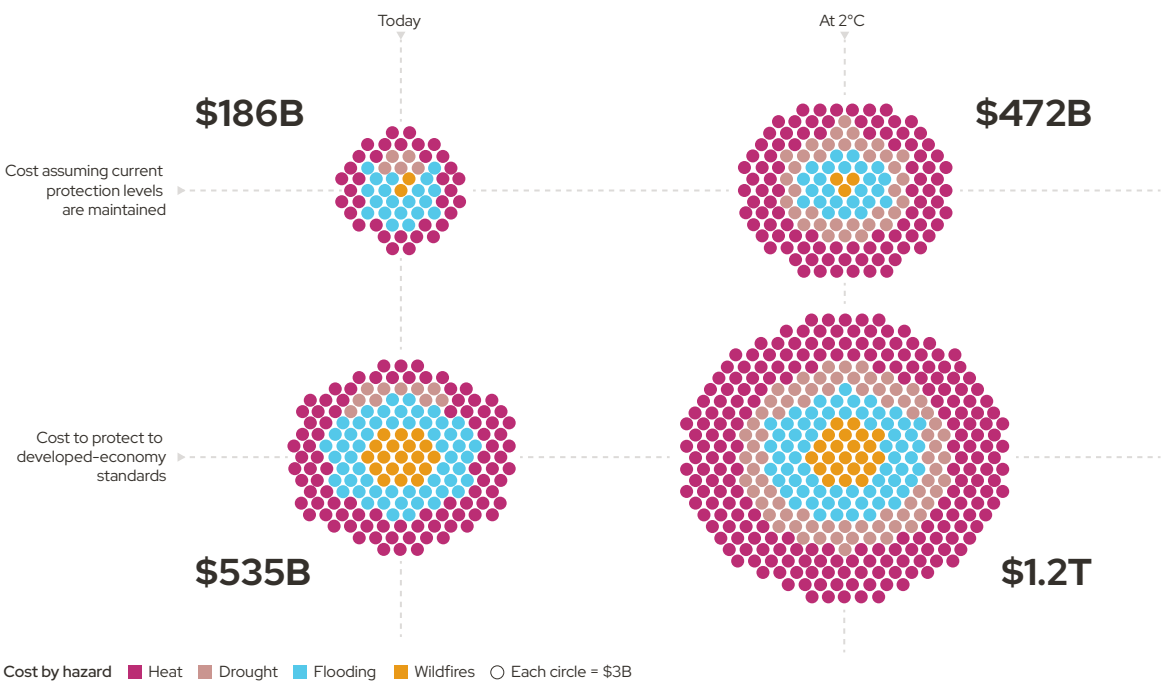
Written in collaboration with

Invesco Dalberg

Significant funding for CA&R continues to be required globally

At 2°C, maintaining current protection costs 2.5x today's spending, and protecting to developed-economy standards costs 6.2x as much

Figure 56. Global average annual operating and amortised capital costs to adapt to hazards
2020 US$, 2020-2050



By 2050:

US$472B p.a. required globally **to maintain**

current protection levels under a 2°C scenario, a significant increase from current cost of US$186 billion[1]

US$1.2T p.a. required globally **to increase**

protection of developing economies to developed economy standards[1]

Heat, drought, and flooding drive future costs, with heat and drought projected to affect significantly more people.[1]

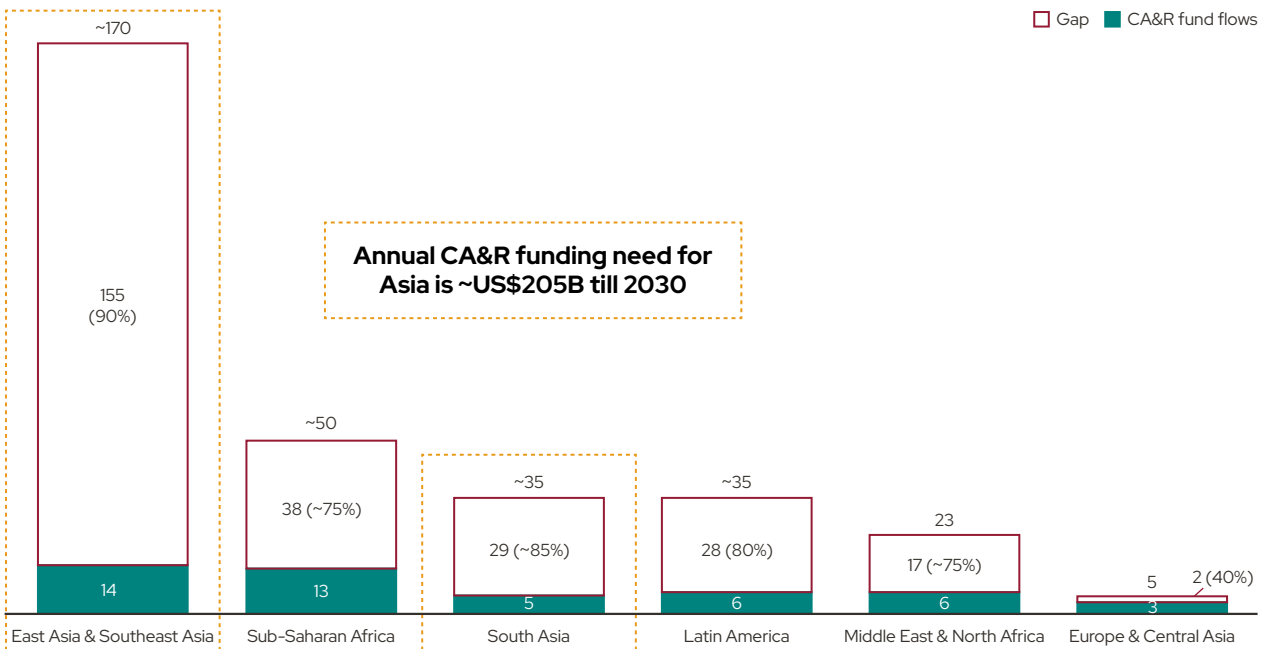
Today, **flooding attracts majority of current funding attention**. For example, the World Bank had no projects explicitly targeting heat from 2012 to 2023.[2] This contrasts with US$4.4 billion committed to urban flood resilience across 58 countries since 2019.[3] Similarly, drought remains underfunded due to its lower visibility relative to floods.[4]

The effects of specific hazards in CA&R financing across sectors will be addressed where relevant in this chapter.

Source: 1 McKinsey Global Institute (2025): Advancing adaptation: Mapping costs from cooling to coastal defenses; **2** World Bank (2024): Combating Heat in Cities: Operationalizing the Urban Heat Agenda at the World Bank; **3** World Bank (2026): Strengthening Flood Resilience in Rapidly Growing Cities; **4** World Bank (2025): Financial Tools for the Water Sector to Support Drought Risk Management.

CA&R financing needs and gaps are largest in Asia

Figure 57. Estimated CA&R annual needs (2030) versus current funding (2023) for developing countries, by region[a, b, 1]
US$B (based on 2023 funding data)



Asia accounts for majority of the global CA&R funding needs and gap. Annual CA&R funding need for Asia is ~US$205 billion until 2030. ~69% of global CA&R needs and ~75% of global gap is concentrated in Asia, reflecting the region's high climate exposure and large infrastructure and population needs.[1] East Asia and SEA show the largest absolute gap

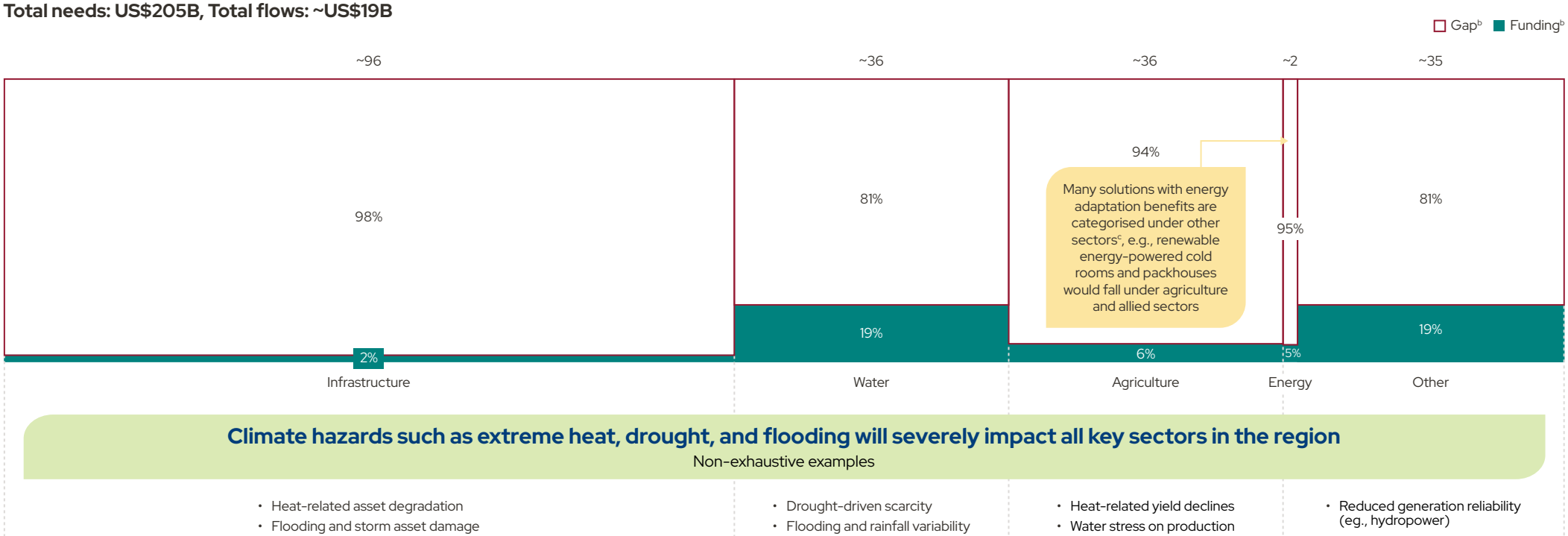
At present, **CA&R fund flows are dominated by public budgets**[c]

Global estimates suggest that 15-20% of CA&R investment needs can be **privately financed**.[2] Private finance[c] accounts for <11% of CA&R funding globally[3]

Note: a Total CA&R finance needs estimates vary by source of data - the annual data for East Asia, Southeast Asia, and South Asia has been sourced from CPI report (2025) and the data for Latin America & the Caribbean, Middle East and North Africa, Europe & Central Asia and Sub-Saharan Africa has been sourced from UNEP Adaptation report; **b** Markets included in regions are **i** East Asia: China, Hong Kong SAR, Japan, Macao SAR, Mongolia, North Korea (DPRK), South Korea, Chinese Taipei; **ii** SEA: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Vietnam; **iii** South Asia: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka; **iv** Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; **c** Private finance includes philanthropies, PE/VC capital, private bonds, private mergers and acquisitions, private debt and publicly traded equities. **Source: 1** Dalberg analyses; Climate Policy Initiative (2025): Bridging the adaptation finance gap in Asia; UNEP (2023): Adaptation Finance Gap Update 2023; **2** McKinsey & Company (2025): Climate resilience technology: An inflection point for new investment; **3** UNEP (2025): Adaptation Gap Report 2025.

Gaps in Asia are significant across all sectors, especially infrastructure, energy, and agriculture

Figure 58. Estimated CA&R annual needs (2030) versus current funding (2023) for Asia[a, b], by sector
% of total, US$B (annual needs until 2030; current funding flow to sectors is based on 2023 funding data)
Total needs: US$205B, Total flows: ~US$19B

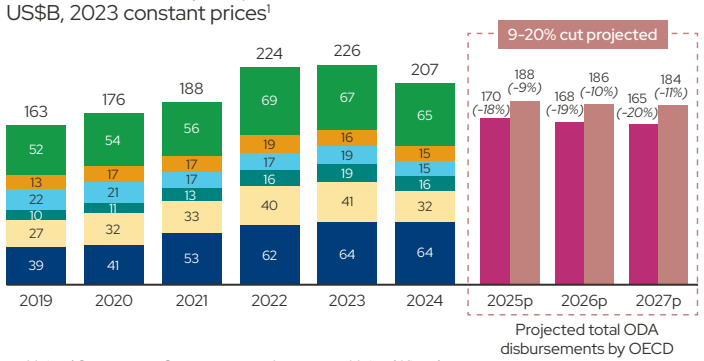


Note: a Asia includes East Asia,SEA and South Asia; **b** Funding gap is based on **i** CPI adaptation finance needs for East Asia & Pacific and South Asia, **ii** sectoral split based on UNFCC data (annual adaptation needs by sector for developing countries for 2021-2030) vs latest tracked fund flows by sector from CPI (2023); where sector splits are not available they have been grouped cumulatively under "Other" as tracked by CPI databases; **c** Solutions categorisation across sectors is based on where outcomes are expected. For e.g, some solutions with energy benefits may be categorized under other sectors RE-powered cold rooms is categorised under agriculture and allied sectors. **Source:** Dalberg analyses; CPI (2025): Bridging the gap in adaptation finance; CPI (2026): Global Landscape of Climate Finance Data Dashboard; UNEP (2023): Adaptation Finance Gap Update 2023.

The current geopolitical and funding landscape underscores the importance of private and philanthropic capital

Global Official Development Assistance (ODA) fund flows in decline

Figure 59. Net ODA disbursements by OECD Development Assistance Committee (DAC) countries
US$B, 2023 constant prices[1]

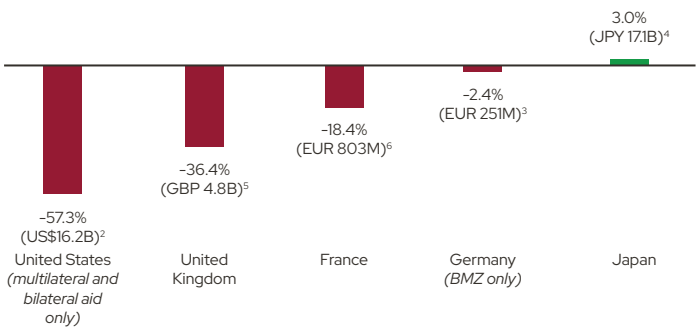


Note: p - projected

~70% of global ODA
is funded by France, Germany, Japan, the UK, and the US, with the US leading[1]

Significant budget cuts by top donors

Figure 60. Change in ODA budgets[a] change for top 5 global donors from FY2025 to FY2026



4 of the 5 top donors are redirecting ODA
in 2026 budgets to defence, security, and domestic economic issues, driven by geopolitical tensions, and broader territorial and security concerns[7]

ODA reductions constrain DFI capacity to crowd in subsequent private capital for developing countries[8]

Shifts in global development landscape

US$32B loss
in global aid due to dismantling of USAID, including **US$6 billion for Asia (US$915 million for SEA)**, based on 2024 disbursements[9]

US$4.6B owed
to the UN in 2026, including US$2.2 billion for the regular budget (>95% of dues), **raising UN financial sustainability concerns**[10]

US$4B loss
in **climate financing** as the **US rescinded its GCF pledge and exited the UNFCCC** in January 2026[11]

£2.6B loss
in **climate financing from the UK to developing countries** for 2027-2031 (22% cut)[12]

Asia will need new initiatives and capital providers to fill this gap

Shift from aid to development finance beyond ODA, such as the mobilisation of domestic public resources, to reduce aid reliance[13]

Stronger integration of civil society and local economy solutions to support inclusive capacity-building and promote self-sufficiency[14]

Increased role for private and philanthropic capital via innovative finance and catalytic capital[15]

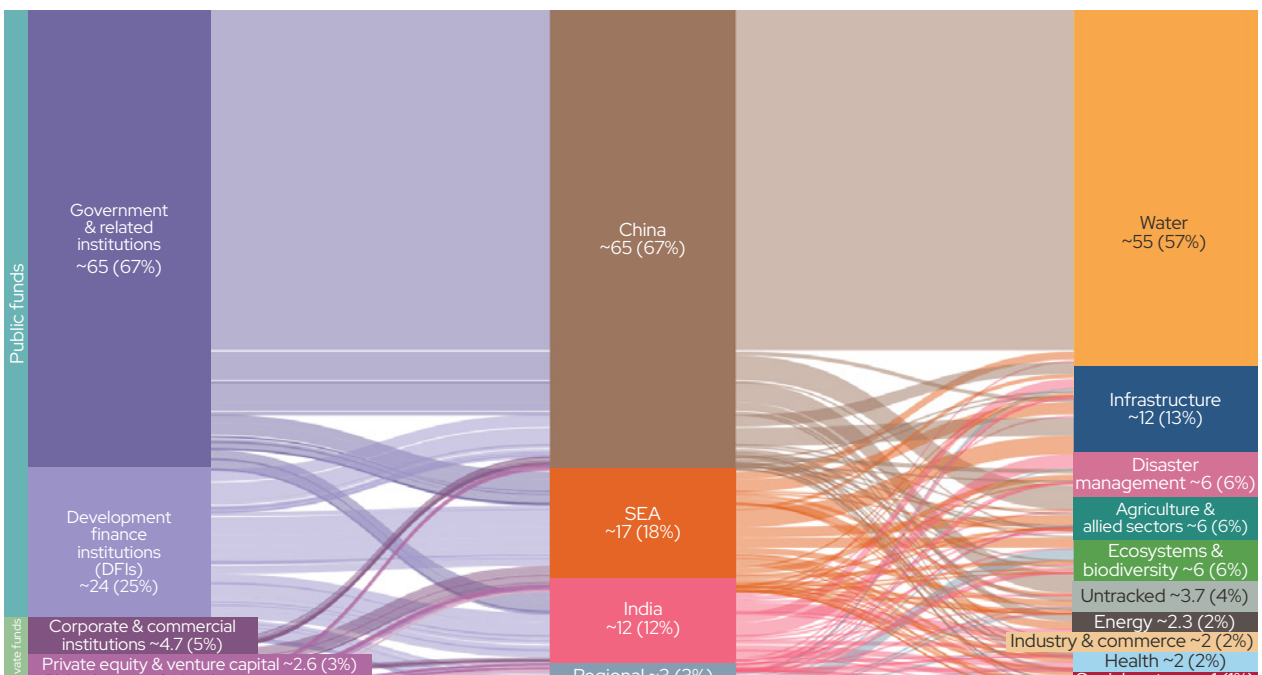
Asia to lead Asia by advancing climate financing, regional cooperation, and initiatives, such as SEADRIF and FAST-P[16]

Note: a Budget change was calculated prior to the Iran war. **Source:** CIIP's calculations; **1** OECD (2025): OECD Data Explorer: DAC1: Flows by provider (ODA+OOF+Private); OECD(2025): Official development assistance (ODA); **2** United States Department of State (2025): Congressional Budget Justification: Department of State, Foreign Operations, and Related Programs; **3** Donor Tracker (2025): Germany approves US$606 billion budget for 2026, US$11.6 billon allocated to the BMZ; **4** Ministry of Foreign Affairs of Japan (2026): ODA Budget; **5** United Kingdom Parliament (2025): UK aid: spending reductions since 2020 and outlook from 2024/25; United Kingdom Parliament (2025): UK aid: Reducing spending to 0.3% of GNI by 2027/28; United Kingdom HM Treasury (2025): Spring Statement 2025 document; **6** Focus 2030 (2025): France's draft 2026 Finance Bill: further cuts planned for Official Development Assistance; **7** Policy Center for the New South (2025): From Financing to Investing for Development: The End of ODA as We Know It; **8** OECD (2023): The Funding Models of Bilateral Development Finance Institutions; Donor Tracker (2025): Innovative financing series: How DFIs are transforming ODA for sustainable development; **9** ForeignAssistance.gov (2025): Dashboard; BBC (2025): USAID officially closes, attracting condemnation from Obama and Bush; **10** The Straits Times (2026): UN seeks clarity on when US will pay dues, and how much; The Straits Times (2026): Explainer: Why is UN warning of 'imminent financial collapse'?; **11** Politico (2026): Trump rescinds $4B in US pledges for UN climate fund; US Department of the Treasury (2026): Treasury Announces the United States' Immediate Withdrawal from the Green Climate Fund; **12** The Guardian (2026): UK to cut climate finance to poor countries by a fifth despite promising more help; **13** United Nations (2025): What is financing for development?; United Nations (2025): Sevilla Commitment: Fourth International Conference on Financing for Development; OECD (2025): Mobilising domestic resources in low- and middle-income countries: An analytical framework; **14** World Economic Forum (2025): How partnerships with financial institutions can power inclusive development; **15** Asian Development Bank (2025): Mobilizing Capital for Local Government Finance in Asia and the Pacific Through Green, Social, and Sustainability Bond Markets; UNDP (2025): Unlocking the potential of philanthropy for climate action in Asia and the Pacific; **16** Reuters (2025): Countries agree 10% increase for UN climate budget; SEADRIF (2025): Scaling Regional Protection: SEADRIF's 8th Technical Meeting Drives Collective Action to Strengthen Fiscal and Social Resilience; The Straits Times (2025): Singapore secures $655m to fund green, sustainable projects in South-east and South Asia.

Directional

Governments and DFIs account for ~90% of funding for Asia today; water and infrastructure are key focus areas

Figure 61. Global flow of CA&R finance across Asia, by funder and sector[a, b, c, 1]
Total: ~US$96B (cumulative 2021-2025); 2025 data may be partial due to data limitations



Public finance accounts for majority of CA&R funding in Asia
Governments, DFIs and public budgets provide ~90% of total flows

DFIs play a critical role in financing and provide the lion's share of CA&R funds especially for India and SEA
This reflects their role in financing large-scale resilience infrastructure in the region

Private capital[c] participation remains limited & concentrated
It flows into infrastructure, water, agriculture, and energy sectors

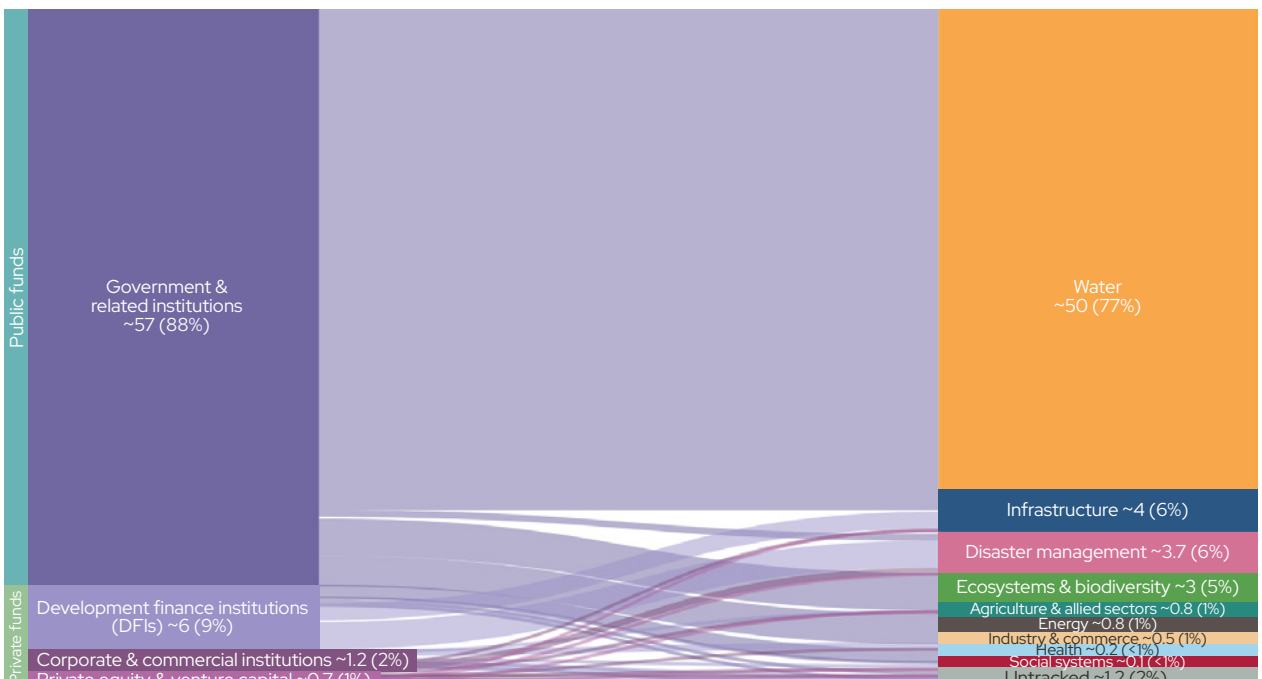
China is investing heavily in CA&R
Primarily led by government institutions (~90%), China has raised US$65+ billion in the last 5 years (2021 – 2025) although this is likely underestimated

Water and infrastructure anchor majority of funding
These sectors receive the largest allocations due to their capital intensity and alignment with public investment mandates

Note: a Asia refers to SEA, China, and India, 'Regional' refers to transactions where funding data is only at a regional level (e.g. Asia) and the split between countries is not given; **b** As government funding data is reported only at the regional level (East Asia & Pacific; South Asia), all such funding has been attributed to China and India respectively, since the majority flows to these economies due to their size (as confirmed by data source); government data unavailable for 2024 and 2025; **c** The proportion of private capital in this analysis may differ from other sources, as this study includes an extensive mapping and tagging of private fund flows not replicated elsewhere. In addition, results may be skewed due to the absence of government funding data for 2024 and 2025. **Source: 1** Dalberg analyses; Pitchbook data (2021-2025); Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard.

Current CA&R financing in China is predominantly government-led, with a strong focus on water

Figure 62. Global CA&R funds to China, by funder type & sector[a, b, 1]
Total: ~US$65B (2021-2025 cumulative); 2025 data may be partial due to data limitations



China's CA&R financing is predominantly state-driven
~97% of funding comes from public sector sources (government financing and related institutions) reflecting the central role of state-directed capital in adaptation investment. This is likely under-estimated given that government and related institution financing data is not available for 2024 and 2025

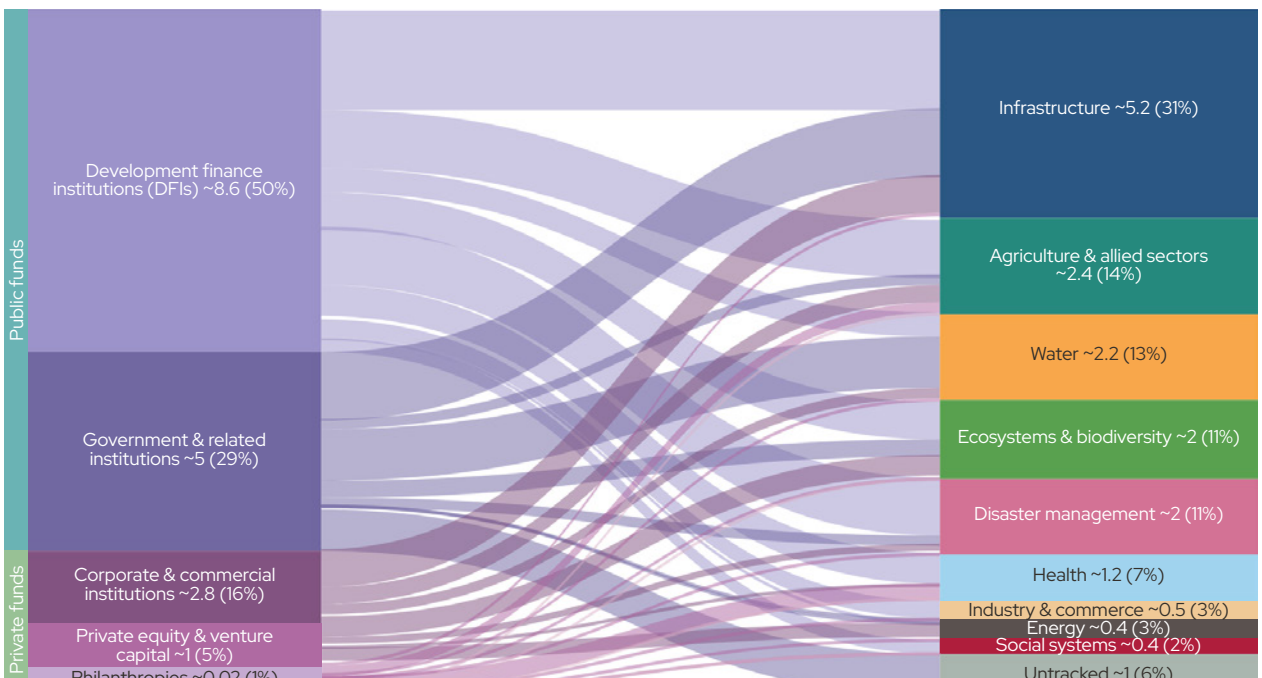
China's CA&R financing is less DFI-led
China's funding mix is anchored in domestic public financing instruments

The water sector dominates fund flows
Water alone accounts for 77% of total flows. Infrastructure and disaster management follow at 6% of financing each

Note: a As government funding data is reported only at the regional level (East Asia & Pacific), all such funding has been attributed to China, since the majority flows to these economies due to their size (as clarified by the data source); government data unavailable for 2024 and 2025; **b** The proportion of private capital in this analysis may differ from other sources, as this study includes an extensive mapping and tagging of private fund flows not replicated elsewhere. In addition, results may be skewed due to the absence of government funding data for 2024 and 2025. **Source: 1** Dalberg analyses; Pitchbook data (2021-2025); Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard.

SEA's current CA&R financing is led by DFIs, with a focus on infrastructure, followed by agriculture, water, and others

Figure 63. Global CA&R funds to SEA, by funder type and sector[a, b, 1]
Total: ~US$17B (2021-2025 cumulative); 2025 data may be partial due to data limitations



SEA's CA&R financing is strongly DFI-led
DFIs account for ~50% of flows in SEA, making them the single largest source of adaptation finance

Private capital financing[b] appears to play an important role in the region
Based on data available, private financing (primarily through private debt and bonds) account for a meaningful share of flows (~21%), indicating the use of capital-market channels alongside development finance. However, the relative proportion of private financing should be interpreted with caution as government and related institution financing data is unavailable for 2024 and 2025

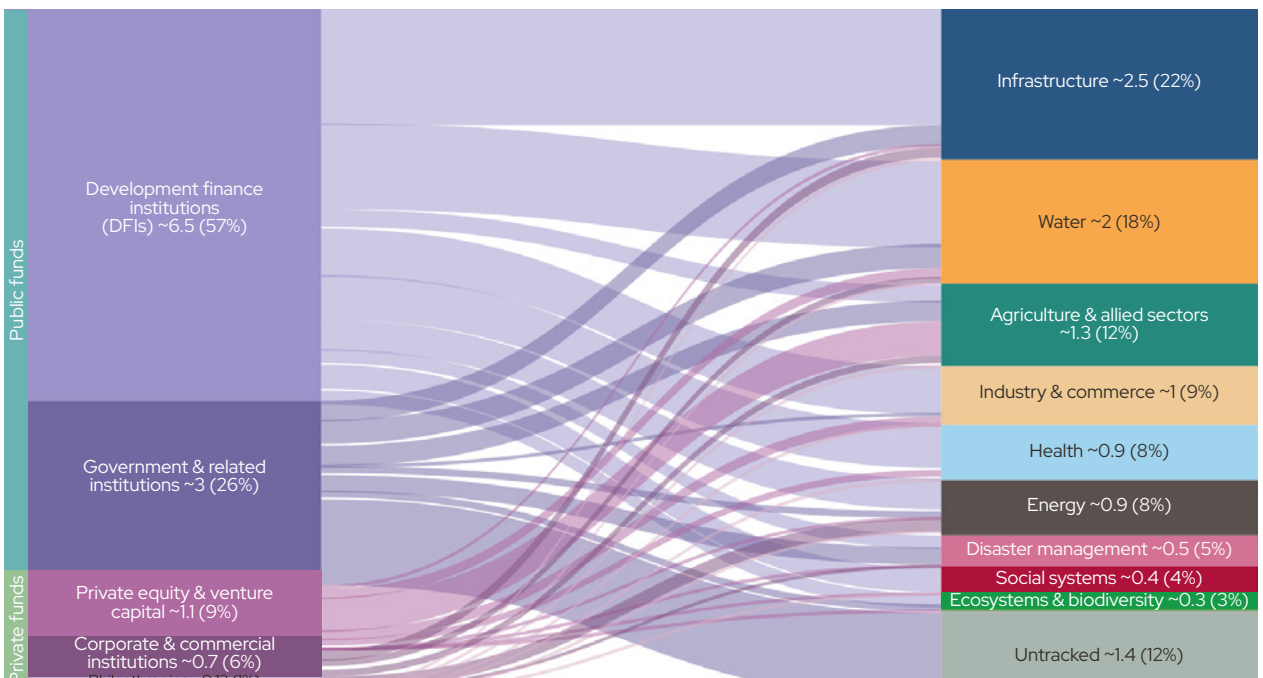
In addition to infrastructure, other sectors receive considerable funding
While infrastructure is the largest sectors of focus, meaningful shares also flow to water, agriculture, ecosystems and biodiversity, and disaster management

SEA funds resilience at the community and systems levels
Funding across varied sectors reflects CA&R financing in the region addressing both large-scale systems and community-level resilience in response to diverse climate risks

Note: a Government data unavailable for 2024 and 2025; **b** The proportion of private capital in this analysis may differ from other sources, as this study includes an extensive mapping and tagging of private fund flows not replicated elsewhere. In addition, results may be skewed due to the absence of government funding data for 2024 and 2025. **Source: 1** Dalberg analyses; Pitchbook data (2021-2025); Climate Policy Initiative (2026): Global Landscape of Climate Finance Data Dashboard.

In India, current CA&R financing is dominated by DFIs, with a focus on infrastructure and water

Figure 64. Global CA&R funds to India, by funder type and sector[a, b, 1]
Total: ~US$11.5B (2021-2025 cumulative); 2025 data may be partial due to data limitations



India's CA&R financing is dominated by DFIs
DFIs account for ~60% of total flows, reflecting their significant role in mobilising adaptation investment in India

Infrastructure and water lead sector allocations
Together they account for ~40% of flows, indicating a strong focus on large-scale system resilience investments

India's market exhibits a diversified sector mix beyond core infrastructure
A meaningful share of funding flows to sectors such as agriculture, industry and commerce, health, and energy

Note: a As government funding data is reported only at the regional level (South Asia), all such funding has been attributed to India respectively, since the majority flows to these economies due to their size (as clarified by the data source); government data unavailable for 2024 and 2025; **b** The proportion of private capital in this analysis may differ from other sources, as this study includes an extensive mapping and tagging of private fund flows not replicated elsewhere. In addition, results may be skewed due to the absence of government funding data for 2024 and 2025. **Source: 1** CPI (2025): Global Landscape of Climate Finance Data Dashboard; **2** Pitchbook data (2021-2025); **3** Dalberg analyses.

Mobilising CA&R financing at scale for Asia

To address existing gaps in CA&R funding in Asia and examine factors underpinning the mobilisation of CA&R financing, this chapter examines three key areas:

Funder insights

How do funders currently approach CA&R as an investment theme, and what key constraints must be addressed to unlock greater allocation?

Innovative finance as a key enabler

How can structures such as blended finance help catalyse a nascent CA&R market in Asia?

Opportunities across asset classes

Beyond innovative financing, how is CA&R reflected across asset classes today, and how can funders align investment objectives with impact outcomes?

The study surveyed funders to better understand activity and interest in CA&R in Asia

Survey completed by **165** Asian[a] funders between September 2025 and March 2026[b]

Representing **>US$1T** AUM or funds managed globally

Survey respondents sample

Figure 65. AUM size

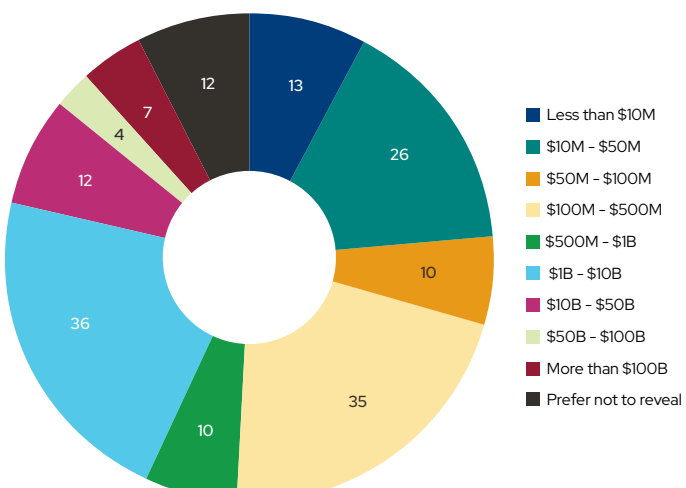


Figure 66. Type of organisation

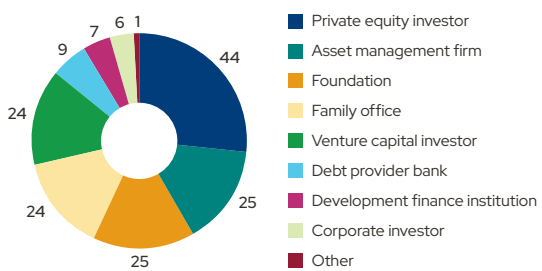


Figure 67. HQ location

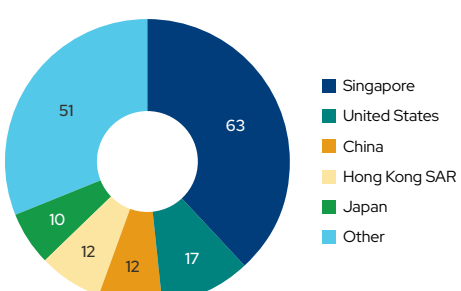


Figure 68. Primary funding approaches

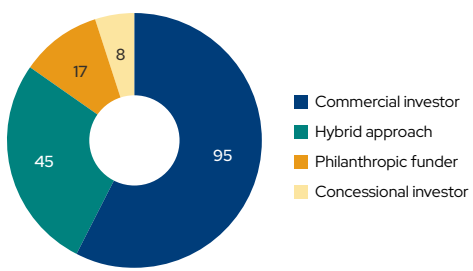
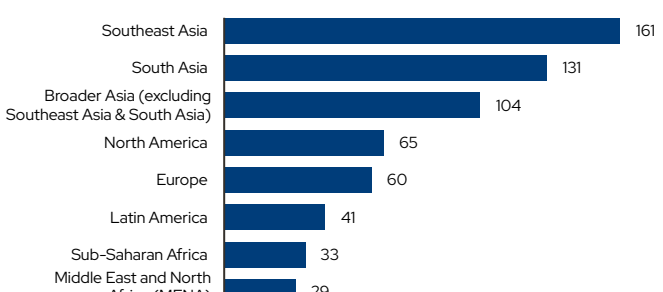


Figure 69. Regional coverage (deployment)

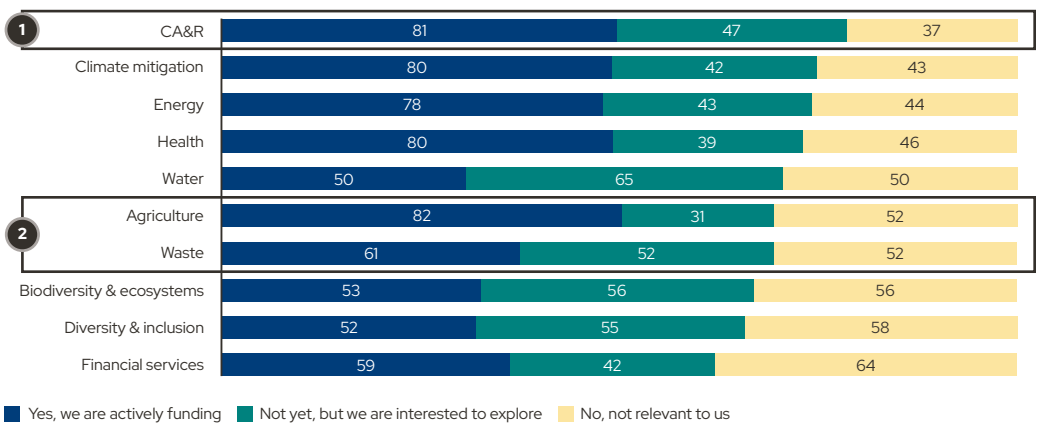


Note: a Asian funders refer to funders who deploy capital into Asia, including Brunei, Cambodia, China, Indonesia, India, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, South Korea, Thailand, Timor-Leste, Vietnam, and others; **b** Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

Survey findings point to strong activity and interest in CA&R

CA&R has highest proportion of funders' current activity and interest

Figure 70. Top 10 funder interest across GIIN impact categories[a] (n=165)

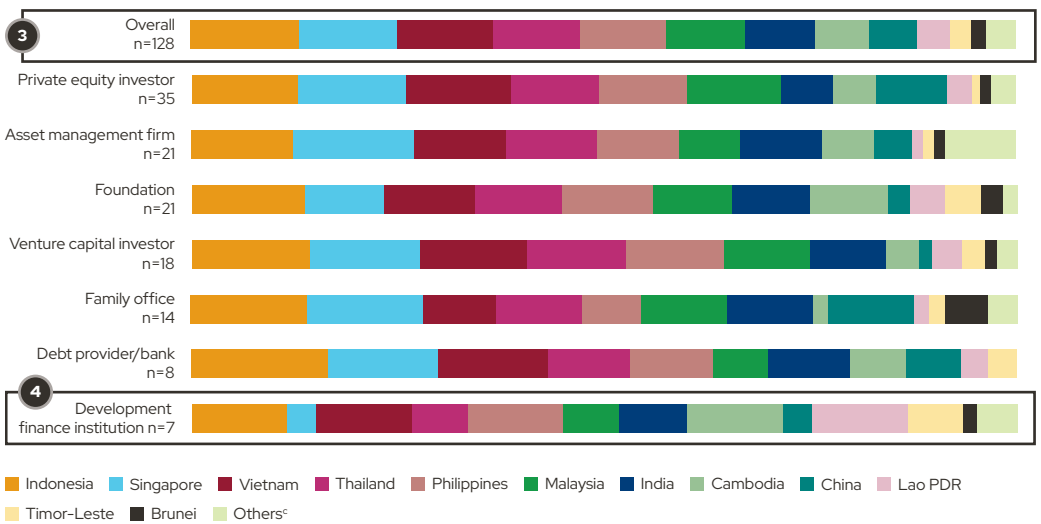


Note: Infrastructure is not presented as a standalone category, but is instead embedded across impact categories, including climate, energy, water, waste, real estate, and others.

1. **Climate adaptation & resilience emerges as the leading impact theme** with the highest combined active & exploratory interest, followed by climate mitigation & energy.
2. **Agriculture attracts the highest active interest, while water has the highest exploratory interest**, reflecting strong investor attention to food and water security. Notable exploratory interest in water suggests latent demand for financing instruments and investment opportunities that are yet to be realised.

Indonesia leads in funder interest for CA&R initiatives

Figure 71. Markets of interest for CA&R active/interested funders, by funder type[b]



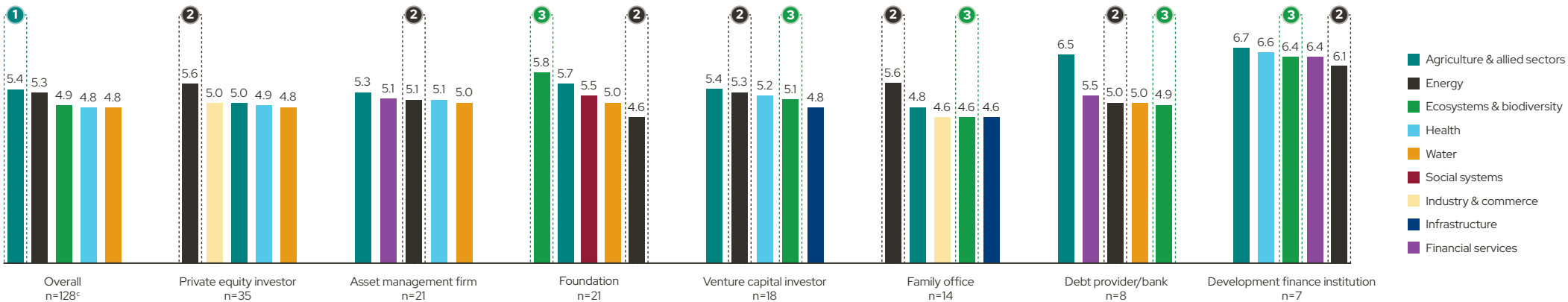
3. **Indonesia, Singapore, and Vietnam attract the highest interest** across all markets surveyed, while Brunei, Lao PDR, and Timor-Leste draw the least interest, reflecting their small market sizes and limited CA&R investment opportunities.
4. **DFIs express higher interest in Lao PDR and Timor-Leste** and less in Singapore relative to other funder types, reflecting their mandate to invest in emerging markets.

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex; **a** Impact categories listed are based on the Global Impact Investing Network (GIIN), with Climate split out into CA&R and climate mitigation for the purpose of this study; **b** Corporate investors are not included in the breakdown as the number of active and/or interested corporate investors is fewer than 5, but is included in Overall, where n=128 and differs from n=165, as the question was only answered by funders who are active and/or interested in CA&R; **c** Other comprises Japan, Myanmar, Nepal, New Zealand, Pacific Islands, Pakistan, Sri Lanka, and Chinese Taipei. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

Directional

Within CA&R, agriculture, energy, and ecosystems are key sectors of interest, with variation across funder type

Figure 72. Top 5 sectors for funders active/interested in CA&R (1 = no interest, 7 = significant interest)[a, b]



1 **Agriculture and allied sectors is consistently among a top priority across funder groups**, reflecting its cross-cutting role in climate resilience, food security, and climate-linked economic stability.

Most solutions are at emerging and high commercial viability, with fund flows concentrated in the climate-smart practices sub-sector. While **climate-smart crop inputs has the high average commercial viability, it receives considerably less funding than other sub-sectors**, suggesting it represents an underinvested opportunity set.[c]

2 **Energy ranks overall second, attracting strong interest from private equity, venture capital, family offices, and DFIs**, suggesting strong scalability and the capacity to mobilise diverse capital pools, supported by innovative financing mechanisms.

Despite strong funder interest, energy solutions with a CA&R lens predominantly have low and emerging commercial viability today. In line with its high commercial viability, **distributed energy mini-grids attract the most funding today as a sub-sector**.[c]

3 **Ecosystems and biodiversity** is of particular interest to **foundations** and **DFIs**, underscoring its relevance to impact-oriented players, given typically longer investment horizons and less immediate financial returns. Despite this, it is notable that **venture capital** investors also show relatively high interest in this sector.

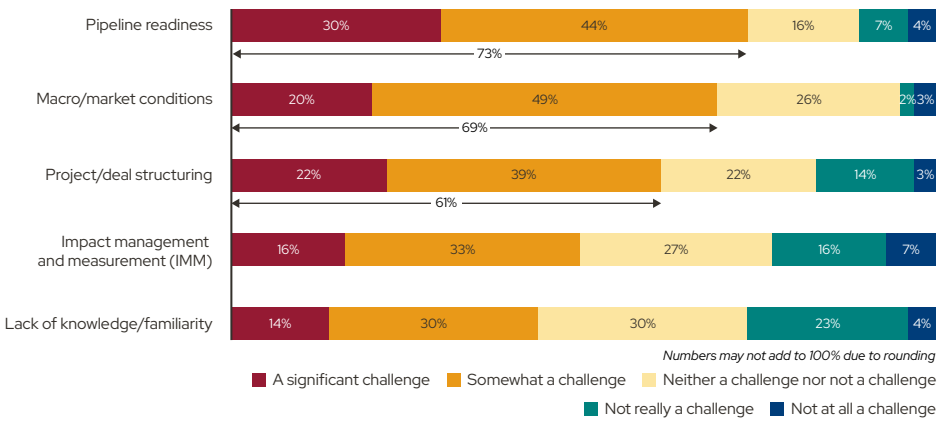
Solutions in this sector have either low or emerging commercial viability today. At a sub-sector level, **freshwater solutions receive the most funding, though terrestrial solutions have the highest commercial viability**, suggesting potential for greater capital allocation here.[c]

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex; **a** Overall n is different from total n of 165, as n =128 represents only the number of funders who are active and/or interested in CA&R ; **b** Corporate investors are not shown in the breakdown as n <5; they are included in Overall; **c** To refer to Chapter 2 for more details on sub-sector solutions and their level of commercial viability. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

However, key challenges persist among interested and active funders

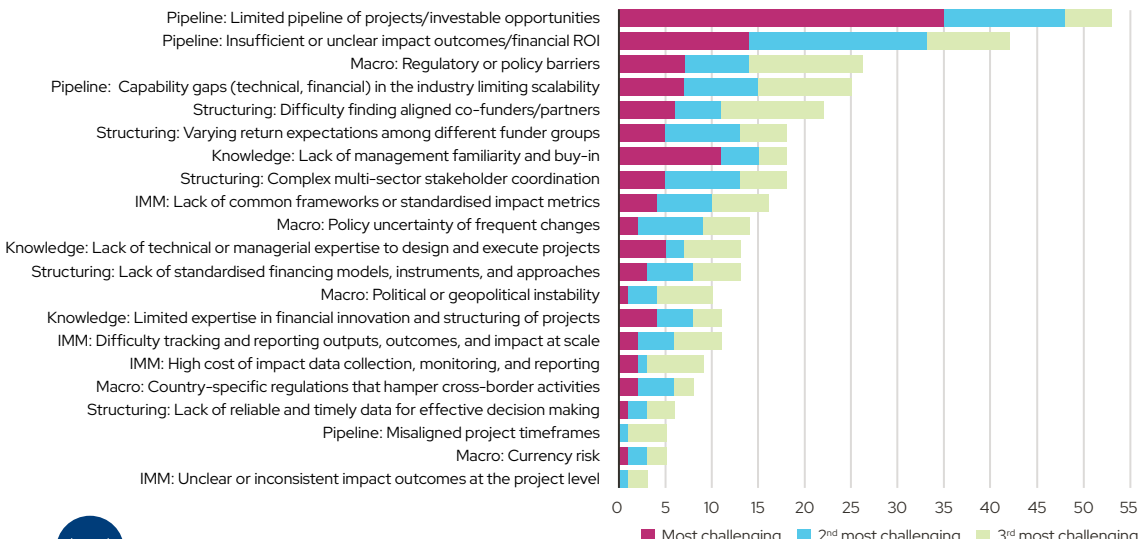
Pipeline readiness emerges as the greatest challenge...

Figure 73. Key challenges for currently active and interested funders (n=128)[a]



...specifically a limited pipeline of projects or investable opportunities

Figure 74. Top 3 specific challenges for currently active and interested funders (n=115)[b]



Pipeline-related barriers top the list of challenges, with limited deal flow, unclear or insufficient impact and financial return profiles, and capability gaps as primary obstacles to deploying capital

Macro-level barriers rank second, as policy and regulatory uncertainty hinder funding decisions, making greater regulatory clarity an important catalyst for increased investment
(further details on the next page)

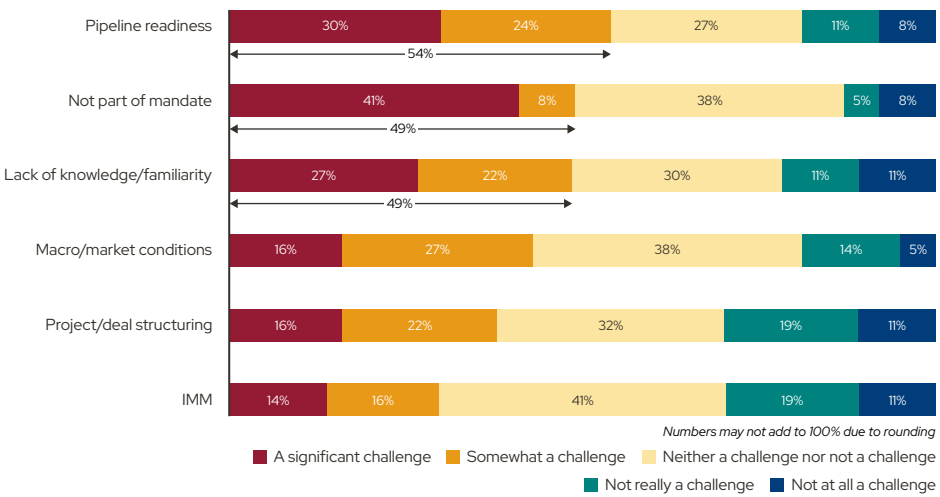
Structuring barriers are another significant challenge, primarily due to difficulty in finding aligned partners, varying return expectations, and complex stakeholder coordination, impeding deal origination

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex; **a** Overall n is different from total n of 165, as n =128 represents only the number of funders who are active and/or interested in CA&R; **b** n differs, as some respondents preferred not to answer. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

For funders not currently interested - Pipeline, mandate alignment and knowledge gaps are core challenges

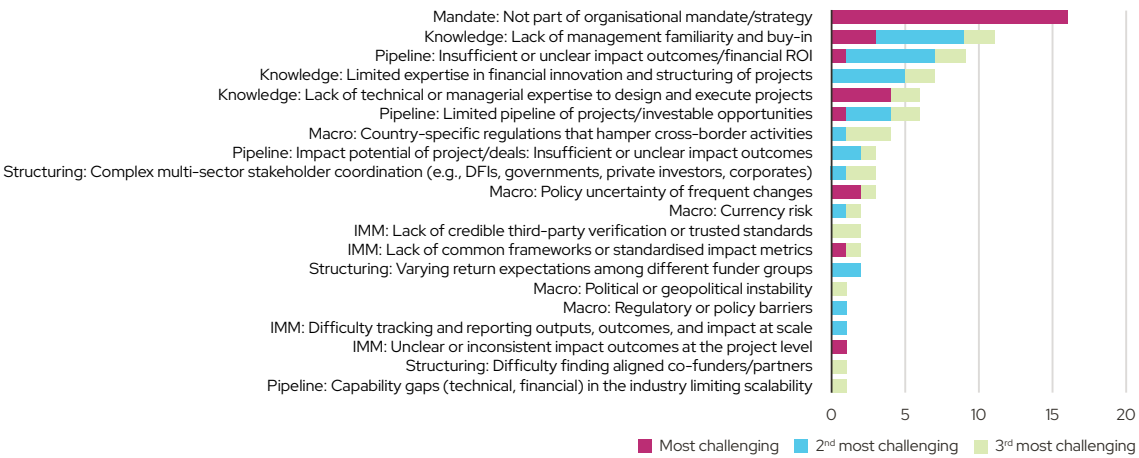
Pipelines, mandates, and lack of knowledge are significant challenges...

Figure 75. Key challenges for funders with no current interest in CA&R (n=37)[a]



...other issues include unclear impact outcomes, limited technical expertise in financial innovation, and project execution

Figure 76. Top 3 specific challenges for funders with no current interest (n=29)[b]



Pipeline readiness tops overall challenges, with insufficient or unclear impact outcomes and financial returns, and limited deal flow as primary deterrents to entry, underscoring the need for greater transparency and impact outcome standardisation

Lack of knowledge is a notable challenge, as limited management familiarity, gaps in technical and managerial expertise, and limited experience with financial innovation are more common for inactive funders, highlighting ongoing needs for capacity-building and education

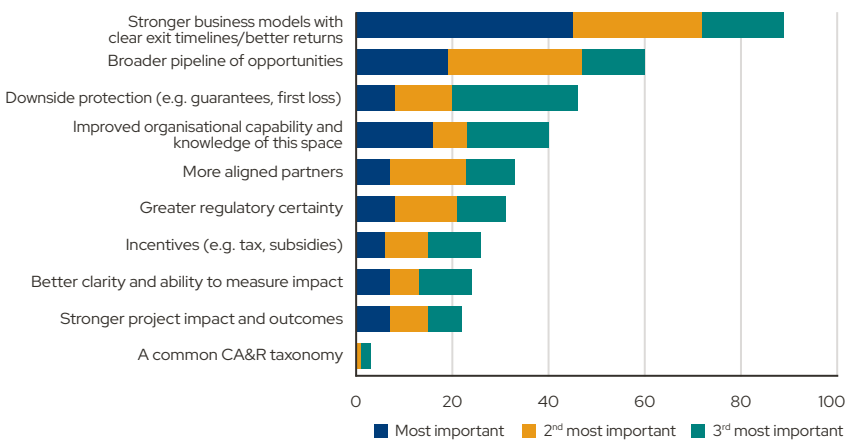
An absence of a CA&R mandate represents the most significant challenge among inactive funders, suggesting that mandate alignment is critical to increasing investor participation

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex; **a** n is different from total n of 165, as n=37 represents only the number of funders who are not active and/or interested in CA&R; **b** n differs as some respondents preferred not to answer. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

Having stronger business models is the top enabler, reflecting returns and risks concerns

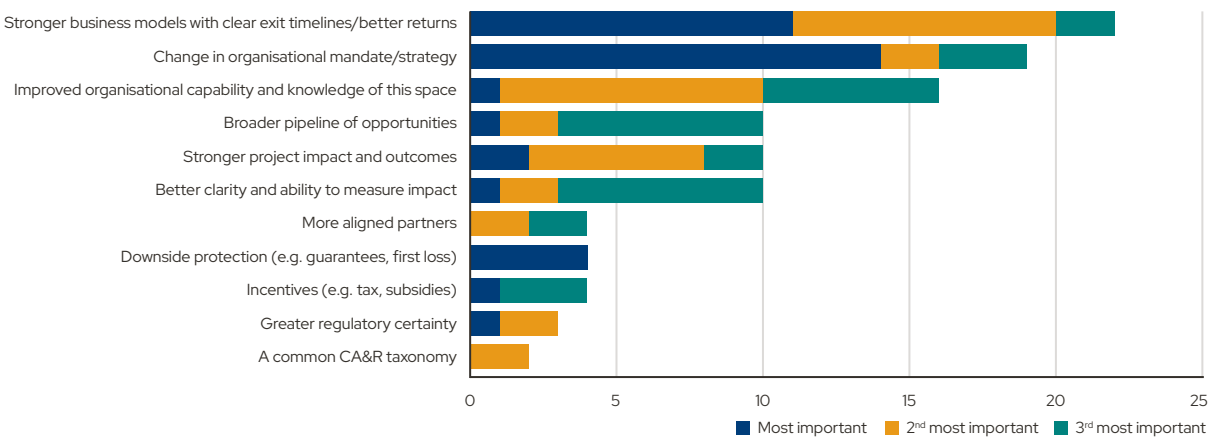
Pipeline and risk mitigation are additional top priorities for active and interested funders

Figure 77. Top 3 among 10 enablers for active and interested funders (n=128)



Strategy change and organisational capability are also key enablers for activating inactive and uninterested funders

Figure 78. Top 3 among 11 enablers for inactive funders (n=36)



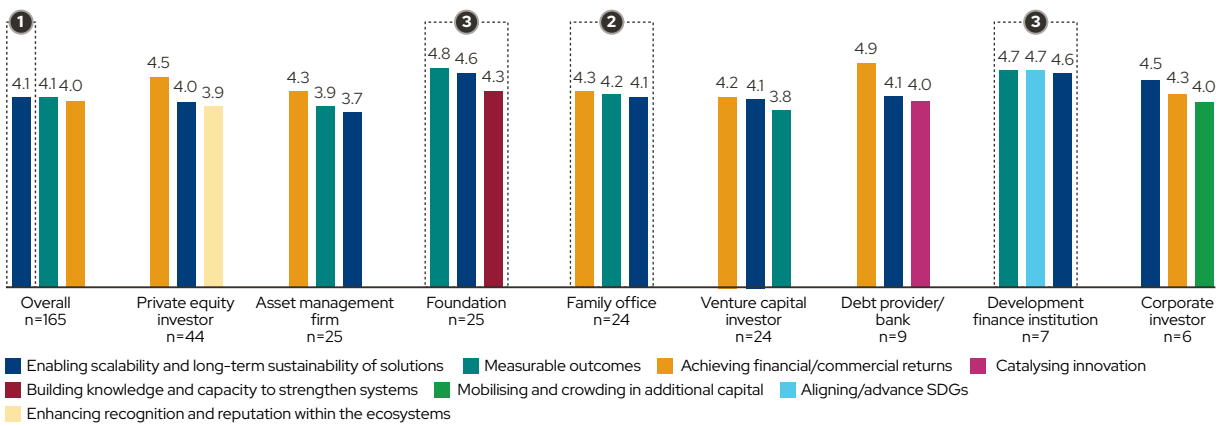
Stronger business models with clearer exit pathways and return potential are imperative for all funders, highlighting the need for better valuing of resilience dividends, capacity, and pipeline building.[1]

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA; **1** Cities Climate Finance Leadership Alliance (2025): The Landscape of Project Preparation 2024; UNEP FI (2025): Adaptation Finance; OECD (2024): Financing Climate Adaptation: Mobilising Investment at Scale.

Scalability and long term sustainability, measurable outcomes, and returns are key drivers of funding decisions

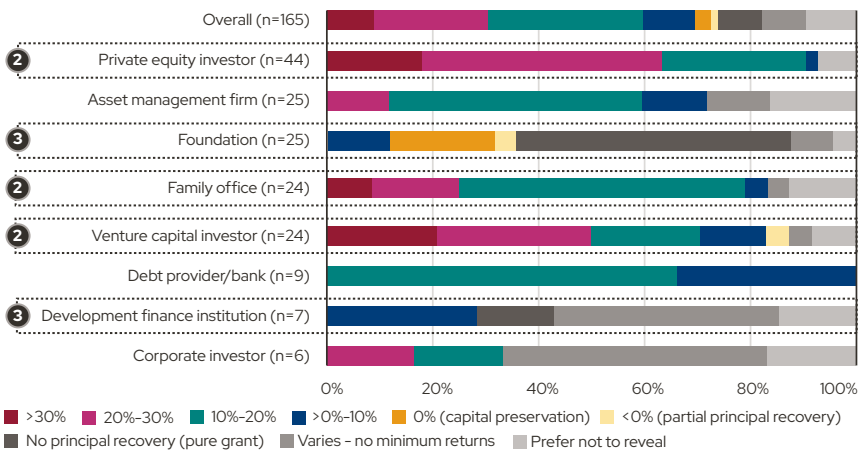
On top of scalability, commercial players prioritise returns while DFI and Foundations focus on measurable outcomes

Figure 79. Top 3 impact funding decision priorities by types of funders (1 = not important at all, 5 = extremely important)



Majority of funders expect minimum returns between 10% and 30%

Figure 80. Minimum expected portfolio returns



1 **Scalability and long-term sustainability rank among the top priorities**, reflecting a shared commitment to self-sustaining solutions that increase reach and impact.

2 **Private equity, venture capital, and family offices expect the highest returns** (>30%), though **family offices prioritise both outcomes and returns**, suggesting potential to bridge commercial and development finance objectives.

3 While **foundations prioritise outcomes over returns, 20% expect to preserve their capital and 12% expect returns of 0-10%. Similarly, 29% of DFIs expect returns of 0%-10%.** Together, these figures suggest that philanthropic and development actors often seek at least capital preservation or modest returns to support the sustainability and recycling of capital.

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

Ultimately, funders' and asset owners' approaches to investing in CA&R are shaped by mandates, returns, and time horizons...

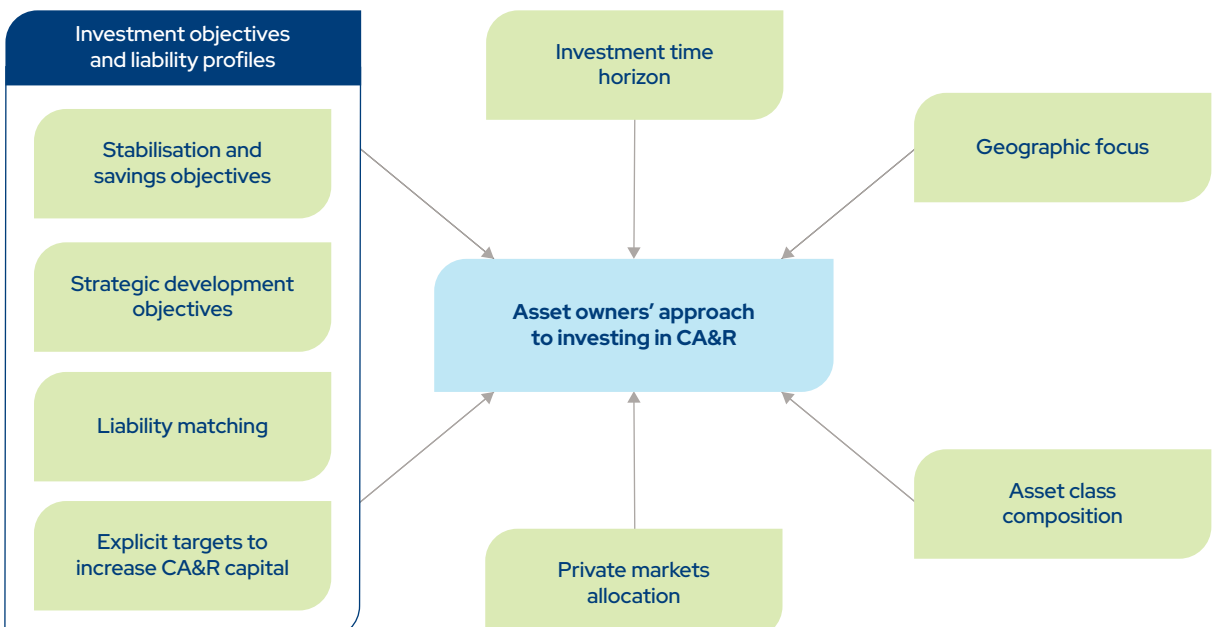
Investment objectives and liability profiles differ depending on whether an asset owner seeks stabilisation, liability matching, strategic development impacts, or other goals

- Asset owners with stabilisation objectives, such as managing exchange rates and liquidity, generally have less flexibility in their allocation
- Similarly, those with savings objectives that require liability matching maintain prudent investment approaches. In contrast, asset owners with strategic development objectives (e.g., national sovereigns, DFIs) often exhibit stronger alignment with investing in CA&R, potentially as a priority area to increase capital targets
- For some foundations, investment objectives have evolved from disaster risk reduction to CA&R

Investment time horizons are connected to investment objectives

- Asset owners with longer investment horizons generally have greater capacity to invest in long-dated, illiquid resilience assets, solutions and real assets. Asset owners with liability matching and retail-driven components (e.g. defined contribution pension schemes with individual selection and switching, or individual insurance investment options) tend to have shorter investment horizons
- While this creates further considerations in terms of potential fund outflows, it also encourages innovative approaches to integrate climate investing within dynamic portfolio management
- However, shorter horizons do not preclude action: they instead require more dynamic approaches to portfolio construction, innovation in fund structures, and integration of climate resilience within ongoing asset allocation and risk management processes rather than through static, long-term commitments

Figure 81. Key factors underpinning asset owners' CA&R investment approaches



Source: Invesco analyses.

...as well as geography and asset class mix

Geographic focus strongly shapes CA&R relevance and opportunity

- Asset owners with domestic or EM-heavy portfolios (e.g., national sovereigns, DFIs) face higher physical climate risk but also clearer, place-based opportunities to invest in resilience.
- CA&R is inherently local, making alignment between geographic exposure, policy priorities, and investment impact key characteristics that shape an asset owner's interest.

Dedicated vs integrated allocation to CA&R

- For asset owners with large public markets exposure, deployment to CA&R is likely largely embedded rather than labelled. Embedded exposure can be in the form of integration of CA&R considerations in investment analysis, or leveraging strong management practices of underlying investments.
- Centralised pension schemes and global sovereign allocators may express adaptation through portfolio-wide integration, rather than discrete CA&R allocations.

Private markets capacity enables more intentional CA&R solution engagement but does not guarantee it

- Private markets allocation, particularly to private equity, venture capital, and private credit, can provide an extra bucket that can closely align with climate themes.
- High private markets allocation provides flexibility to finance long dated, illiquid resilience assets.

Despite these constraints, there is room to rethink mandates, shape strategic development objectives, and encourage dedicated CA&R investment through increasing allocators' familiarity with CA&R opportunities.

Source: Invesco analyses.

Today, CA&R interest and maturity levels are uneven amongst asset owners

CA&R leadership correlates with mandate flexibility, investment objective and asset class allocation. For asset owners who are more exposed to climate adaptation through fixed income and public equities, deployment is more often embedded as part of investment criteria and analysis rather than labelled, a reflection of pipeline and investment return opportunities. National sovereigns, DFIs, insurers, and philanthropy lead in interest, with global allocators, insurers, pensions able to act as enablers. Therefore, philanthropic funders also need to play a key role in addressing CA&R.

		Public					Private				
		Sovereign funds		Pensions		DFI/MDBs	Insurer	Other institutional investors (i.e. asset managers)	Corporate investors	Family offices	Philanthropy (e.g., foundations)
		National focus	Global allocator	Centralised schemes	Selection schemes						
Objectives	Strategic	✓	Partial			✓			✓	✓	✓
	Savings		Partial	✓	✓		✓	✓			
	Returns	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time horizon		10-20 + years	10-20 + years	10-40+years	Variable – dependent on scheme participants	Long-term	5-10 years (General) >10 years (Life)	Varies	Varies (project-linked; 5-15%)	Long-term	Long-term / perpetual
Private markets allocation %		>80%	~0-30%	~10-30%	~5-15%	~20-40%	~5-15%	~10-20%	~20-50%	>40%	>30%
Interest in climate allocations across asset classes		Primary private markets, national focused, infrastructure	Cross-asset classes; FI, PE, infra	Primarily FI focused; some private allocations	Less likely given constraints	Cross-asset classes	Primarily FI focused; some private allocations	Less likely given constraints	Selective; focused where strategic relevance exists	Greater allocations towards private but mostly equity	Greater allocations towards private but mostly equity
Interest in CA&R		Medium - High	Medium	Medium	Low	High	Medium	Low	Medium	Medium	Medium

Source: Invesco analyses; Asia Investor Group on Climate Change and Invesco (2026): Asia 2030 Playbook: How Asian asset owners can deliver 2030 targets and scale climate investment.

Market highlight: Macro and systems-level issues need to be addressed to unlock regional CA&R financing at scale

Financing supply constraints

Contribution of domestic capital to blended finance is marginal at ~6% vs. 66% internationally and 28% regionally from across Asia (2018-2023), with Singapore and Vietnam as exceptions due to targeted policy frameworks.[1]

Domestic bank financing can be constrained by perceived risks, limited reliable data for pricing climate risk (such as physical risk projections and climate disclosures), and uncertain and long-duration revenue streams of adaptation projects.[2]

For foreign capital, the all-in cost of financing local adaptation can be prohibitive. Risks such as currency risk, mismatch between local and hard currency rates, shallow domestic capital markets, limited enforceability, and general unfamiliarity can make foreign currency funding unfeasible.[3]

Country	Current base rate (LCCY) (%)	Net interest margin of large banks (LCCY) (%)	FX hedged costs (3m) bid/ask
Indonesia	4.75	4.04 - 4.76	USD yield: 3.9040/3.9079 LCY yield: 5.0656/5.2489
Malaysia	2.75	1.40 - 1.85	USD yield: 3.9042/3.9081 LCY yield: 3.2602/3.2612
Philippines	4.25	3.78 - 4.54	USD yield: 3.9032/3.9071 LCY yield: 5.5352/5.5352
Thailand	1.00	2.24 – 3.31	USD yield: 3.9042/3.9081 LCY yield: 2.0173/2.3421
Vietnam	4.50	2.20 - 2.66	USD yield: 3.9042/3.9081 LCY yield: 8.1107/8.8065

Source: Bloomberg. Data as of March 2026.

"Adaptation and resilience sit at the heart of the climate challenge yet remain underfunded because markets struggle to price solutions that prevent losses and generate broader societal value. The Asia Ocean Fund takes a systems approach—using blended capital to bridge this gap, align incentives across stakeholders, and scale solutions that protect both economies and the ecosystems they depend on."

- May Liew, CEO and Executive Director, OCTAVE Capital

Systems-level barriers

Policies and mechanisms that reduce the attractiveness of CA&R investments, inhibiting allocation. These include risk-based mechanisms (e.g., risk-weighted asset adjustments), capital requirements (for banks and insurers), and other tax-based incentives (for private investors). Other mechanisms such as, trade barriers, agricultural, and energy subsidies can inhibit CA&R solution-transfer and potentially introduce negative externalities (e.g., ecosystem degradation).[4]

Risk-transfer mechanisms remains underdeveloped, with scale of credit guarantees constrained by the classification and risk assessment of emerging MSME segments, particularly those which are newer, impact-oriented and climate-aligned.[5]

Difficulty measuring resilience outcomes,[1] with reference assessments for emerging markets and developing economies failing to fully account for capital costs, as is highlighted in the UNEP Adaptation Gap Reports (2024, 2025). Debt & equity costs can more than double total project costs and prevent sound, socially essential adaptation projects from reaching financial close.[6]

Source: 1 Catalytic Climate Finance Facility, Climate Policy Initiative, and Convergence Blended Finance (2025): Domestic Capital Mobilization for Climate Finance in Southeast Asia; **2** World Bank (2024): Finance and Prosperity 2024: Special Focus: Sovereign-Bank Nexus Climate and the Banking Sector; International Monetary Fund (IMF) (2023): Climate Risks and Financial Stability: What Can Central Banks and Financial Sector Supervisors Do?; **3** Climate Policy Initiative (2024): Managing Currency Risk to Catalyze Climate Finance; **4** Climate Financial Risk Forum (2025): From Risk to Resilience: Integrating Adaptation into Finance; Asian Development Bank (2024): Asia-Pacific Climate Report 2024: Catalyzing Finance and Policy Solutions; World Bank (2023): Detox Development: Repurposing Environmentally Harmful Subsidies; Asia Society Policy Institute (2024): Building Sustainable Futures: Advancing Climate Resilience in South Asia; **5** Alliance for Financial Inclusion, Inclusive Green Finance Working Group (IGFWG), and SME Finance Working Group (SMEFWG) (2022): Green Credit Guarantee Schemes for MSMEs; **6** UNEP (2024): Adaptation Gap Report 2024; UNEP (2025): Adaptation Gap Report 2025; Institute for Climate Economics (I4CE) (2026):Unlocking Capital for Climate Adaptation: how financing costs exacerbate needs, and ways to address them in EMDEs.

Case study examples: Spectrum of funders

	Insurer		DFI		Philanthropy	Family office initiative
Organisation	**Prudential**	**Tokio Marine (Impact Investing team)**	**Asian Development Bank**	**British International Investment**	**Gates Foundation**	**Potato Impact Partners**
Year established	1848	1879	1966	1948	2000	2023
Key markets	Global	Global	Asia	Africa and Asia	Global, with focus on Sub-Saharan Africa and South Asia	Global
AUM/Fund size	US$2M for climate and health (community investment)	US$200-300M (impact investments)	US$310B	US$13B	US$86B (unaudited endowment size, as of July 2025)	Undisclosed
Funding approach	Hybrid	Commercial	Hybrid	Hybrid	Philanthropic	Hybrid
CA&R focus areas	• Just transition • Resilient water and sanitation • Climate-smart agriculture • Coastal/flood defenses	• Enhancing existing social infrastructure such as water utilities • Flood resilience • Reducing and preventing damage from large natural disasters	• Water supply • Sanitation • Agriculture and irrigation • Flood control • Transport • Energy infrastructure	• Regenerative agriculture • Water security • Coastal resilience • Launching adaptation and resilience partnerships for investors	• Agriculture • Health • Financial inclusion • Water	• Seaweed farming and aquaculture • Climate risk analytics
Instruments used	Equity, fixed income, multi-asset, quantitative, alternatives	Private equity	Direct equity, intermediated equity (funds), debt, guarantees	Direct equity, intermediated equity (funds), debt, guarantees	Grants, catalytic capital instruments (debt, equity, guarantees)	Private equity, venture debt, convertibles
Select portfolio	• **Brookfield's Catalytic Transition Fund:** Transition investing in emerging markets • **Climate-focused strategy managed by KKR:** Infrastructure equity investments in Asia focused on energy transition	• **WOTA:** Small-scale decentralised water recycling system that can be installed in small units such as residences or in disaster-affected areas	• **Louis Dreyfus Company:** Improving farm management and biochar adoption for smallholder coffee and cotton farmers in India and Indonesia. • **DSN Group:** Multiforestry agroforestry systems in Indonesia	• **Zephyr Power:** Wind power company in Pakistan implementing mangrove protection and rehabilitation. • **Grow Indigo:** Sustainable agriculture in India	• The **Cereal Systems Initiative for South Asia** drives early wheat planting • The **Odisha Digital Stack** enables targeted subsidy delivery, programme monitoring, and climate responsive service provision	• **Cascadia Seaweed:** Cultivating native kelp on regenerative ocean farms • **Coast4C:** Promoting sustainable seaweed farming around marine protected areas for coastal resilience

Note: All examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP. Key CA&R focus areas defined by investors.

Innovative financing, capacity building and data, and macro levers are key to addressing challenges

1 Innovative financing – deep dive in next pages

- Pooled capital can be deployed across multiple projects to diversify exposure to various risks, including climate, currency, and market risks, contributing to an investable pipeline of projects[1]
- Smaller projects can be bundled in single investment vehicles to increase scale and improve risk-return profiles[2]
- Instruments such as blended finance can mitigate regulatory and political risks while offering downside protection[3]
- Experienced fund managers can lead, leveraging their track record to reduce private investors' capability gaps[4]
- Transactions can be structured to bring together diverse funders with aligned interests to co-fund transaction components matched to their expertise, broadening partnerships opportunities[5]

2 Capacity building and data

Funders:

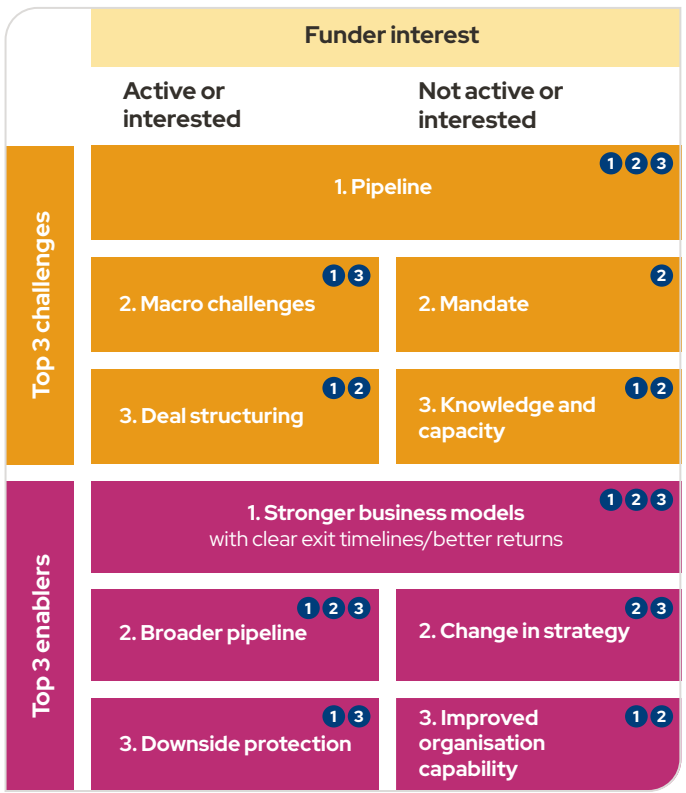
- Standardised core metrics can be embedded into due-diligence and disclosures to improve risk assessment, reduce transaction costs, and measure impact[5]

Enterprises:

- Open-access climate-relevant data on risks, funding, and outcomes can be published to enhance transparency, comparability, and replication of viable project and financing models, to address capability and knowledge gaps[5]

3 Macro levers

- Integration of climate adaptation strategies into government planning and budgeting across ministries is crucial given the complex effects of climate change. This will also help to provide regulatory certainty for industry and investors[5]
- Incentives can be provided to de-risk private investments and encourage private funders to include adaptation in their organisational mandate or strategy, supported by improved valuation of resilience dividends as well as avoided losses[5]



Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA; **1** World Resources Institute (2025): From Bonds to Blended Finance: How a Diverse Range of Financial Instruments Are Financing Climate Adaptation and Resilience; Climate Policy Initiative (2024): Understanding Global Concessional Climate Finance 2024: Enhancing its scale and efficiency for climate action; **2** Oxera Consulting for the International Chamber of Commerce (ICC) (2025): The role of the private sector in climate adaptation; **3** OECD (2025): OECD DAC Blended Finance Guidance 2025; **4** Convergence Blended Finance (2025): To support climate adaptation, experienced fund managers must take the lead; **5** OECD (2025): Scaling finance and investment for climate adaptation; International Institute for Sustainable Development (2025): Innovative Financial Instruments for the Mobilization of Private Sector Investment in Climate Change Mitigation and Adaptation in Developing Countries; NAP Global Network (2025): Finance for National Adaptation: What can we learn from countries' national adaptation swap to plans?

Innovative financing structures can address structuring, pipeline, and data monitoring challenges

Active and interested funders Inactive and uninterested funders

Instruments	Top 5 specific issues faced by active and inactive funders									Top 3 of 11 enablers across active and inactive funders					Approach
	Pipeline: Limited pipeline of projects/investable opportunities	**Structuring:** Difficulty finding aligned co-funders/ partners	**Macro:** Regulatory or policy barriers	**Pipeline:** Capability gaps in the industry limiting scalability	**Pipeline:** Insufficient or unclear impact outcomes/financial ROI	**Mandate:** Not part of organisational mandate/strategy	**Knowledge:** Lack of management familiarity and buy-in	**Knowledge:** Lack of technical or managerial expertise to design and execute projects	**Knowledge:** Limited expertise in financial innovation and structuring of projects	Stronger business models with clear exit timelines/better returns	Broader pipeline of opportunities	Downside protection	Improved organisational capability and knowledge of this space	Change in strategy[a]	
Guarantees, insurance, or risk transfer mechanisms	✓	✓	✓							✓	✓	✓			De-risks deals, increasing commercial viability, funder pool, and pipeline
Blended with mix of commercial, concessional, or catalytic tranches	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		Varied partners share risk and skills, boosting returns and opportunities
Blended with technical assistance	✓	✓		✓	✓		✓	✓	✓	✓	✓		✓		Builds capacity and lowers costs, expanding deals and funder pool
Design/prep stage funding	✓			✓	✓		✓	✓	✓	✓	✓		✓		Improves investment readiness, broadening investable deals
Revenue/profit-based financing	✓	✓								✓	✓	✓			Returns vary with revenue, spreading risk and expanding diverse funder reach
Mechanism to monetise adaptation co-benefits	✓	✓			✓		✓			✓	✓		✓		Quantifies value, unlocking varied funder interest, revenue, and pipeline
Outcomes based financing	✓	✓			✓		✓		✓	✓	✓		✓		Payments tied to outcomes, boosting interest, funder pool, and pipeline
Sustainability linked instruments	✓		✓		✓		✓		✓	✓	✓		✓		Pricing tied to sustainability KPIs, driving interest, funder pool, and deals
Sustainability bonds	✓	✓	✓		✓		✓		✓	✓	✓		✓		Earmarks proceeds for CA&R, boosting funder interest and pool, and deals
Sovereign debt restructuring	✓		✓								✓				Frees fiscal space and reduces risk, enhancing funder interest and pipeline

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex. **a** Innovative financing structures do not directly enable change in strategy. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

In SEA, blended finance models are gaining traction

Deployment in SEA growing, from low base

Figure 82. Compound Annual Growth Rate (CAGR) deal count

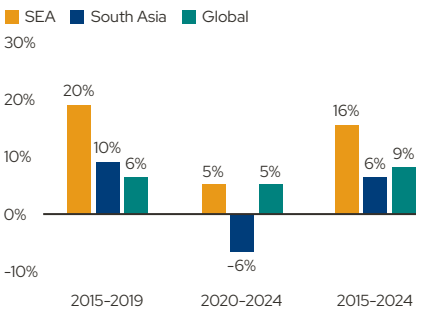
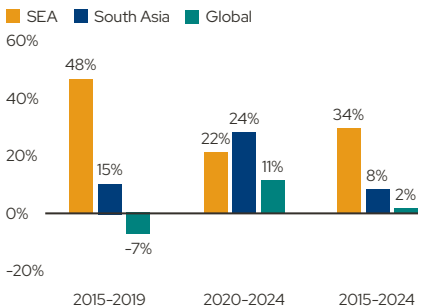


Figure 83. CAGR deal volume



Deal count (#)

	2015	2020	2024
SEA	4	14	18
South Asia	8	20	15
Global	64	115	150

Deal volume (US$M)

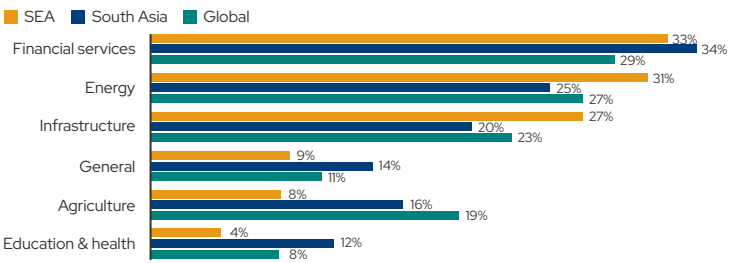
	2015	2020	2024
SEA	292	1,983	5,326
South Asia	1,677	1,225	3,613
Global	19,400	13,355	22,658

Robust growth in deal count and volume in Southeast Asia, particularly 2015-2019, was supported by the launch of the Sustainable Development Investment Partnership (SDIP) and its ASEAN Hub,[1] and ADB's expansion of private sector operations.[2] Between 2015-2024, deal count growth is particularly driven by non-climate deals[a] while deal count volume is driven by mitigation deals.[b, 3]

Note: a Non-climate deals primarily being financial services transaction, with the top 3 being the LeapFrog Emerging Consumer Fund III, Vietnam Prosperity Joint Stock Commercial Bank, and the Japan ASEAN Women Empowerment Fund (JAWEF); **b** Top 3 mitigation deals being the Catalytic Transition Fund, Monsoon Wind Power, and Gulf Solar and Solar with Battery Energy Storage Systems; **Source:** Convergence Market Data as of November 2025 and CIIP analyses; **1** World Economic Forum (2022): Sustainable Development Investment Partnership: Annual Report 2021-2022; **2** Asian Development Bank (2018): Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific; **3** Convergence Blended Finance (2023): Market Data Explorer, data as of April 2026; **4** Convergence Blended Finance (2023): Blended Finance in the Association of Southeast Asian Nations (ASEAN); **5** ISEAS – Yusof Ishak Institute (2025): Outlook for Agriculture and ASEAN's Role in Southeast Asia's Food Security; **6** UNESCO (2023): Technology in education: A tool on whose terms?; **7** ASEAN (2024): Building a Resilient Health System to Strengthen Regional Health Security in the ASEAN Region; **8** GuarantCo (2026): Our portfolio; **9** MIGA (2026): Our impact: Low-Income (IDA) countries; **10** MIGA (2026): Our impact: Fragile and Conflict-Affected Situations (FCS).

Financial services, energy, and infrastructure drive large deal sizes in SEA

Figure 84. Sector proportion of deals



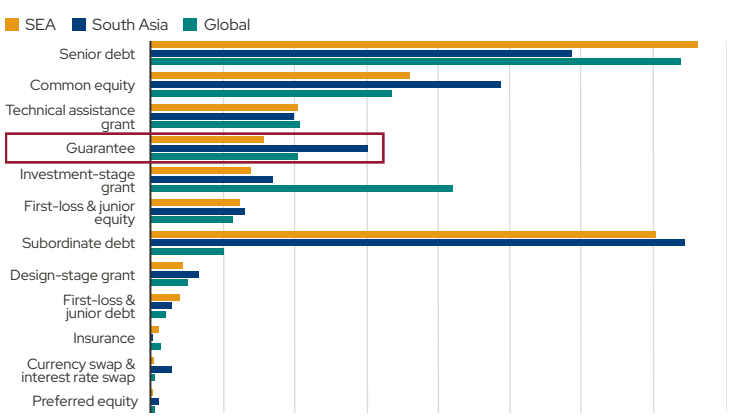
Note: Transactions could address multiple sectors simultaneously, resulting in the aggregated proportion not adding to 100%.

SEA has the highest median deal size, concentrated in large-ticket sectors like financial services, energy, and infrastructure.[3] The largest deal to date is the US$2.4 billion Catalytic Transition Fund targeting energy,[4] with a target fund size of up to US$5 billion.

Agriculture, education, and health are underinvested in SEA, despite trends such as high agricultural employment,[5] rapid education digitalisation,[6] and persistent infectious disease and climate-related health risks.[7]

Guarantees in SEA trail South Asia and Global

Figure 85. Proportion of instrument count by region

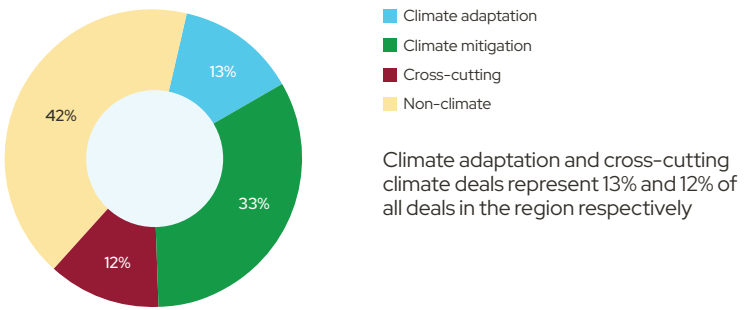


Guarantees are SEA's primary risk-transfer instrument, though underutilised. Two of the largest providers, GuarantCo and the Multilateral Investment Guarantee Agency (MIGA)[4] invest globally. However, Guarantco's exposure to SEA is currently small,[8] while MIGA prioritises International Development Association (IDA)-eligible (low-income)[9] and fragile or conflict-affected countries, which are mostly outside the region.[10]

However, climate blended finance in the region skews towards mitigation

58% of deals in SEA are climate related; 33% are climate mitigation-focused

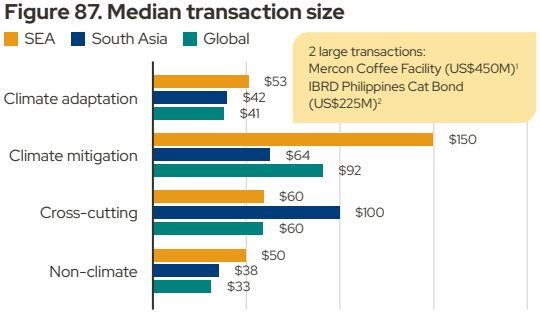
Figure 86. Proportion of historical deals in SEA by deal count



Climate adaptation and cross-cutting climate deals represent 13% and 12% of all deals in the region respectively

Climate adaptation deals sizes are smaller than climate mitigation and cross-cutting transactions

Figure 87. Median transaction size



The median transaction size of adaptation deals in SEA is greater than those of South Asia and Global, skewed by large transactions, including Mercon Coffee Facility in which only a portion of the US$450 million deal size was allocated to SEA and the others to markets in Latin America[a, 1]

Note: Transactions could address multiple regions simultaneously, and may therefore be counted across more than one region.

The ability of concessional capital to crowd in private sector financing is low in SEA, with mitigation showing stronger performance

Figure 88. Average market-rate capital to concessional capital ratio (all sources of market-rate capital)

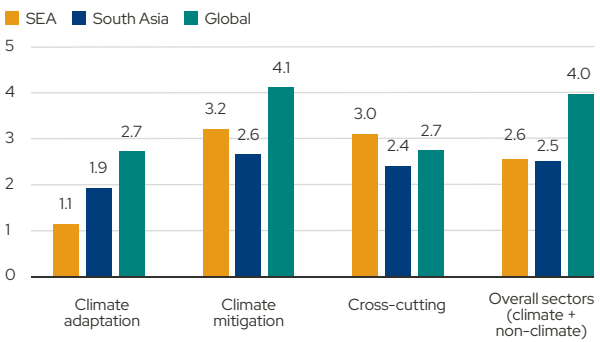
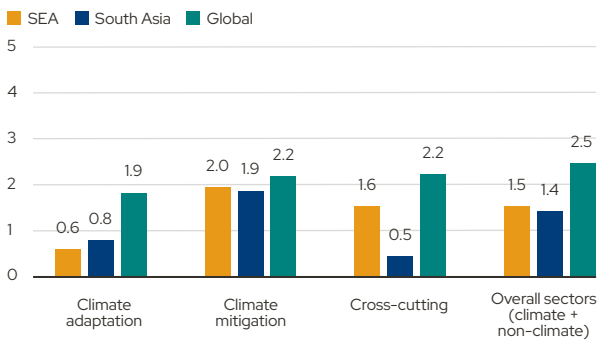


Figure 89. Average market-rate capital to concessional capital ratio (private market-rate capital only)



Mitigation draws more private capital due to familiar deal structures, proven revenue models, and growing commercial viability, with **energy, specifically renewables, and infrastructure[b] being the leading sectors in SEA**.[3] Contrastingly, adaptation projects are often small, fragmented, context-specific, and constrained by limited robust data for risk assessment, limiting private investment.[4]

Regional initiatives contribute to mitigation's higher ratios to crowd in market-rate capital in SEA, compared to adaptation. Vehicles such as the SEACEF I and II blended investment funds[5] and FAST-P blended finance platform focus on energy transition and decarbonisation, closely aligning with mitigation goals.[6] Comparable large-scale adaptation-focused initiatives remain limited.

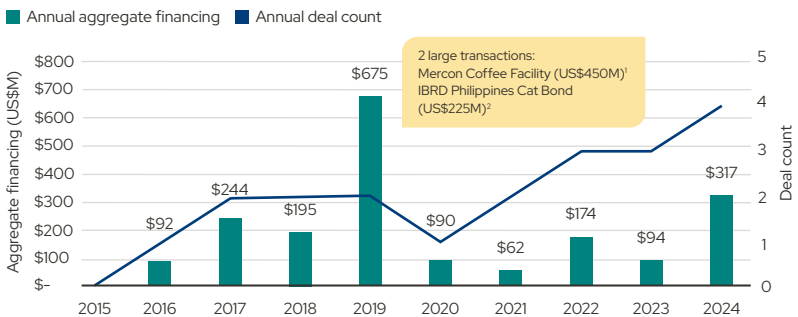
Across both ratios, SEA records the lowest ratios for climate adaptation[c] relative to other climate themes and overall sectors. This indicates substantial potential for MDBs, DFIs, and private sector investors to direct more capital into SEA for adaptation purposes, thereby increasing the mobilisation of market-rate capital.

Note: a The smallest SEA adaptation deal is Chamrouen (US$2 million) while the largest transaction is Mercon Coffee Facility; **b** Energy constitutes 86% of mitigation deal count in Southeast Asia, 78% in South Asia, & 84% globally; **c** Every $1 of concessional capital mobilises $1.14 market-rate capital and $0.60 private market-rate capital for adaptation in SEA. **Source:** Convergence Market Data as of November 2025 and CIIP analyses; **1** Convergence Blended Finance (2024): Mercon Coffee Facility; **2** Convergence Blended Finance (2024): IBRD Philippines Cat Bond; **3** Convergence Blended Finance (2025): State of Blended Finance: Spring 2025; Convergence Blended Finance (2026): Market Data Explorer; **4** Asian Development Bank Southeast Asia Development Solutions (2024): As Temperatures Rise, Southeast Asia Needs a Larger Share of Climate Finance Flows; **5** ClimeCapital (2020): First-of-its-kind clean energy investment initiative for Southeast Asia; Southeast Asia Clean Energy Facility (2023): About SEACEF; ClimeCapital (2025): Clime Capital announces SEACEF II achieves maximum capitalization; **6** The Straits Times (2025): Singapore secures $655m to fund green, sustainable projects in South-east and South Asia.

WASH, NbS, and agriculture are key focus areas for CA&R blended finance in SEA

Subdued growth for SEA blended finance

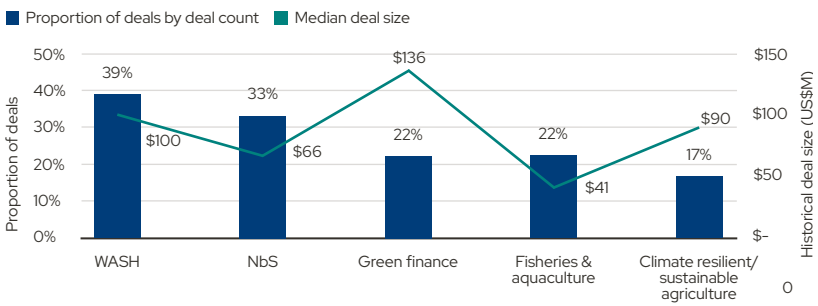
Figure 90. SEA climate adaptation market growth (US$M)



Highest deal count of 4 deals in 2024

Water, sanitation, and hygiene (WASH), nature-based solutions (NbS), green finance, fisheries and aquaculture, and sustainable agriculture are top sub-sectors of focus

Figure 91. Top 5 sub-sectors covering 86% of historical deals within SEA (US$M)



WASH has the highest proportion of deals, while green finance has the highest median deal size. For green finance, high deal size is largely driven by the Mercon Coffee Facility[a] transaction, which has agriculture as its primary sectoral classification with sub-sectoral focus that includes green finance.[1]

NbS, fisheries and aquaculture, and sustainable agriculture are within the top 5 sub-sectors, reflecting a strong interest in agri-food and natural ecosystems resilience in the region.

"Green Finance" follows World Bank's definition: Finance that addresses environmental objectives, such as climate change mitigation and adaptation, natural resource conservation, biodiversity conservation, and pollution prevention and control.

Top 4 CA&R deals in the past decade in SEA

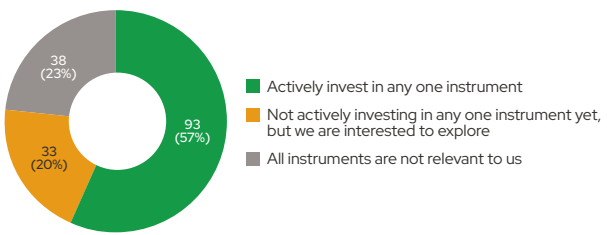
Deals	Details	Sector	Structure and funders
Mercon Coffee Facility[a] (2019)[1]	**US$450 million** credit facility deployed by Mercon Coffee Group to improve efficiency across its supply chains in **Brazil, Guatemala, Honduras, Nicaragua, and Vietnam**[a]	Agriculture	**Concessional debt (FMO)** + commercial debt (IFC, Rabobank Group)
IBRD[b] Philippines Cat Bond (2019)[2]	**US$225 million** catastrophe bond issued by IBRD to insure against losses from earthquakes and tropical cyclones in the **Philippines**	Financial services	**Design-stage grant (MAS)** + commercial debt (private investors)
Maynilad Water Service Project (2017)[3]	**US$222 million** project that funds Maynilad Water Services Inc. to provide water and wastewater services in the **Philippines**	Infrastructure (WASH)	**Design-stage grant (JICA) + technical assistance grant (JICA) + concessional debt (JICA)** + commercial debt (MUFG, Mizuho Bank, SMBC)
Karian-Serpong Regional Drinking Water Supply System (SPAM) (2024)[4]	**US$212 million** project to develop and operate a greenfield water treatment plant to provide clean water supply in **Indonesia**	Infrastructure (WASH)	**Concessional debt (CFPS II and Finland-IFC Blended Finance for Climate Program)** + currency swap, commercial debt, commercial equity [ADB, Development Bank of Singapore (DBS), IFC, PT Karian Water Services, Export-Import Bank of Korea]

Note: Transactions could address multiple subsectors simultaneously, resulting in the aggregated proportions not adding to 100%; **a** Given Mercon Coffee Facility's geographic coverage across four Latin American countries and one in Southeast Asia, allocations to Vietnam represent only a portion of the total US$450 million facility, as of 2026; **b** International Bank for Reconstruction and Development (IBRD). **Source:** Convergence data as of November 2025 and CIIP analysis; **1** Convergence Blended Finance (2024): Mercon Coffee Facility; **2** Convergence Blended Finance (2024): IBRD Philippines Cat Bond; **3** Convergence Blended Finance (2025): Maynilad Water Service Project; **4** Convergence Blended Finance (2025): Karian-Serpong Regional Drinking Water Supply System.

Over 50% of funders surveyed indicate active participation in innovative financing structures, yet more required to unlock capital at scale

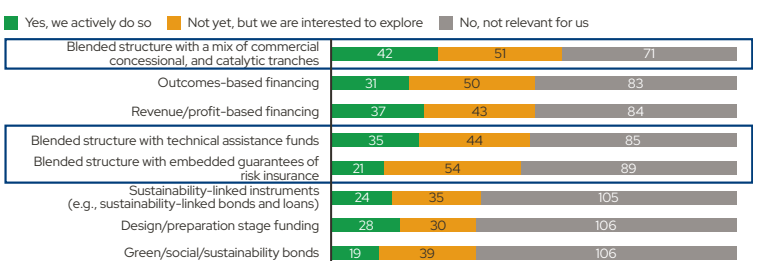
>50% of funders are currently investing in innovative financing mechanisms

Figure 92. Financing mechanism participation by respondent count (n=164)



Blended finance mechanisms are among the top instruments funders are interested in exploring

Figure 93. Financing mechanism participation (n=164)



The challenge of blended finance in CA&R

Smaller adaptation deal sizes, compared to mitigation and cross-cutting transactions

Market-rate capital mobilisation constrained by fragmented, small, context-specific, adaptation projects and limited data to assess risks, reducing bankability

Pipeline remains stagnant with slow adaptation market growth in SEA over the past decade

Lessons from mitigation and adaptation finance for scaling CA&R capital

Market-rate capital deployment strategies

Bundling small, fragmented projects to build a bankable pipeline
CrossBoundary Energy Access bundles small, fragmented mini-grid projects into a single finance facility, enabling cost reduction, scale, and private capital mobilisation in Africa,[1] an approach replicable for overcoming CA&R fragmentation

Leveraging geographically-targeted blended finance platforms to mobilise capital at scale
SEACEF uses a private sector-led early-stage de-risking approach focused on mitigation in SEA while the Climate Investor facilities (CI1 and CI2), supported by DFIs and MDBs, use lifecycle-structured models across mitigation and adaptation in Africa, Asia, and Latin America,[2] together illustrating replicable approaches for crowding in capital for CA&R

Targeting high-priority sectors to generate multiple co-benefits
Camimex's mangrove–shrimp investment in Vietnam shows how targeted, well-structured CA&R deals with private funders deliver multiple co-benefits, including enhanced livelihoods, coastal protection, and biodiversity conservation[3]

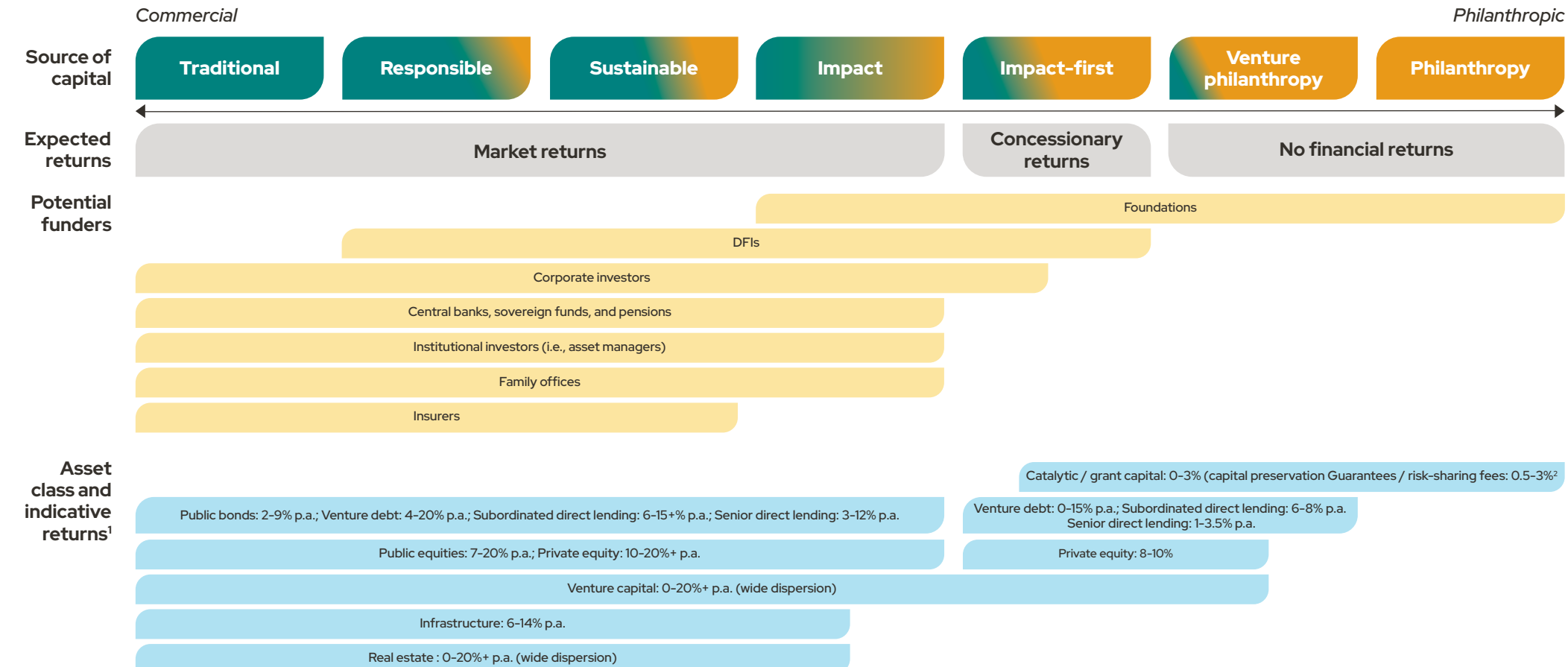
Market-enabling strategies

Performance-based incentives to drive outcomes and scale
China's eco-compensation programmes delivered large-scale CA&R outcomes including deforestation reversal, water quality improvement, and flood and drought resiliences[4]

Strengthening local bond markets to attract local and foreign capital and reduce FX risk
Indonesia's green sukuk (Islamic bond) and Malaysia's deep bond market, including green sukuk, show how local and foreign issuances for climate projects mitigate FX risk to support domestic financing while attracting local and foreign capital, enhancing market liquidity and mobilising long-term investment for CA&R[5]

Note: Survey findings are indicative, drawn from a non-random sample using purposive and snowball sampling. Findings were not tested for statistical significance. For detailed methodology, please see Annex. **Source:** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA; **1** CrossBoundary Group (2023): "We build mini-grids": explaining CrossBoundary Access' project finance approach in 3 minutes; **2** ClimeCapital (2025): Clime Capital announces SEACEF II achieves maximum capitalisation; Climate Fund Managers (2024): Funds; **3** FMO (2024): Camimex Joint Stock Company; SNV (2025): Camimex's journey to sustainable shrimp farming; SNV (2025): Business case spotlight: Camimex; **4** World Bank (2022): Ecological Compensation in China : Trends and Opportunities for Incentive-Based Policies Towards a Greener China; **5** Ministry of Finance of the Republic of Indonesia (2025): Green Sukuk Allocation and Impact Report 2025; Securities Commission Malaysia (2025): SC Annual Report 2024; UNDP (2024): The Potential Growth and Future Trends of Green Sukuk as a Tool for Sustainable Financing; OECD (2025): Unlocking local currency financing in emerging markets and developing economies.

Beyond innovative financing, opportunities exist across asset classes and the spectrum of capital



Source: 1 MSCI (2025): MSCI Private Capital Benchmarks Summary; OECD (2021): The Role of Guarantees in Blended Finance.

CA&R opportunities across asset classes vary from direct to embedded exposures

The next few slides illustrate how CA&R may feature across common investment asset classes through opportunities and examples observed globally.

Category	Infrastructure	Real estate	Public bonds	Public equity	Private equity and venture capital (PE/VC)	Private debt	Philanthropic capital
CA&R investment opportunity	Protecting long-lived assets to defend revenue continuity and preserve insurability, providing clear long-term return profile	Protects property values and rental income by reducing physical damage and exposure to rising insurance costs and loss of coverage	Provides scalable and stable risk-adjusted entry for investors into CA&R. Ongoing adaptation CapEx should also improve creditworthiness over time	Opportunities in identifying resilience leaders across sectors, and the companies supplying solutions for a climate-adapted economy	Potential to gain exposure to pure-play adaptation solutions and ride on growing structural CA&R need	Contract-based structures allow funders to match return requirements, downside protection, and impact alignment	Critical to support adaptation projects in building resilience and delivering impact, where pathways to long-term financial sustainability are still being developed
Capital deployment pathways	Direct investments into projects and requiring climate resilient design as part of investment, including ongoing monitoring	Financing asset hardening and resilience retrofitting (e.g., flood protection, cooling efficiency)	Financing issuers' CapEx demand for adaptation measures	As shareholders, exercise active engagement with company management to improve operational resilience or capture new CA&R markets	PE/VC investors can exercise operational control to build resilience into the business, supporting value creation	Providing light-sized, non-dilutive capital to mid-market businesses, with covenants that can embed adaptation requirements	Early-stage projects, capacity building, technical assistance. Limited capital available
Example instruments	Project finance, asset-level investments, MDB-backed finance	Direct (real asset developments or retrofits); sustainability- or adaptation-linked insurance	Green, resilience, and adaptation bonds, private placements, ongoing CapEx financing for resilience leaders	Stock selection based on CA&R revenues or spend, tailored to specific market segments	Impact equity, climate venture funds, CA&R focused accelerators	Resilience-linked loans, working capital financing, project financing, mezzanine debt within a blended finance structure	Recoverable/recyclable grants, grants as guarantees
Catalytic potential	Hard infrastructure serves as a backbone to resilience. Infrastructure often featured in blended finance	Potential to attract premium pricing with resilience ratings	Single-investor influence minimal, but bond labelling mechanism for CA&R outcomes to be tied to financing	Less catalytic as a single investor and requires collective investor action	Can attract follow-on capital if track record is proven	Enhanced by blended structures that mobilise capital across the spectrum of funders	Often used as catalytic capital with private capital mobilisation and/or strong impact objectives

Key implications for funders:

Direct CA&R allocation is feasible in select asset classes. Infrastructure and private markets offer the clearest pathways for explicit CA&R strategies, while public equities & bond portfolios currently provide more diversified exposure.

Scaling CA&R investment depends on aligning mandates, time horizons, and risk assessments, with philanthropic capital remains a critical enabler for building pipelines and de-risking early opportunities.

CA&R can be accessed through multi-asset portfolio construction. Funders with flexibility with asset class allocation can leverage the full spectrum of opportunities, each with distinct risk-adjusted return profiles.

Source: Invesco analysis.

For long-lived assets like infrastructure, adaptation and resilience spend aligns with investment horizons

Key return drivers: Protecting long-lived assets

- **$4 returned per $1 invested** in infrastructure resilience in developing countries, while adding only ~3% to upfront construction costs[1]
- **Defends revenue continuity** across 10- to 30-year asset lives by preventing outages, reducing unplanned maintenance, and preserving service delivery through climate events
- **Cost of capital optimisation** for assets with superior resilience profiles and service reliability attract favourable risk ratings, borrowing costs
- **Preserves insurability** as assets without resilience hardening face rising premiums, coverage withdrawal, or both — directly impacting financing terms and valuations

Investment opportunities

Matching investment horizon with climate risk: Long economic life (10-30 years) of infrastructure assets mean that future project value will be impacted by physical climate impacts, and consideration of such risks are fundamental to the investment thesis.

Commercial viability across a spectrum of interventions:[2] Resilient materials and certifications can be integrated as brownfield retrofits during scheduled maintenance, enabling staged CapEx.

Figure 94. Opportunities span the CapEx spectrum[2]

CapEx level	Examples of adaptation spend	Characteristics
Low	Reflective coatings, shading, wind breaks	Quick wins, low complexity, often OpEx-like
Medium	Pumps, drainage upgrades, blue-green infrastructure, insulation	Moderate cost, scalable, co-benefits
High	Flood barriers , undergrounding cables, structural hardening	Capital-intensive, long-term resilience, protects critical asset

Key market trends

- **US$700–850 billion in annual global infrastructure losses** from climate and natural hazards.[3] Up to 54% of global infrastructure value is at risk without adaptation[4]
- **Water and wastewater infrastructure absorbs ~34% of tracked adaptation finance**, making it the largest single recipient. **Private capital is entering: in water security, public-sector share is projected to fall from 78% to 43%**[5]
- **76% of infrastructure investors** say physical climate risks will have medium-to-high impact on their portfolios[6] — yet fewer than 1/3 of major infrastructure companies report on the resilience of their assets.[2] This gap between perceived risk and disclosed response signals repricing ahead

Illustrative opportunities

Power grid and utility hardening

Physical risks addressed: Extreme heat (conductor sag, transformer overload), flooding (substation inundation), tropical cyclones (line damage).

Adaptation approach: Undergrounding of distribution lines in high-risk zones, substation elevation and flood barriers, and deployment of smart grid monitoring for real-time management. These measures can be staged into scheduled maintenance CapEx cycles.

Investment opportunity: Adaptation measures at the asset level have quantifiable payback periods. For utility-scale assets, chronic heat degradation can erode annual output over a project lifetime, impacting IRR hurdle rates. Utilities with credible resilience programmes also face lower refinancing risk as lenders increasingly screen for physical climate exposure.

Flood-resilient urban water and drainage infrastructure

Physical risks addressed : Intense rainfall, pluvial and coastal flooding, combined sewer overflow, drought-driven water stress.

Adaptation approach: Elevated or flood-proofed treatment plants, expanded stormwater capacity, upgraded pumping and backup power.

Investment opportunity: Long-duration utility-style cash flows, typically supported by regulated tariffs or concession agreements (10 to 30-year horizons). Total capital in water security-related assets is projected to grow fromUS$3.8 to US$12.6 trillion.[5] DFIs and multilateral banks are actively deploying concessional capital in this space, creating natural blended finance entry points.

Source: **1** World Bank (2019): Lifelines: The Resilient Infrastructure Opportunity; **2** EDHEC Climate Institute (2025): Reducing Infrastructure Climate Risk Through Technology Measures: An Overview; **3** Coalition for Disaster Resilient Infrastructure (CDRI) (2023): Global Infrastructure Resilience Capturing the Resilience Dividend; **4** EDHEC Infrastructure & Private Assets Research Institute (2023): Its getting physical; **5** Global Water Intelligence (2024): Investing in a Water Secure Future: Value creation strategies in a changing world; **6** EDHEC Infrastructure & Private Assets Research Institute (2024): Physical climate risk survey: those in the infrastructure investment industry are concerned and lack data.

Adaptation interventions in real estate hardens assets, contains insurance costs, and prevents climate-driven loss of value

Key return drivers: Rents, capital value

- **Insurance costs doubling:** U.S. real estate insurance as a share of income has doubled over the last 5 years.[1] Resilient assets preserve insurability; unadapted assets face repricing or coverage withdrawal
- **Tenants screening for resilience:** 45% of corporate renewable energy leaders will select only climate-resilient buildings by 2030.[2] LEED-Certified U.S. offices command 3.7% rent premiums[3]
- **Exit value protection:** FORTIFIED-standard homes sell at ~7% premium and sustain 20–40% less damage in storms.[4] Adaptation spend protects residual value across 5 to 15-year holding periods

Investment opportunities

Adaptation strategies vary by asset type; investment mechanisms are most direct in commercial and industrial assets where tenant covenant and business continuity are priced.

Figure 95. Opportunities span the CapEx spectrum[2]

Asset type	Key physical risks	Adaptation strategy	Investment mechanism
Commercial office	Extreme heat, flooding	Passive cooling, flood doors, resilient fit-out	Rent premium, lower vacancy, green certification uplift
Residential	Heat stress, storm surge	Elevated construction, green roofs, insulation	Reduced insurance premiums, mortgage rate advantage
Industrial / Logistics	Flooding, wind damage	Elevated floor levels, reinforced envelopes	Business continuity premium; tenant covenant strength
Retail / Mixed-Use	Urban heat island, flooding	Blue-green infrastructure, shading, drainage	Footfall protection, reduced downtime, ESG compliance

Key market trends

- **Emerging markets will drive 80% of global floor-area growth to 2050**,[5] placing climate-resilient design at the centre of future expansion. Yet most of these markets lack mandatory building resilience codes. This is both the largest source of future real-asset value creation and the widest gap between adapted and unadapted stock
- **Regulations are converting climate risk into binary outcomes**. The European Union Energy Performance of Buildings Directive mandates renovation of the worst 16% of commercial stock by 2030[6]
- **Insurance withdrawal can act as a repricing mechanism**. US commercial real estate insurance costs projected to grow at 8.7–10.2% CAGR to 2030.[7] In markets where insurers are pulling out, the path from climate-exposed to uninsurable to unfinanceable can close within a single holding period

Illustrative opportunities

Flood-resilient commercial real estate

Physical risks addressed: Pluvial and coastal flooding, storm surges, and groundwater ingress in rapidly urbanising delta cities.

Adaptation approach: Elevated ground-floor construction, engineered flood barriers and doors, waterproofed building envelopes, and backup power systems.

Investment opportunity: Avoided damage and downtime costs protect rental income continuity. In flood-prone markets, resilient assets can retain access to insurance coverage that is increasingly unavailable for non-hardened stock. Relevant for value-add and core-plus strategies targeting coastal commercial and mixed-use assets.

Passive cooling and climate-resilient office retrofit

Physical risks addressed: Extreme heat and urban heat island effects driving cooling energy demand, occupant productivity loss, and tenant churn.

Adaptation approach: High-performance glazing, reflective and vegetated roofing, natural ventilation design, and thermal insulation upgrades — reducing mechanical cooling load.

Investment opportunity: Green-certified assets in Asia-Pacific command up to 3.5-11% rental premiums and attract institutional tenants with ESG mandates. Retrofit CapEx can be staged across lease renewal cycles, improving capital efficiency.[8]

Source: **1** MSCI (2024): Insurance Has Bigger Bite of Commercial Property Income; **2** JLL (2025): From Climate Risk to Climate Resilience; **3** CBRE (2022): Green Is Good: The Enduring Rent Premium of LEED-Certified U.S. Office Buildings; **4** University of Alabama's Center for Risk and Insurance Research (CRIR) (2025): Fortified Performance in Hurricane Sally; **5** IEA (2025): Breakthrough Agenda Report 2025; **6** European Commission (2024): Energy Performance of Buildings Directive; **7** Deloitte Center for Financial Services (2024): Climate change impacts elevate US commercial real estate insurance costs; **8** World Green Building Council APAC (2025): A Changing Business Case.

Public bond markets provide scalable capital for CA&R, with sovereigns and supranationals paving the way

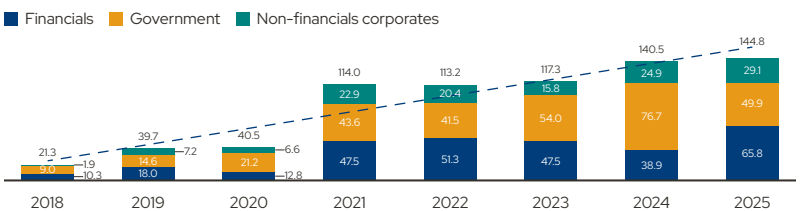
Key return drivers: Yield, quality, duration

- **Adaptation CapEx supports creditworthiness:** Credit rating agencies are considering physical risks within assessments of credit quality. Corporate issuers who invest in resilience today can be credit winners of tomorrow
- **Labelled green, social, and sustainability bonds offer comparable returns:** The greenium has compressed to ~1 bp globally.[1] Adaptation-labelled bonds trade at comparable yields to conventional equivalents — investors access the theme without sacrificing return
- **Tenor matches climate risk horizon:** Long duration instruments align with physical risk timeframes — a natural fit for liability-matching investors (pension funds, insurers)

Investment opportunities[2]

Expanding instrument set: There is over **US$600B** of outstanding stock of Asia issued labelled bonds with adaptation use-of-proceeds (UoP), with steady rise of annual issuance since 2015. Adaptation financing spans green bonds (with adaptation UoP), resilience bonds, sustainability-linked bonds with physical risk KPIs, catastrophe bonds, and debt-for-climate swaps. In practice, corporates issue labelled bonds to fund a wide variety of projects, for mitigation, adaptation and broader environmental and social project categories.

Figure 96. Amount of labelled bonds issued in Asia with adaptation UoP (US$B)



Key market trends

- **Under-penetrated and growing**. While CA&R features in UoP tagging, only under 2% of cumulative GSS bond proceeds since 2018 have been allocated to adaptation projects,[3] indicating room for further capital allocation towards CA&R
- **Certification is catching up to the market**. CBI's Resilience Taxonomy enables science-based certification of adaptation bonds for the first time. The Tokyo's Resilience Bond was the first certified issuance[4]
- **Sovereign issuers are entering via innovative structures**. Barbados completed the world's first debt-for-climate-resilience swap, generating S$125 million in fiscal savings, channeled into new resilience investments.[5] Including the Tokyo Resilience Bond, these instruments expand investment opportunities to adaptation-focused investors

Illustrative opportunities

Tokyo Resilience Bond[6]

First issuance certified under Climate Bond Initiative' Resilience Criteria

Physical risks addressed: Increasing typhoons, extreme rainfall, sea-level rise, and landslide risks across Tokyo's dense urban areas.

Use of proceeds: Flood-defence upgrades, coastal protection, enhanced drainage, and sediment-prevention works.

Investment opportunity: The bond drew US$2.2 billion in demand (a 7x oversubscription) underscoring strong investor appetite for high quality, resilience-focused instruments. The robust demand allowed the bond to tighten by 6 basis points (bps) from initial guidance to 40bps over mid-swap.

(See the Climate Adaptation and Resilience in Asia Case Study Library (2026) for more details)

Asian Infrastructure Investment Bank[6]

Adaptation-labelled bonds aligned with the Joint MDB Methodology for Tracking Adaptation Finance

Physical risks addressed : Increasing floods, storm surges, heat extremes, & infrastructure failures affecting vulnerable communities & critical systems across AIIB member countries.

Use of proceeds: Financing climate-resilient infrastructure—such as flood-recovery works, water-system upgrades, and urban resilience projects.

Investment opportunity: The January 2025 deal attracted significant investor demand from APAC and EMEA. The deal priced at a re-offer spread (+51bps) tighter by 7 bps relative to its issue spread in 2023 (+58bps).

Note: Data on labelled bonds sourced from Bloomberg as of 18 March 2026. The Asia universe was defined as bonds with Region of Risk classified as Asia and screened using Bloomberg ESG project Use of Proceeds categories. This included Bloomberg's climate adaptation classifications (primarily Early Warning Systems and Information Support) and was expanded to include relevant Sustainable Water categories and bonds marketed as Climate Adaptation. **Source: 1** IFC-Amundil (2024): Emerging Market Green Bonds 2024; **2** Invesco analysis, Bloomberg, as of March 2026; **3** MainStreet Partners (2025): Green, Social and Sustainability Bonds Market Trends; **4** Climate Bonds Initiative (2025): Tokyo Metropolitan Government to issue world's first Climate Bond Certified using the Resilience Criteria and Taxonomy; **5** IDB (2024): Barbados Launched the World's First Debt-for-Climate-Resilience Operation; **6** Climate Bonds Initiative (2025): Sustainable Debt Global State of the Market 2025.

Listed corporates' CA&R activities indicate strong momentum, creating opportunities as earnings prove more durable over time

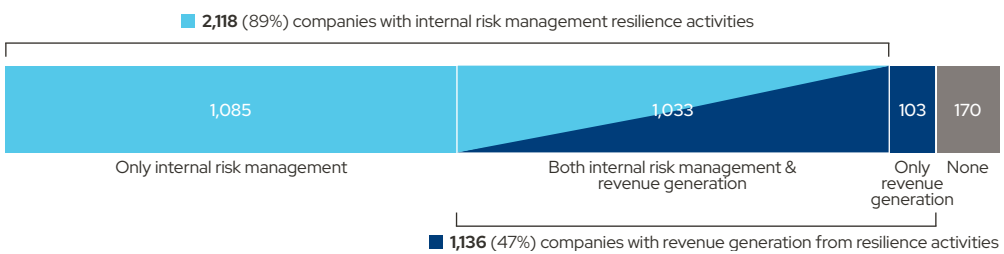
Key return drivers: Earnings growth, downside protection

- **Revenue growth from structural demand:** Companies with resilience-relevant product lines access a structural growth vector
- **Operating leverage from resilience:** Companies that adapt operations experience fewer disruptions, lower unplanned maintenance, and more predictable cost structures
- **Business interruption risk reduction:** Potential business interruption losses are 14x larger than direct asset damage[1]

Investment opportunities

A **large majority of listed companies have identifiable adaptation activities**, spanning internal risk management (89%) and revenue generation (47%). Both create value: risk management protects earnings from disruption, while revenue generation captures structural demand growth. The opportunity lies in **identifying resilience leaders** across sectors, and the **companies supplying solutions** for a climate-adapted economy.

Figure 97. Corporate resilience activities of the MSCI ACWI Index: risk management vs. revenue generation



Key market trends

- **Asia positioned to be customer and developer of CA&R solutions**. 41% of publicly listed resilience solutions providers are domiciled in APAC, led by industrials and materials.[2] This concentration reflects both the region's acute physical exposure and its role as a manufacturing base for adaptation products, from cooling systems to flood-resilient infrastructure
- **A US$1 trillion market growing to US$4 trillion:** Global annual revenues from adaptation solutions are projected to reach ~US$4 trillion by 2050 under current policies and a 2.7°C scenario, roughly quadrupling from ~US$1 trillion today. Approximately half of that growth is attributable to rising climate risk rather than broader economic expansion[3]
- **Opportunities available today:** 47% of MSCI All Country World Index constituents (~1,136 companies) generate revenues from resilience-enabling products and services today, spanning every Global Industry Classification Standard sector and every major hazard category. Financials and industrials are the most represented sectors; drought and extreme heat solutions are the most common product areas[4]

Illustrative opportunities

AkzoNobel India[2]

Physical risks addressed: Severe weather, heat.

Adaptation approach: The group has developed a line of paints and coatings that offer low-solar absorption, using a reflective pigment that deflects infrared light and the sun's heat. Compared with conventional paints, the low-solar-absorption paint reflects sun and infrared radiation by up to 90% more than conventional paints, allowing less heat transfer to the building interior and reducing the building's surface temperature by up to 5°C.

Investment opportunity: Heat-reflective paints are a small but high-growth segment of the total paint market in Asia, expected to grow at 2-3x the rate of the broader market. The total paint market in Asia is estimated to be US$60 to 70 billion (as of 2023) and expected to grow to US$104 billion by 2030.

Manila Water[5]

Physical risks addressed : Extreme typhoons, severe floods, prolonged droughts, and rising sea levels affecting water quality and infrastructure.

Adaptation approach: Infrastructure resilience and retrofitting to withstand extreme weather, water source protection and development, advanced techniques to minimise water loss including pressure management, automated controllers, pump automation, and advanced leak detection technologies.

Investment opportunity: Regulated diversified water utility with strong tariff structure, providing predictable cash flows. Operates under a long-term concession with regulated returns. CA&R investments protect the revenue base against service disruption and regulatory penalty.

Source: 1 MSCI (2025): Building Resilience: Understanding and Managing Physical Climate and Nature Risks; **2** MSCI Sustainability Institute (2025): How adaptation finance can help Asia withstand a hotter future; **3** GIC (2025): Sizing the Inevitable Investment Opportunity: Climate Adaptation; **4** MSCI Institute (2025): The Hidden Adaptation Economy; **5** Manila Water Company (2026).

Innovative, pure-play CA&R solutions are being supported through thematic PE/VC funds

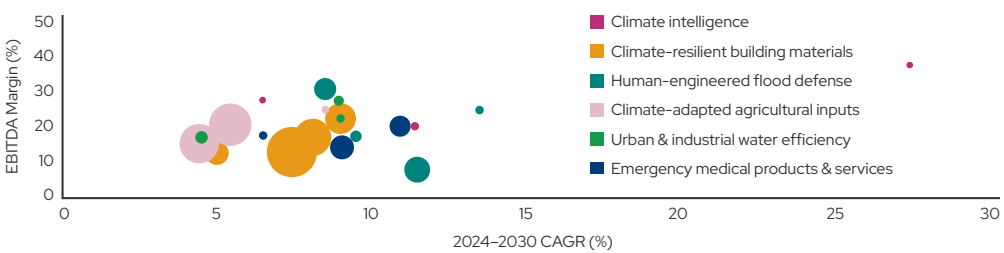
Key return drivers: Structural growth

- **Structural expansion potential:** Early-mover advantage in under-capitalised Asian sub-sectors (e.g., water efficiency, agri-tech) allows for significant operational improvement and pricing power
- **Operational control to build resilience into the business:** PE investors can embed adaptation into portfolio companies' strategy, creating value. This is both a risk management (protecting from physical disruption) and a revenue accelerator (repositioning offerings toward resilience demand)

Investment opportunities

Compared to large diversified players, **early-stage companies provides stronger pure-play CA&R exposure**. Today, the relative attractiveness of these opportunities differ in the short-run, requiring various sources of capital (from early-stage venture to growth PE), to draw on respective expertise in identification, value creation, scaling businesses, and guiding companies to maturity.

Figure 98. CAGR, EBITDA margin and market size of key climate adaptation growth markets



Key market trends

- **Adaptation start-ups are underfunded**. Pure-play CA&R start-ups make up 12% of climate-tech start-ups but receive only 3% of funding (US$4.5 billion)[1]
- **Largest value pools today** include façade materials, crop protection, resilient seeds, waterproofing, emergency medical system products and services[2]
- **Venture funding today primarily flows to technology**. Solutions leading the pack include climate risk analytics and modelling , as well as manufacturing, insurtech, fintech and construction tech[1]

Illustrative opportunities

Early stage, venture capital

Mazarine Climate Fund[3]

Physical risks addressed: Water-related climate risks—flooding, drought, and water-quality degradation.

Adaptation approach: Backs early-stage Industry 4.0 solutions (sensors, data/AI, automation) to help operators detect, manage, and mitigate water risk.

Investment opportunity: Early-stage venture focused on significant climate adaptation vertical (58% of climate technology spend in 2024) with growth potential through four end market sectors. US$25 million initial fund, with syndication planned.

Venture capital

Convective Capital[4]

Physical risks addressed: Extreme wildfire risk in North America and other fire-prone regions.

Adaptation approach: Invests in wildfire-tech start-ups—AI detection, robotics, remote sensing, and grid-resilience tools. Advances technologies that lower wildfire ignition and spread, improving safety, grid reliability, and community resilience.

Investment opportunity: Invest in early-stage startups aiming to bridge the gap In venture funding for fire-tech. US$35 million Fund I; US$75 million Fund II.

Growth equity

The Lightsmith Group

Physical risks addressed: Climate shocks, including irregular rainfall, heat, storms, drought.

Adaptation approach: Focus on Infrastructure & energy resilience and supply chain resilience.

Investment opportunity: Advancing growth stage companies with a total addressable market that grew from US$170 billion in 2017 to US$480 billion in 2024, a ~20% CAGR.

(See the Climate Adaptation and Resilience in Asia Case Study Library (2026) for more details)

Source: 1 Tailwind (2024): The Adaptation & Resilience Innovation Playbook; **2** Boston Consulting Group and Temasek (2025): The private equity opportunity in climate adaptation and resilience; **3** Mazarine Climate (2026); **4** Convective Capital (2026).

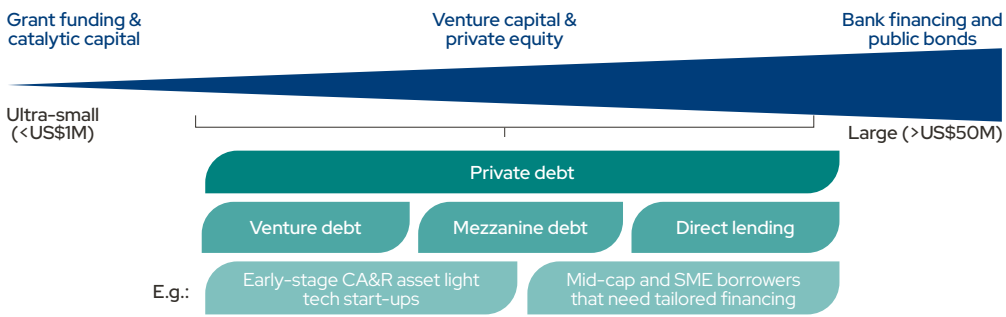
Private debt can provide right-sized, non-dilutive, and innovative financing for emerging CA&R solutions, but require strong risk management

Key return drivers: Contractual yields with CA&R alignment

- **Contract-based:** Loan covenants can require borrowers to maintain physical risk management standards, ringfence proceeds for adaptation CapEx, and report on resilience KPIs. Such structures can sit alongside typical cash yield terms. This gives lenders both downside protection and impact alignment in a single instrument
- **Access to under-financed markets:** Certain segments of CA&R opportunities require ongoing debt financing, however, typically fall out of scope for formal banks e.g., agriculture). This provides private debt funders with access to untapped markets

Investment opportunities

Most CA&R borrowers sit between public bond markets (which require scale) and equity (which requires dilution). Private debt fills this structural gap: **right-sized tickets, non-dilutive, with covenants that can embed adaptation requirements**. It also layers naturally into blended structures alongside grants and catalytic capital.



Key market trends

- **Asia is underserved but poised for structural growth**. Private credit in Asia holds just 6% of global AUM.[1] SMEs account for more than 96% of Asian businesses and provide two out of three jobs in the region, yet struggle to access bank financing due to systemic and regulatory constraints,[2] providing strong structural tailwinds for private credit in Asia. Industry estimates expect APAC's market is expected to grow from US$59 billion in 2024 to US$92 billion by 2027[3]
- **Risk management differs by market**. Asia spans multiple jurisdictions with varied regimes. Emerging-market lending requires more complex structuring through DFI co-investment, first-loss guarantees, or local currency facilities to manage currency, enforcement, and data risk[3]

Illustrative opportunities

Root Capital[4]

Physical risks addressed: Heat stress, erratic rainfall, and rising pest and disease pressures, all of which increasingly threaten smallholder crop yields and income stability.

Approach to climate adaptation: Provide climate- resilience loans for more climate-tolerant crops, regenerative agriculture, clean energy, and agroforestry; extend cooperative credit lines that fund on-farm adaptive practices; and deliver advisory services in climate-smart agronomy and digital risk management to strengthen long-term resilience.

Investment opportunity: Impact-first offering working-capital and growth loans to agricultural SMEs, with risk advisory services. Enterprises financed through Root Capital in 2025 generated over US$1 billion in income for farmers and their families — a 37% increase YoY.

Tropical Resilience Fund (TREF)[5]

Physical risks addressed: Ecosystem and nature loss.

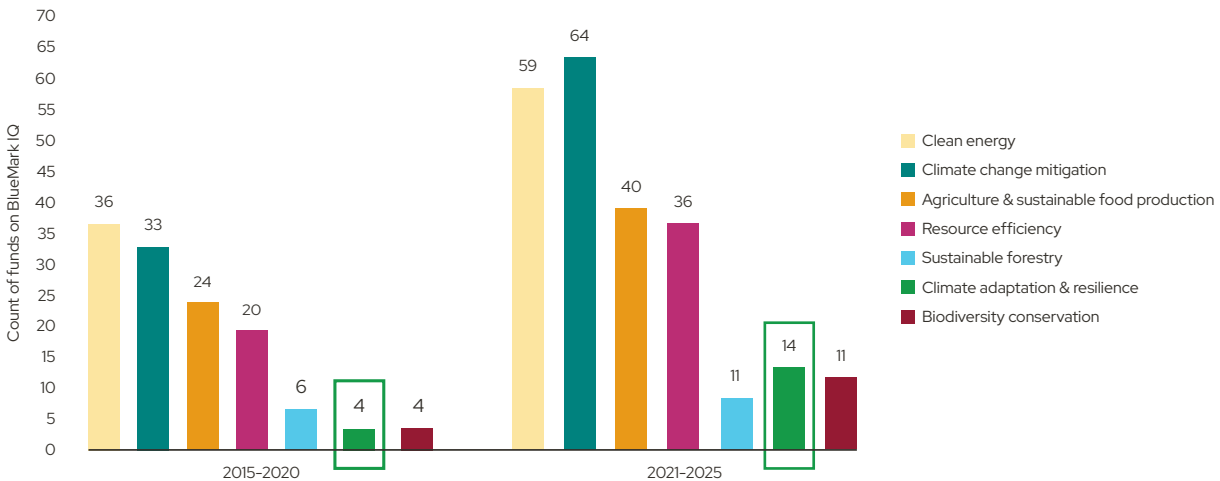
Approach to climate adaptation: TREF is a US$100 million closed-ended mezzanine debt fund designed to scale nature-positive, climate resilient solutions. It provides revenue-based loans, convertible debt, and bridge loans to early- and growth stage ventures and nature projects.

Investment opportunity: With a 12-year term and two potential one-year extensions, TREF uses a blended structure to attract commercial capital while reducing risk. Senior tranche investors are expected to include institutional investors and DFIs, while philanthropies and governments will anchor the junior, first-loss tranche, potentially alongside DFIs. A 70:30 senior-to-junior split.

Source: 1 Prequin via Bloomberg (2025): Private Credit Funds Target Billions in Retail Demand from Asia ; **2** ADB Institute (2018): The Role of SMEs in Asia and Their Difficulties in Accessing Finance ; **3** AIMA (2025): Private Credit in Asia 2.0; **4** Root Capital (n.d.); **5** Climate Finance Lab (2025): Tropical Resilience Fund.

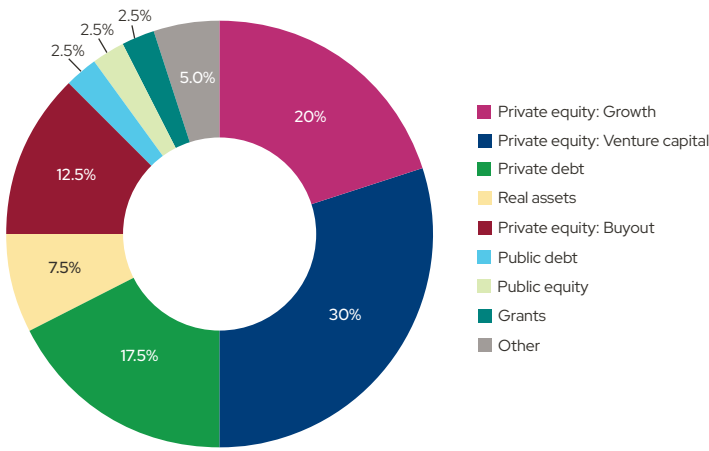
Market highlight: CA&R focus among impact funds is small but growing

Figure 99. Growth of climate-related funds for the past decade (2015-2025), tracked by BlueMark[1]



CA&R funds have grown from 4 funds between 2015-2020, to 14 funds between 2021-2025. This is a **3.5x increase** in number of funds established

Figure 100. Asset class composition of funds with CA&R thematic focus, tracked by BlueMark (self-disclosed)[1]



Growth private equity is the most common asset class tagged by investors disclosing CA&R as a thematic focus

Note: a Based on vintage year (i.e. year of fund establishment) **Source: 1** BlueMark. About BlueMark: BlueMark is a leading provider of independent impact assessments and market intelligence for the investment industry. The data and insights from these assessments have been integrated into the BlueMark IQ platform, which is custom-designed for asset allocators to more easily identify, monitor, and report on fund and portfolio-level impact. Funds tracked on the BlueMark IQ platform are primarily invested in private equity, private debt and real assets.

Philanthropic capital is still critical for delivering impact, especially where pathways to financial sustainability are developing

Catalytic potential

- Support innovative solutions and business products to be tested and implemented in-market
- Share financing risk with private and public funders and ensuring project investability
- Mobilise other capital providers into crucial, but currently underfunded, sectors or communities

Impact potential

- Increase access to financing for underserved and unserved communities
- Improve adaptive capacity of vulnerable communities and countries
- Build climate resilience across sectors

Types of solutions

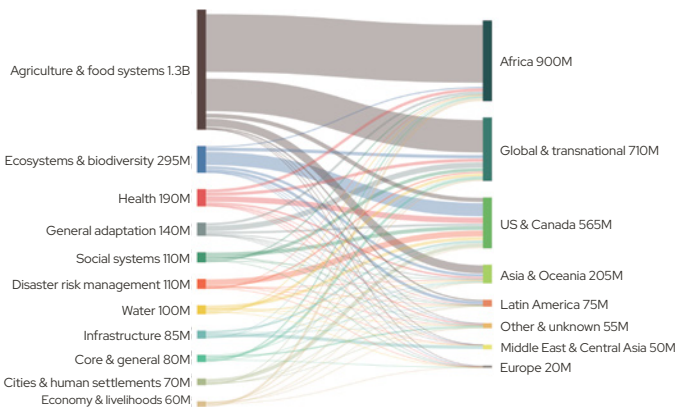
Recoverable/recyclable grants
This mechanism helps to stretch philanthropic dollar through allowing repayment without interest and enable reuse of funds into the next solution or programme

Grants as guarantees
This mechanism provides a safety net for private capital, where philanthropic monies absorb first loss, therefore increasing confidence for investors to unlock and avail their capital

Key market trends

- **Philanthropic funding towards climate adaptation is growing:** Since 2021, foundation funding for adaptation grew by 120%, to an estimated US$870 million in 2024[1]
- **More funders are contributing to building a more resilient world:** Between 2021 and 2024, the number of foundations making adaptation- and resilience-related grants increased by 55%
- **However, Asia and Oceania remain under the radar**: Of all the tracked foundation funding for adaptation and resilience, Asia and Oceania received less than 10% of total funding despite being home to more than half of the world's population

Figure 101. Known foundation funding (US$) for adaptation to sectors & geographies, 2021-2024[1]



elea

Innovation in philanthropic capital deployment: elea deploys philanthropic capital through a catalytic approach, where they invest in early-growth enterprises using equity or quasi-equity instruments, and journey together in close partnership with the enterprise as they grow.

Adaptation focus: People living in poverty (e.g., smallholder farmers) and integrating them into local and global supply chains, focusing on enterprises at the intersection of environmental and social impact.

Temasek Foundation

Innovation in philanthropic capital deployment: Temasek Foundation provides their grants as guarantees to de-risk agricultural financing, therefore unlocking more capital for agri-SMEs and smallholder farmers. Some projects include insurance as additional protection for enterprises as they grow.

Adaptation focus: Emphasising the triple bottom-line of People-Planet-Prosperity, Temasek Foundation seeks to enable new business models in agritech and agri-financing to then create systemic change.

Gates Foundation

Innovation in philanthropic capital deployment: Gates Foundation deploys through early-stage equity for pre-commercial technologies that are suitable for the small farms of India. These technologies are funnelled through the Foundation's incubator and may be too nascent and unable to raise funding for further commercialisation otherwise.

Adaptation focus: Accelerating breakthrough innovations and system enablers that enable smallholder farmer productivity and resilience. At COP30, the Gates Foundation pledged to invest US$1.4 billion over the period 2026-2029 to support innovations that help smallholder farmers adapt to the increasing challenges of climate change.

Source: 1 ClimateWorks Foundation (2025): Foundation funding for climate change adaptation and resilience 2025.

Case study examples: CA&R opportunities for innovative finance and philanthropic capital

	Innovative finance				Philanthropic
Organisation	**Climate Fund Managers' Climate Investor Two Fund**	**Mirova's Sustainable Land Fund 2**	**MUFG's GAIA Blended Finance Fund**	**Rare's Small-Scale Fisheries Impact Bond**	**Temasek Foundation**
Year established	2019	2023	2025	2023	2007
Key markets	Global (Africa, Asia, Latin America)	Global	Emerging markets	Indonesia (pilot in Southeast Sulawesi); model designed for replication across coastal markets	Global
AUM/fund size	US$1.065B	US$400M	US$1.5B	US$6M	Not publicly disclosed
Funding approach	Blended finance	Hybrid	Blended finance	Outcomes-based financing (hybrid public–private capital)	Grant as guarantee
CA&R focus areas	• Water security through desalination, distribution systems, and safe water access • Urban resilience with sanitation and waste-to-energy infrastructure • Marine ecosystem protection • Coastal and ocean resilience	• Sustainable land management and restoration • Transition and decarbonisation of agricultural and forestry value chains • Positive impacts on climate, biodiversity, water, and social inclusion	• Sustainable agriculture • Water management • Ecosystem resilience • Climate-smart infrastructure	• Healthy and stable marine ecosystems • Contribution to 30x30 and effective area-based conservation • Better food security and improved livelihoods	• Sustainable and regenerative agriculture • Livelihood improvement • On-farm adaptive practices • Market access • Blended finance
Instruments used	Concessional equity, grants, senior/ subordinated loans, guarantees, technical assistance	Public equity, private equity, credit, bonds, venture debt, mezzanine financing, convertibles, technical assistance, prizes and awards, scholarships	Long-term debt instruments supported by concessional capital, guarantees, and technical assistance	Impact bonds, technical assistance, community-led conservation	Grant as Guarantee
Select portfolio/ projects	• **AZUR** is developing Waste to Energy facilities in Northern Thailand, utilising incineration technology to burn municipal solid waste • **CA Water** platform addressing increasing water and sanitation demands in Vietnam	• **Big Tree Farms** is a leading producer of organic coconut sugar products in Indonesia • **Kennemer** is a Philippines-based diversified agroforestry holding company	N/A	• Outcome-based financing for Managed Access with Reserves fishing in pilot locations in Southeast Sulawesi	• Sustainable rice planting and access to better inputs in Indonesia • Embedding insurance within an agricultural project to de-risk philanthropic funding

Note: All examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP. Key CA&R focus areas defined by investors.

Case study examples: CA&R opportunities across asset classes (1/2)

	Infrastructure	Real estate	Public equity	Private debt
Organisation/ asset	**Tokyo Resilience Bond[a]**	**Alabama Homeowners[a]**	**Manila Water**	**Root Capital**
Year established	2025	2009	1997	1999
Key markets	Tokyo, Japan	Alabama, United States	The Philippines	Latin America, Africa, Southeast Asia
AUM/fund size	US$333M	N/A	US$665M	US$117M
Funding approach/ instruments	Municipal bond	State-level insurance incentives	Debt, equity	Private debt
CA&R focus areas	• Flood defences • Coastal protection • Sediment prevention	• Wind damage reduction • Storm-driven water intrusion prevention	• Infrastructure resilience and retrofitting to withstand extreme weather • Water source protection and development • Advanced techniques to minimise water loss	• Crop diversification • Regenerative agriculture • Clean energy • Agroforestry • On-farm adaptive practices
Select portfolio/ projects	• Pond regulation • Seawall construction • River infrastructure reinforcement • Coastal protection facility upgrading	FORTIFIED-standard roof upgrades for homes to: • Reduce structural failure during hurricanes • Maintain insurability • Encourage statewide adoption of disaster-resilient construction techniques	• Water pressure management • Automated controllers • Pump automation • Advanced leak detection technologies	• Partnership for Sustainable Coffee aimed at strengthening smallholder coffee enterprises through resilience funding and capacity building • Solar drying infrastructure in Peru and Rwanda to reduce post-harvest losses for coffee

Note: a All examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP. Key CA&R focus areas defined by investors.

Case study examples: CA&R opportunities across asset classes (2/2)

	Private equity and venture capital			
Organisation	**ABC Impact**	**Asia Oceans Fund**	**LeapFrog Investments**	**The Lightsmith Group**
Year established	2019	2023	2007	2016
Key markets	Asia	75% APAC, 25% ROW	Asia and Africa	Global
AUM/fund size	~US$900M	US$75M	US$3.2B	US$185M
Funding approach/ instruments	Commercial	Hybrid; Venture capital	Commercial	Hybrid approach
CA&R focus areas	• Climate and water • Food and agriculture	• Maritime decarbonisation • Ocean renewable energy • Green shipping infrastructure • Ocean biodiversity and restoration solutions • Circular resources • Sustainable aquaculture and marine biotechnology	• Inclusive financial services • Energy • Mobility • Built environment • Agriculture and food	• Precision agriculture • Risk analytics • Geospatial imaging and mapping • Supply chain analytics • Wood harvesting and drip irrigation • Food resilient food systems
Select portfolio/ projects	• **Cropin:** Cropin provides a digital agriculture platform that digitises farm operations and integrates field-level data into enterprise and government systems • **Akshayakalpa:** Akshayakalpa is a certified-organic, farm-to-fork dairy enterprise that offers organic milk, dairy value-added products and allied farm products	N/A	• **HDBank:** Advancing climate adaptation by strengthening financial resilience through lending and insurance, as well as financing of green projects • **Bolttech:** A global Insurtech company, offering home insurance to climate disaster prone regions	• **AiDash:** Satellite imaging-based analytics for utilities to manage wildfire and storm risks • **Tive:** Real-time supply chain tracking and condition monitoring

Note: All examples are available as full case studies in the Climate Adaptation and Resilience in Asia Case Study Library (2026) by CIIP. Key CA&R focus areas defined by investors.

Bridging the CA&R financing gap requires coordinated collaboration between capital providers across the life cycle of projects

CA&R financing today

Current CA&R funding covers only a small share (15-20%) of estimated needs in most regions. Asia accounts for majority of the global CA&R funding needs and gap. ~69% of global CA&R needs and ~75% of global gap is concentrated in Asia.

CA&R financing is focused more heavily on flooding, while rising risks such as extreme heat and drought remain relatively less funded.

Public funds remain the primary source of CA&R financing, and investors' capital allocation decisions are shaped by defined mandates. To crowd-in more private capital, funders need stronger pipeline, favourable macro and structural tailwinds, and innovation in purpose-fit financing solutions.

Blended finance structures can play a role in matching funder appetite to appropriate risk/return profiles within a single construct. **There are early signs of this gaining traction in SEA today.**

Within traditional asset classes, there are direct (pure-play) and diversified opportunities to allocate towards CA&R today. Such opportunities span across downside mitigation, capturing upside, and value creation.

What can be done today?

Respond now: achieve near-term outcomes

By mobilising capital across the spectrum, innovative finance structures can solve for structuring, pipeline, and data challenges. For example, pooling capital and expertise from philanthropy and private investors can lead to the creation of CA&R transactions with embedded technical assistance, priming the path to scalability and profitability.

Funders can apply a hazard-led investment prioritisation framework to better direct CA&R finance toward underfunded, locally relevant risks such as **extreme heat and drought.**

CA&R opportunities can be accessed through multi-asset portfolio construction. Funders can leverage the full spectrum of opportunities by developing CA&R investment frameworks that enable intentional allocations to CA&R, within mandate constraints.

Prepare for the future: enable systemic change

Incentives, such as subsidies and performance-based payments, are crucial to address CA&R information asymmetry (high perceived risk) and to value positive externalities (triple dividends including avoided losses).

Clearer sector classification and a shift toward a multi-hazard risk assessment framework capturing slow-onset and compounding climate risks and allocating finance based on exposure rather than visibility, will require public sector coordination and investment in **data as a public good**. Private sector can complement this by adopting physical climate risk tools to improve data availability and reduce knowledge barriers, enabling more targeted allocation toward underfunded hazards.

Improving structural financing environment through policy coherence across financial and real-economy regulations enables commercial capital flow towards locally and nationally strategic resilience objectives (e.g. European Banking Authority's reduction in risk-weighted assets for qualifying investments under CRR2).[1]

Strengthening local capital and bond markets can attract foreign commercial capital participation in domestic CA&R projects. Companies' access to diversified sources (domestic and foreign) of financing can strengthen local economies and amplify structural growth, such for SEA's MSME segment.

"We believe everything operates within interconnected systems, and our mandate is rooted in systems change. We invest not only in individual solutions, but in the systems that allow those solutions to succeed and scale. From that perspective, climate adaptation is a natural and essential part of our mandate, it has always been core to how we think and invest."

- Maureen Brésil, Associate Director, Katapult Ocean

Source: 1 Climate Financial Risk Forum (2025): From Risk to Resilience: Integrating Adaptation into Finance.

Chapter 4
Translating intent to outcomes

Delivering measurable impact amidst complexity

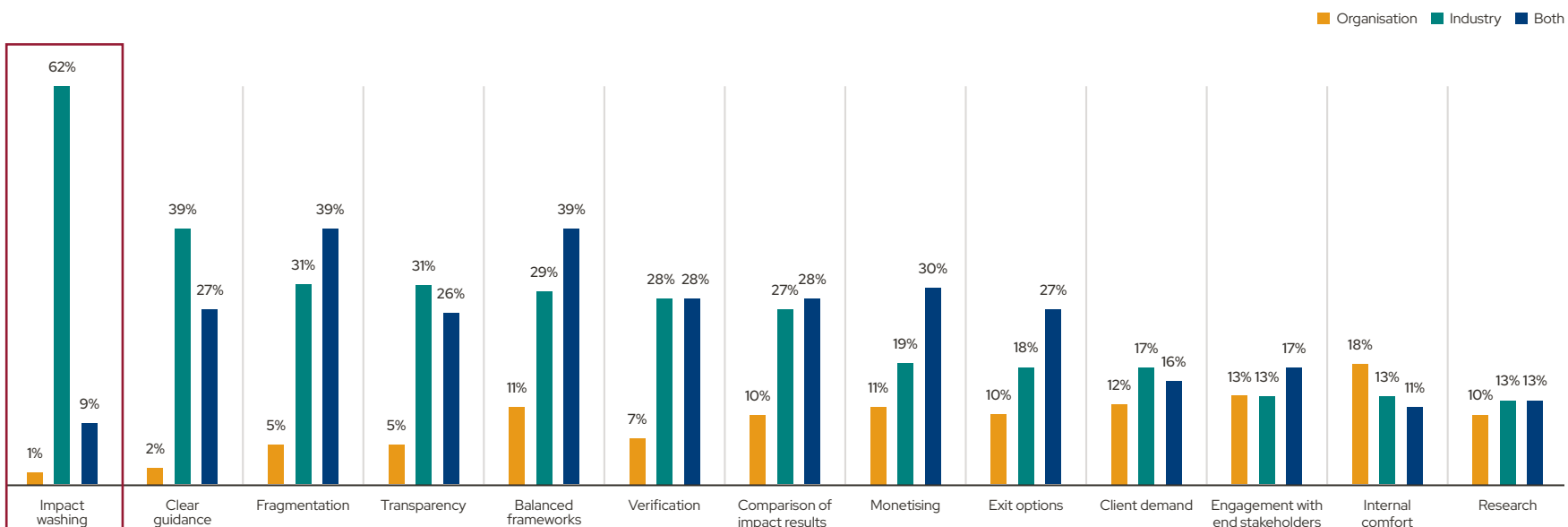
Impact measurement and management (IMM) enables capital flows by ensuring transparency and accountability over outcomes

The importance of **proper impact measurement and management** is reflected in this study's funder survey.[a]

62% of investors surveyed in GIIN's latest State of the Market 2025 report cited the leading challenge for impact investing is **"impact washing"**, where impact claims are overstated.[1]

73%
of funders surveyed by CIIP across the capital spectrum placed importance on impact outcomes.[2,b] Out of 14 factors considered when evaluating impact funding decisions, impact outcomes is ranked **second**.

Figure 102. Impact investing challenges at the organisation and industry level[1, c] (n=264)



However, **reported metrics today are largely output-focused**. Subsequent sections of this chapter provide recommendations for moving towards the measurement and monitoring of CA&R outcomes.

Note: a Level of importance measured on a Likert scale between 1 (not important at all) and 5 (extremely important); **b** 73% represents the number of respondents who indicated 4 and 5 on the Likert scale among the 165 funders who responded to CIIP's funder survey, covering those who place some level of importance towards impact outcomes as a priority when making impact funding decisions. Survey findings are directional and indicative only, drawn from a non-random sample using purposive and snowball sampling; they are not statistically representative of the broader funder population. For methodology, please see Annex; **c** Investors reported a variety of challenges they faced over the past three years. For every challenge, investors were asked whether the issue was a challenge to their organisation, the industry or both. Excludes investors who did not provide answers to this question. **Source: 1** GIIN (2025): State of the Market 2025; **2** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

Clear IMM frameworks are crucial in CA&R given the field's evolving nature

Our findings indicate that **climate adaptation remains an emerging investment theme, with impact measurement frameworks still evolving**. The development of standardised resilience indicators – particularly those capable of capturing system-level climate risk reduction – will be critical for improving transparency and comparability across adaptation investments.

> "Where climate mitigation finance is relatively well understood and easy to measure against, the same is not yet true of climate adaptation finance.
>
> To prioritise and scale up investment in adaptation and resilience, investors need to better understand the types of adaptation and resilience, what qualifies as adaptation finance in private investment, and have **suitable methodologies to accurately measure and report on the positive adaptation and resilience impacts** of their investments."[1]

For private and philanthropic sectors, CA&R is...

Nascent

- **Misconceptions and uncertainties** related to physical climate risks and associated solutions could lead to CA&R funding being de-prioritised
- Appropriate and scalable IMM systems can help strengthen funder confidence

Capital flows are global, but CA&R is...

Inherently local and context-specific

- **Resilience is valued differently by different stakeholders.** Therefore, there is a need to align funder requirements and global standards with localised, decision-useful measurements and metrics
- Clearly defining the **boundaries of impact assessment** helps ensure that impact is not overstated, while keeping the analysis grounded in physical climate risks that are relevant to the specific context of focus

Establishing CA&R outcomes and impacts....

Requires a practical approach

- **Measuring outcomes** such as whether climate vulnerability has actually been reduced, typically require multi-year studies and carries significant cost
- **Counterfactual data**, i.e., what would have happened in the absence of the intervention, is rarely available or easily observable. This is true for the impact sector as a whole, and specifically for CA&R because of its long-term and multidimensional nature, making it difficult to attribute changes in vulnerability or resilience directly to specific actions
- **Activity and output metrics are a necessary first step** in a market still building its evidence base

Source: 1 Adaptation & Resilience Investors Collaborative (2024). Assessing Adaptation & Resilience Impact in Private Investments: A measurement framework for investors.

Counterfactuals for CA&R: Key considerations

What are counterfactuals?

A counterfactual is a commonly referenced concept within impact investing to estimate the alternative outcome that would have occurred in the absence of an intervention or investment. There are two primary considerations:

	CA&R Challenge
Additionality Would this outcome have happened without our capital/ intervention?	**Temporal mismatch:** Adaptation benefits may take decades to materialise, beyond typical funding and reporting cycles. **Scale fragmentation:** Asset-level counterfactuals (e.g., a seawall) use engineering models, while population-level counterfactuals (e.g., community heat resilience) requires social science methods. Determining contribution across various scales require integration of fundamentally different data and methods, which may not be practical.
Avoided damage What losses were prevented because of this intervention?	**Measuring non-events:** Adaptation success often means damages from a hazard did not materialise, and to the extent anticipated. This is challenging to model and therefore measure. **A universal metric:** Unlike emissions for mitigation, adaptation has no fungible unit for "resilience delivered" or "damage averted", limiting comparability across portfolios.

The way forward...

Approaching counterfactuals in CA&R in a practical, resource-efficient manner is a constructive first step, while allowing methodologies to improve as data quality strengthens.

Here we suggest key considerations for establishing counterfactuals in CA&R:

Funder or capital type

Level of intervention or involvement

Hazard profile (and its interaction with the geography or segment of focus)

Illustrative approaches to counterfactuals by funder profile

Funder	Philanthropic	Commercial
Level	Single programme	Portfolio
Hazard profile	*At the location of the programme, if the hazard is...* Acute: identify core implications on societies and economies resulting from hazard occurrence, drawing on comparables where relevant Chronic: measure baselines and track performance over time (i.e., productivity in extreme heat)	*Across the portfolio, there may be hazards that are...* Acute: shorter-term risk exposures, which could be more material to fund life and require strong risk management Chronic: longer-term and slower onset, requires identifying investment opportunities providing CA&R solutions or are best-in-class in resilience
Approach	Contribution analysis: • Assessment of catalytic ability (i.e. capital mobilisation) and impact additionality of concessional/grant capital • Improvement in commercial viability of project with addition of concessional or catalytic capital	Portfolio physical risk assessment: • Identifying comparables where financial impacts of climate risks have materialised • Where available, leverage sector- and asset class-relevant climate scenario analysis to model avoided losses across the short-, medium- and long-term

A Theory of Change provides a practical foundation for developing and measuring CA&R impact

CA&R interventions are complex, context-specific, and influenced by multiple climatic and socio-economic factors. This makes impact measurement for CA&R challenging.

The **Theory of Change (ToC)** framework can provide a practical foundation to address this challenge.

It articulates the **causal pathway** through which investments and business activities translate into **CA&R outcomes.**

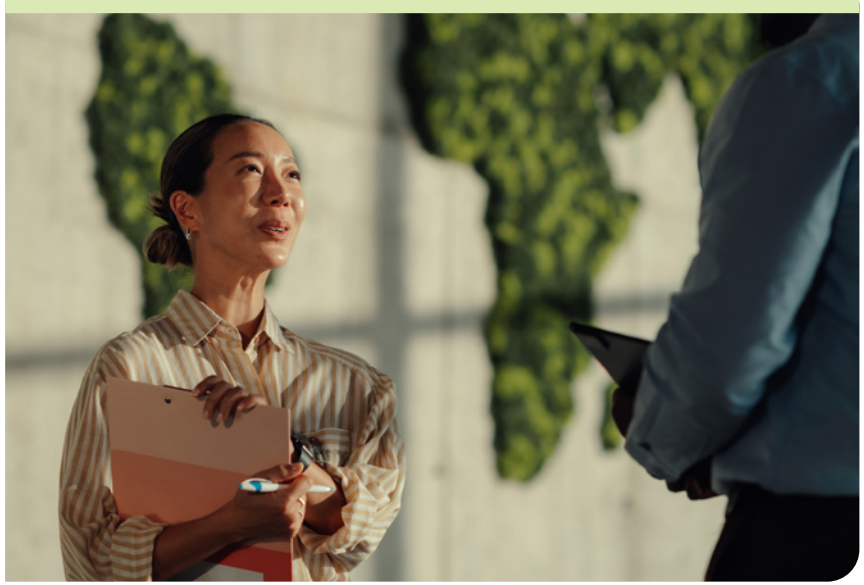
In impact evaluation, ToC originated from theory-based evaluation and programme theory, gaining prominence in the 1990s through Carol Weiss and the Aspen Institute's efforts to evaluate complex social programmes by making causal assumptions explicit.

Resources that support **establishing strategic intent, designing approaches, and measuring and demonstrating impact** can collectively support the development of project- or funder-specific ToC.

Consideration of **counterfactuals** can enable more specific and nuanced ToC pathways.

These will be explored in the next few pages.

A ToC clarifies impact intent and strategy, aligning actions with a vision while moving beyond outputs to a more coherent and transparent view of CA&R impact.



Note: In impact evaluation, Theory of Change originated from theory-based evaluation and programme theory, gaining prominence in the 1990s through Carol Weiss and the Aspen Institute's efforts to evaluate complex social programmes by making causal assumptions explicit. **Source: 1** The Center for Theory of Change (2026): TOC Origins.

Mapping long-term impact pathways helps track progress where end-outcomes remain uncertain

ToC is a widely referenced conceptual framework for impact-focused organisations to outline an impact pathway and forward-looking investment or funding thesis. ToC provides a structured approach to connect actions with outcomes. For CA&R, it enables funders and companies to set **context-specific impact theses and track impact**. Here, we show how leading frameworks can inform ToC design for CA&R funding and programmes:

	Define the problem	Activity/inputs	Outputs	Outcomes	Impact
Description	ToCs anchor on an identified issue (including target groups), outlining boundaries and scale of the problem	Solutions, processes, or mechanisms that the funder or company may be responsible for in delivering desired impact	Immediate deliverables (products and services) resulting from activities. Such metrics tend to be shorter term and at the scale of the activity	Short- or medium-term changes within the context of the activity. Intermediate causal link between immediate outputs and long-term impact	Long-term changes as a result of outcomes. Aligns with impact intent of funder/company, and can be aggregated across multiple activities
C A&R approach	As CA&R issues and associated interventions are highly context-specific, the local physical risk exposure and vulnerability should be considered	Many activities contribute to system-level resilience – understanding where a particular activity sits within overall system resilience is key. Distinguishing between enabling or adapted (or both) activities guides IMM	Output indicators or metrics can be social, environmental, and economic. These should correspond to the physical risk context	Three capacities of resilience help frame outcomes by intensity and scale of change: • Absorptive capacity • Adaptive capacity • Transformative capacity	CA&R impacts may be present across people, planet, and economy, and at a broader system level, which requires drawing on wider analysis of impact against counterfactuals
Example resources	National Adaptation Plans (NAPs), IPCC's key determinants of physical risk, local hazard studies, and assessments	Climate Bonds Resilience Taxonomy (CBRT), Tailwind Taxonomy for Adaptation & Resilience Investments, UNEP Taxonomy of Climate Change Adaptation Technology	Adaptation & Resilience Impact Measurement Framework (ARIC), CBRT, GIIN IRIS+	Five Dimensions of Impact, ARIC guidance materials, Cross-MDB Harmonised Framework	World Bank Integrating Resilience Attributes into Operations, WRI Triple Dividend of Resilience, UN SDGs, NAPs

Anchoring in practice-based activity or output metrics is a strong and resource-efficient starting point when constrained by data challenges

A growing ecosystem of CA&R frameworks is emerging: Navigating these require effective matching of resources to objectives

	Establishing strategic intent	Designing the approach	Measuring and demonstrating impact
	Resources that help funders, corporates, and governments identify where climate adaptation needs are most acute, quantify the cost of inaction, and establish strategic priorities. Includes risk frameworks, country diagnostics, cost-benefit evidence, and sector-level gap analyses.	Guidance on how to translate strategic intent into project design, instrument selection, and implementation. Covers sector playbooks, taxonomies, alignment frameworks, and guidance on integrating CA&R into specific vehicles – from grants and blended finance to labelled bonds and corporate strategy.	Metrics, reporting standards, evaluation tools, and benchmarking resources that enable funders to track whether CA&R interventions are working. This spans ex-ante appraisal tools (scoring resilience quality at design stage) and ex-post measurement tools (capturing realised outcomes on the ground).
Examples (non-exhaustive)	Adaptation Policy Framework (APF)	Operating Principles for Impact Management (OPIM)	Framework for Resilience & Adaptation Investment (FRAIME)
	APC A&R in SEA Primer for Philanthropy	ICMA Green/Social/Sustainability Bond Principles	EU Taxonomy – Adaptation Technical Screening Criteria
	Climate Adaptation Investment Framework (CAIF)	UNEP FI PRB Adaptation Target Setting Guidance	GIIN IRIS+
	Belém Indicators (COP30 59 global adaptation indicators)	Adaptation & Resilience Impact Measurement Framework (ARIC)	
	Sendai Framework for Disaster Risk Reduction	Climate Bonds Resilience Taxonomy (CBRT)	
	World Bank's Resilience Attributes	SCB Guide for Adaptation and Resilience Finance	
	Common questions addressed at each step:		
	• Which areas are most at risk? • What is the cost of inaction? • Which sectors need intervention first? • What baselines can be established?	• How do I apply a CA&R lens to my fund? • Which criteria to apply? • How should the transaction be structured for bankability and financial resilience?	• How should adaptation outcomes be measured? • What metrics should be monitored? • How can performance be benchmarked?
	Collectively, these frameworks build on the Rio Markers[a, 1] across the full decision cycle – adding the design rigour and outcome evidence needed to move adaptation finance from tagged commitments to demonstrated resilience.		

More information in subsequent pages

Note: a Rio Markers: OECD-DAC tagging system (introduced 1998) used by bilateral donors to flag whether finance flows target adaptation, mitigation, biodiversity, or desertification objectives at the point of commitment. **Source: 1** Capacity4dev (2025), Rio Markers Handbook OECD-DAC Climate Markers.

Understanding broader development agenda helps stakeholders frame CA&R objectives more effectively

Examples, non-exhaustive	What	Core guidance	For who?
	The **Asia Philanthropy Circle (APC)** published an Adaptation & Resilience primer in 2025, stemming from the COP28 Call to Action for Philanthropy to accelerate action for climate adaptation. The primer provides an overview of the climate resilience landscape in SEA, including risks, challenges and opportunities.	The primer **maps out key stakeholders** and their roles in addressing crucial CA&R gaps, and advocates for **locally led adaptation, geographically specific solutions** and investment in **ecosystem enablers**. It identifies **specific focus areas for SEA**, including solutions for coastal zones, agricultural regions, and urban areas.	The primer suggests initial directions for **philanthropic actors** to consider to advance the field of adaptation within SEA and catalyse action and impact at a scale. It calls for philanthropy to convene stakeholders to **amplify local actions**. As ecosystem enablers, philanthropy can help to establish **shared climate intelligence** as a public good and **local capacity building**, among others.
	The **World Bank** published a guide for international development practitioners in 2021, outlining how climate resilience can be enhanced in project design and monitoring and implementation. It recommends applying a resilience lens from project outset.	The guide introduced the **resilience attributes** – key characteristics that help build and secure resilience – as an approach to strengthen a project's resilience approach to maximise impact. These attributes are **Robustness, Learning, Redundancy, Rapidity, Connectedness, Diversity, Flexibility, Inclusion, and Self-Organisation**.	The integration of resilience attributes can enable **funders, project implementers, decision makers and broader policy interests** in the identification of interventions/ activities that can bolster **resilience outcomes**. This framing allows for context-relevant design and structure of a CA&R strategy.

Figure 103. Elements for building climate resilient societies in SEA and role of philanthropy[2]

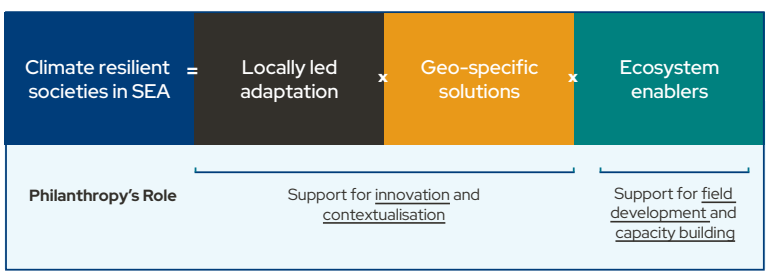


Figure 104. World Bank's resilience attributes[1]

Robustness
Ability of the system to withstand the impact of shocks and fluctuations and maintain its characteristics and performance.

Rapidity
Speed at which assets can be accessed or mobilised by system stakeholders to achieve goals in an efficient manner.

Flexibility
Ability of the systems to nimble in response to uncertainty addressing challenges and utilising the opportunities that may arise from change.

Learning
Ability of the system to gain or create knowledge, and build the skills, attitudes and other competencies needed to innovate and adapt to change.

Connectedness
Breadth of assets and structures that a system can access, at multiple levels, to respond or adapt to shocks and stressors, and ensure cross-scale alignment.

Inclusion
Extent to which the system embraces equity and inclusiveness, and provides fair access to rights, resources and opportunities to all its members.

Redundancy
Availability of additional or surplus resources that can be accessed in case of shocks or stressors, and that are interchangeable among them, including overlap of processes, services and/or capacities among institutions.

Diversity
Ability of the system to undertake different courses of action and to innovate.

Self-Organisation
Ability to independently re-arrange functions and processes in the face of shocks or stressors, to diagnose problems, assess priorities, and/or mobilise resources to initiate solutions.

Source: 1 World Bank (2021), Integrating Resilience Attributes into Operations: A Note for Practitioners; **2** Asia Philanthropy Circle (2025), Adaptation & Resilience in Southeast Asia: A Primer for Philanthropy.

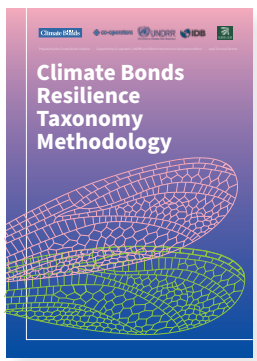
Practical tools for designing, implementing, and measuring impact in CA&R: Examples from ARIC and CBRT

1

The **Adaptation & Resilience Investors Collaborative (ARIC)** is an international partnership of 18 development finance institutions working together to accelerate and scale up private investment in climate adaptation and resilience in developing countries. ARIC's guide:

1. Offers **investors** a practical and consistent framework for assessing A&R impacts
2. Draws on **best practices in impact measurement** to provide a conceptual approach to embedding CA&R in impact assessment
3. Showcases **a set of clear metrics** that can support CA&R impact assessment and management

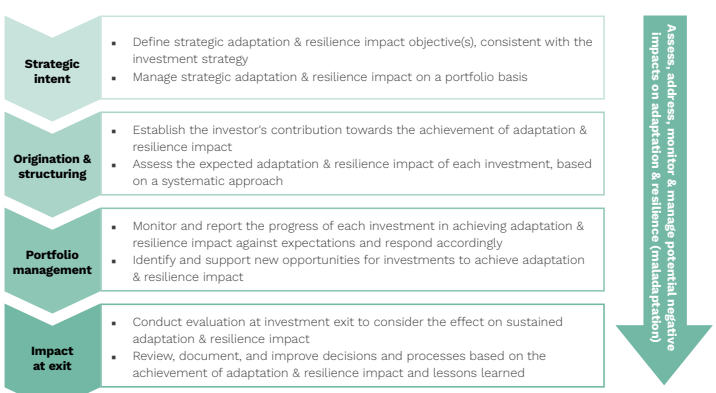
2



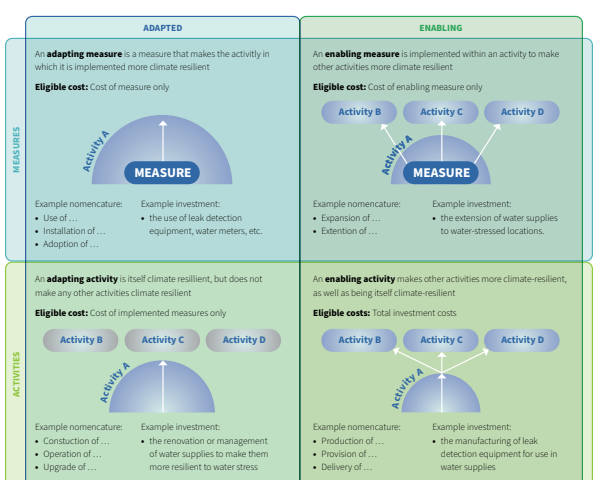
The **Climate Bonds Resilience Taxonomy (CBRT)** aims to accelerate global capital flow for climate resilience investments by offering clear definitions, science-based criteria, and a common framework. The CBRT:

1. Provides a **classification system and interim screening criteria** for climate adaptation and resilience investments
2. Allows **issuers, investors, market regulators, observers, and policymakers** to identify and develop actions and investments that make substantial, consistent, and verifiable contributions to climate resilience

For investors, ARIC recommends aligning to the **Operating Principles for Impact Management** (OPIM) for integrating adaptation and resilience impact assessment into the **investment lifecycle**—from investment origination through to investor exit.



Building from the widely recognised distinction between **adapted and enabling activities** set out in the EU Sustainable Finance Taxonomy, the CBRT layers on the consideration of the purpose of investments (measures vs activities), to arrive at **4 main investment types**.



Source: 1 Adaptation & Resilience Investors Collaborative (2024): Assessing Adaptation & Resilience Impact in Private Investments: A measurement framework for investors; **2** OPIM (n.d.), Operating Principles for Impact Management; **3** Climate Bonds Initiative (2024): Climate Bonds Resilience Taxonomy Methodology.

Market highlight: Applying ARIC's guidance and the Five Dimensions of Impact to ABC Impact's CA&R framework

IMPACT MANAGEMENT PROJECT

The Impact Management Project (IMP)[1] is a widely recognised framework for assessing the positive impact of investments. ARIC's guidance[2] uses the Five Dimensions of Impact as organising logic for assessing adaptation and resilience impact.

abc IMPACT

Figure 105. ABC Impact's Framework for IMM[3]

Our objective is to find relevant technologies and business models for the Asia context, and help them achieve scale and deliver meaningful impact

Climate mitigation and decarbonisation
Solutions that alleviate the severity of climate change by preventing or reducing GHG emissions and other negative impacts on environmental systems

Adaptation and resilience
Solutions that facilitate a just transition of societies, economies and environmental systems to cope in the face of risks, and uncertainty posed by climate change

Resource efficiency and circularity
Solutions that improve utilisation of the planet's limited resources in a sustainable manner, reduce waste and promote the transition towards a circular economy

To measure and manage the impact enabled, we start by understanding the challenges addressed by our investments, contexts in which they operate and outcomes enabled by them

Impact	People	Planet	Economy
Outcomes	Selection of A&R outcome metrics to measure the contribution		
Investment activities	Determination of impact pathway		
Risk context	Boundaries of assessment & determination of physical climate risk context		

The Asia-based impact private equity fund's CA&R framework aligns with the IMP's five dimensions, which include:

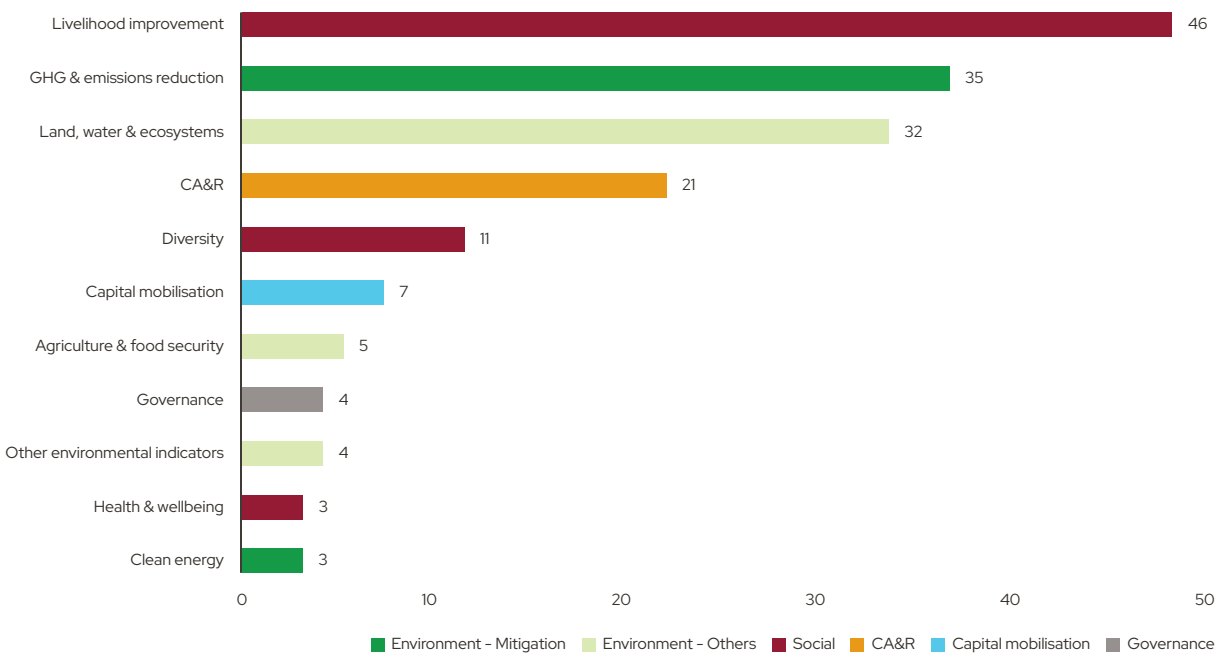
- **What:** Outcomes an investment is contributing to and how important it is to stakeholders, as well as expected CA&R benefits of the investment backed with evidence
- **Who:** Individuals, households, and communities supported, and natural systems (e.g., habitats, ecosystems or biodiversity) protected are more resilient to climate impacts
- **How much:** Scale, or the extent of the system boundary within which climate vulnerability is reduced (number of people adopting A&R solutions) and Depth, the extent of the reduction of climate vulnerability (Change in income/ productivity due to adoption)
- **Contribution:** How the efforts of the investor or investee result in better A&R outcomes than would have been expected if the investment had not taken place
- **Risk:** Business and external risks that may change the likelihood that CA&R impacts will be different than expected as well as whether possible strategies or measures exist to mitigate these impacts

Source: 1 Impact Frontiers (2026): Five Dimensions of Impact; **2** Adaptation & Resilience Investors Collaborative (2024): Assessing Adaptation & Resilience Impact in Private Investments: A measurement framework for investors; **3** ABC Impact (n.d.)

This study's survey of Asian funders reflects that CA&R impact tracking spans diverse domains, highlighting the intersectional nature of CA&R

- The diversity of metrics cited by this study's survey of funders **reflects the intersectional nature of CA&R impact.**
- **Social and mitigation metrics are prevalent across the funder landscape.** Livelihood improvement metrics were cited most frequently, followed by emissions, then land, water and ecosystems metrics.
- A small but meaningful share of respondents cite direct **CA&R** metrics, which intend to measure improved resilience on a project or systems level.
  - These include metrics such as investee resilience scores, climate stress-testing metrics, value of assets protected, and number of people with increased climate resilience or enhanced resilience to climate shocks.
  - These indicators are mainly reported by DFIs and foundations.
- **Capital mobilisation** metrics reflect interest from funders to crowd in additional capital, a recognition of the need for cross-sector collaboration for the sector.

Figure 106. Number of unique metrics tracked by funders who are active or interested in CA&R, by category (n=65, as of April 2026)[a, 1]

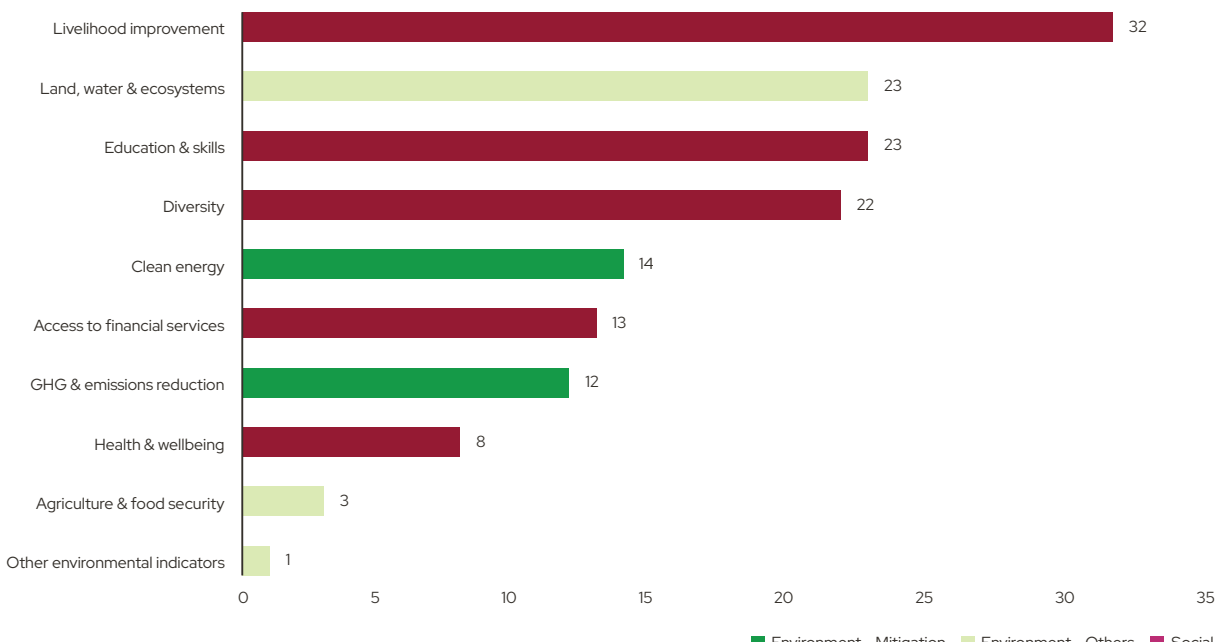


Note: a Of the 165 Asian funders surveyed, 65 respondents, who were either active or interested in CA&R, provided free-text responses on impact metrics tracked for CA&R investments. Respondents were asked to list up to five metrics, with no requirement to rank them. Following manual review, 32 entries were excluded as they were too vague, meta-level responses, or placeholder text (e.g. "sector-specific KPIs", "exits", "incentives"). This resulted in a final analytical dataset of 174 coded impact metrics. **Source: 1** Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA.

Similar range of impact metrics seen in CA&R impact funds, with social indicators showing most prominence

- Across 17 CA&R-tagged impact funds, 151 distinct metrics were identified — averaging approximately 9 per fund, with most indicators appearing only once. This **fragmentation** reflects a field that is still developing shared measurement conventions, with funds largely drawing on sector-specific frameworks rather than a common CA&R vocabulary.
- Similar to this study's funder survey, the **distribution of metrics reflects the intersectional nature** of CA&R investment: social indicators (livelihood improvement, education, and diversity) dominate, while environment indicators (land, water & ecosystems, clean energy, and emissions) form the second largest grouping. This pattern is consistent with funds pursuing dual climate-social mandates, where mitigation and development outcomes are tracked alongside adaptation-specific metrics.
- Metrics are **predominantly output and activity-based** rather than outcome-focused. Examples include number of farmers reached, hectares of land protected, jobs created, and renewable energy capacity installed. Adaptation outcomes (such as change in climate vulnerability, avoided losses, or recovery capacity) are not tracked by these funds. This is **a pragmatic starting point,** as measuring whether climate vulnerability has genuinely been reduced typically requires multi-year studies that exceed typical fund lifespans and carry significant resource requirements.
- Of impact funds that have a climate focus, close to **60%** align impact metrics with **IRIS+**, making it the most common industry standard. Other standards include Harmonised Indicators for Private Sector Operations (HIPSO), the Global Reporting Initiative (GRI), and Joint Impact Indicators (JII), among others.

Figure 107. Number of unique metrics tracked across 17 BlueMark tracked CA&R impact funds, by category[a, 1]



Note: a 151 distinct metrics were self-reported across 17 CA&R tagged funds. Category counts reflect the number of distinct indicators tracked across the 17-fund universe, not the number of funds per category Each fund reports on average 10 metrics. **Source: 1** BlueMark. *About BlueMark: BlueMark is a leading provider of independent impact assessments and market intelligence for the investment industry. The data and insights from these assessments have been integrated into the BlueMark IQ platform, which is custom-designed for asset allocators to more easily identify, monitor, and report on fund and portfolio-level impact. Funds tracked on the BlueMark IQ platform are primarily invested in private equity, private debt and real assets.*

For Green, Social, and Sustainability (GSS) bonds, existing metric guidance supports disclosure while helping issuers identify CA&R-eligible spend

Metric guidance provides the taxonomy for adaptation-eligible spend, enabling issuers to map resilience investments to established GSS bonds project categories

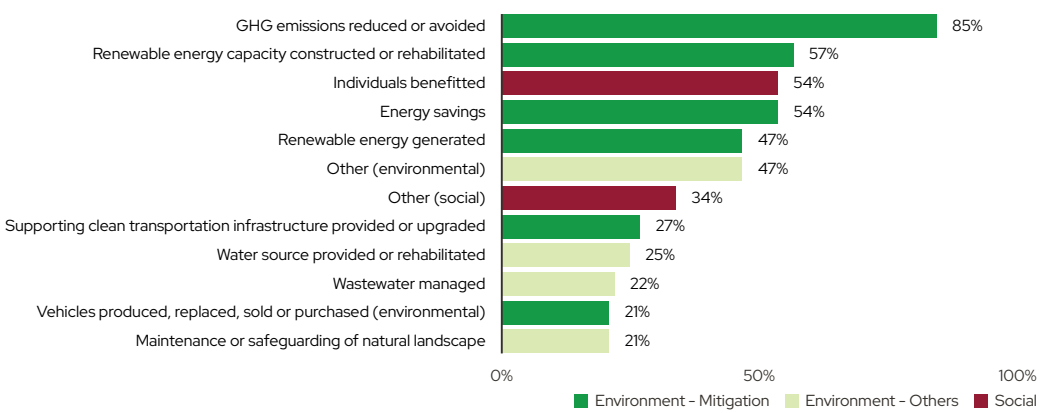
The ICMA **Harmonised Framework for Impact Reporting** sets standardised, sector-specific metrics that enable issuers to measure and report environmental and social outcomes.[1] In practice, **such guidance serves a dual function**: helping issuers identify which resilience investments qualify as eligible use-of-proceeds categories, and providing standardised metrics for post-allocation impact reporting. The table below shows ICMA's illustrative indicators for CA&R.

Sub-category	Core indicator #1	Core indicator #2	Other sustainability indicators
Temperature-related projects	Increase in grid resilience, energy generation, transmission/distribution and storage in MWh	Reduction in the number of wildfires, and/or in the area damaged by wildfires in km²	Increased number of urban residents with access to thermally safe conditions in buildings/transport systems
Wind-related projects	Reduction in repair costs due to storms (to all kinds of infrastructure and assets) Unit valorised ($ etc.)	Reduction in the number of power lines incapacitated due to storms	Decrease in climate-related risk insurance premia
Water-related projects	Reduction in flood damage costs Unit valorised ($ etc.)	Reduced/avoided water loss (in reservoirs/waterways/ natural habitats etc.) in m³	Additional water availability and/or increased water catchment in m³/year
Land-related projects	Reduction in repair costs and/ or operating days lost due to landslides Unit valorised ($ etc.)	Reduction in the number of operating days lost to disrupted transport networks or other infrastructure	Area cultivated by precision agriculture in km²

Among 1,004 bonds with CA&R-tagged use of proceeds and published impact reports, **95% include at least one mitigation indicator**, reflecting the **relative maturity of mitigation project pipelines**.[2]

Other environmental and social indicators appear less frequently but cover a broader scope. These include indicators such as individuals benefitted, water management and natural landscape management. In practice, many corporates raise bonds to fund a variety of projects which span across adaptation, mitigation, and broader environmental and social themes.

Figure 108. Share of CA&R tagged labelled bonds reporting these indicators (Top 10 indicators)



Source: 1 ICMA (2024): Handbook – Harmonised Framework for Impact Reporting; **2** Bloomberg. Data as of March 2026.

Examples of metrics observed across CA&R funders, funds, and GSS bonds

Non-exhaustive list of metrics tracked[1, 2, 3]

Mitigation
- GHG emissions avoided
- GHG emissions – all scopes
- Solar capacity installed
- Renewable energy generated
- Electric vehicles sold

Land, water, and ecosystems
- Area protected
- Water supply protected
- Pollution prevented
- Soil health

Agriculture
- Number of efficient irrigation management
- Agriculture yield improvement
- Sustainable seafood produced

Metrics cluster classification
- Environment - Mitigation
- Environment - Others
- Social
- CA&R
- Capital mobilisation
- Governance

Livelihood improvement
- Jobs created
- Smallholder farmers supported
- Number of beneficiaries
- Increase in income/earnings
- Businesses supported

Diversity
- Number and share of (%) female employees
- Number and share of (%) underrepresented employees
- Number of local founders
- Alignment with 2X framework

Access to financial services
- Number of borrowers
- Green loans disbursed
- Loan volumes

Health and wellbeing
- Number of patients
- Reduction in healthcare costs
- Employee safety

CA&R
- Reduced climate-related losses
- Value of assets protected
- Reduction in areas classified as "high" physical risk
- Number of people supported to become more climate resilient
- Strengthened local capacity for climate adaptation

Capital mobilisation
- Leverage ratio/capital unlocked multiplier
- Volume of investments
- Private capital mobilised

"Impact in climate adaptation and resilience is multi-dimensional, so scale metrics such as beneficiaries should be used alongside qualitative measures. We see impact lasting longest when it is tightly aligned with commercial success, meaning impact KPIs are embedded in day-to-day operations rather than tracked separately. In insurance, metrics like gross written premium, sums insured, claims paid and clients or beneficiaries reached can function as both operational KPIs and impact indicators, with beneficiary reach providing a consistent measure of how climate insurance is expanding into historically underserved, climate-vulnerable markets."

- Anne Jackermeier, Senior Impact Manager, BlueOrchard Finance

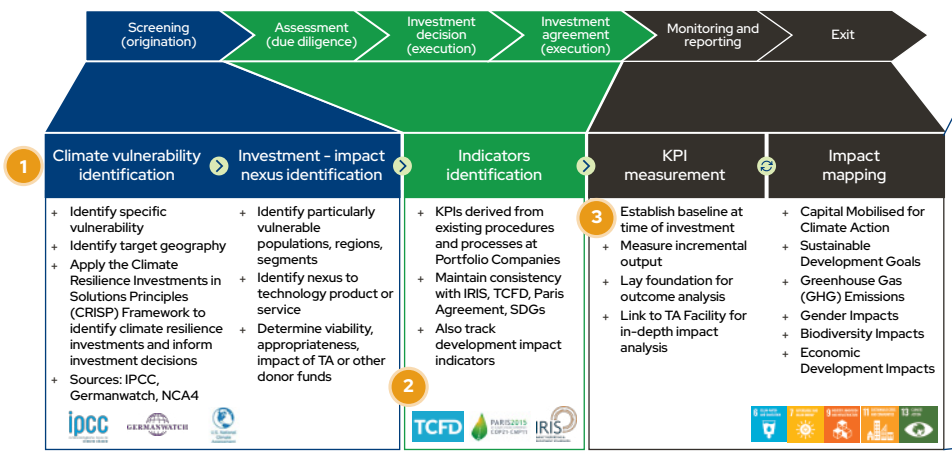
Source: 1 Asia Funder Impact Survey (2026) by CIIP in collaboration with SVCA; **2** BlueMark data and analysis; **3** Bloomberg data.

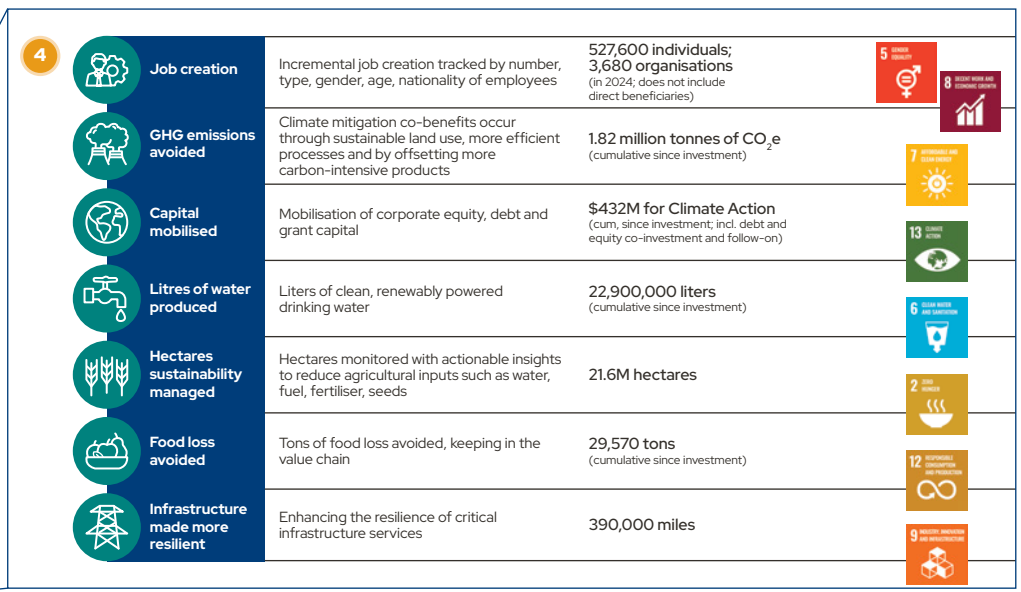
Market highlight: The Lightsmith Group's measurement system designed for CA&R investments

The Lightsmith Group

Integrated, aligned sustainability and impact assessment

Sustainability and impact measurement are integrated into all stages of the investment process - IFC Performance Standard, EU Taxonomy





1 **Integrating a CA&R lens across the investment lifecycle** ensures impact measurement captures CA&R-specific results. For example, hazard identification at screening provides a foundation to attribute A&R gains at exit.

2 In a nascent space, **aligning to best-available standards** (IFC Performance Standards, IRIS+, EU Taxonomy) while tailoring KPIs to CA&R-specific outcomes bridges the gap between measurement robustness and CA&R relevance.

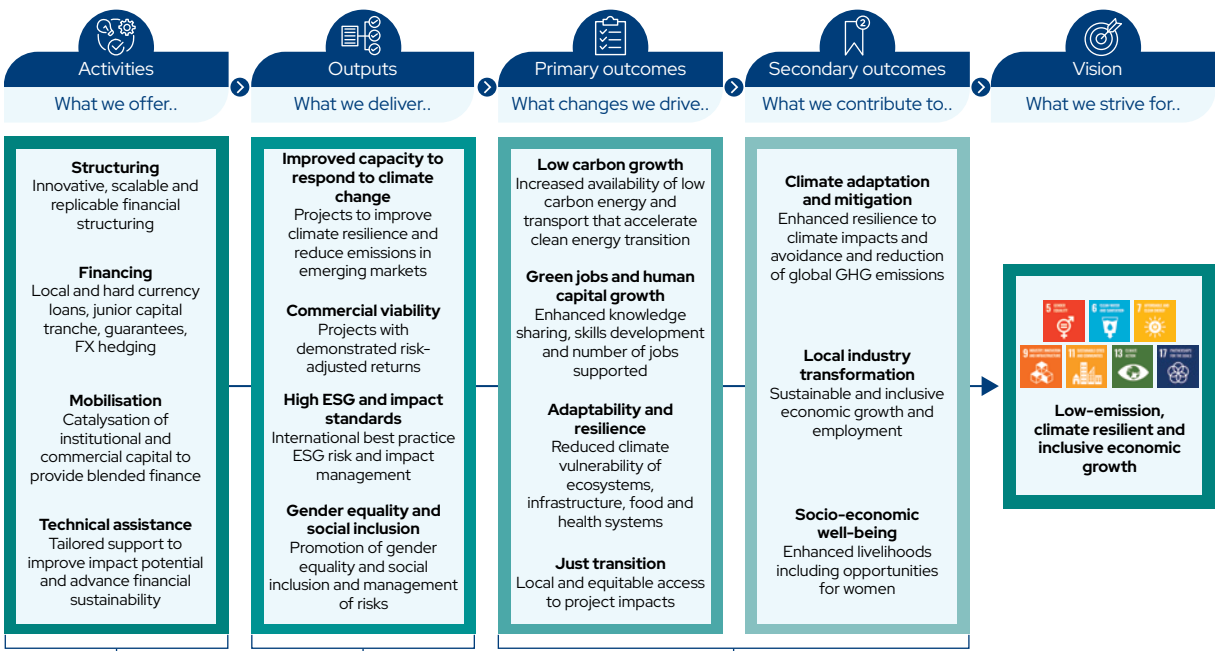
3 **Baselining pre-investment is a practical method to inform counterfactuals.** Full attribution remains challenging, but establishing conditions at the point of capital deployment provides a directional basis for assessing adaptation outcomes.

4 **Cross-cutting** impact metrics reveal the intersectionality of CA&R investments, including mitigation co-benefits.

More information can be found in The Lightsmith Group's case study in the Climate Adaptation and Resilience in Asia Case Study Library (2026).

Market highlight: MUFG's GAIA Climate Loan Fund ToC outlines blended capital's role in supporting resilience in underfunded markets

GAIA's ToC: activities, outcomes, and impacts



'Inputs' or 'Activities' are structures and instruments deployed through the blended fund

Commercial viability recognised as 'Outputs', illustrating the intended catalytic role of the blended finance

Given the sovereign tilt of underlying investments, outcomes, and impacts illustrate systems-level mitigation and adaptation co-benefits

GAIA **blended finance climate loan fund** investing in sovereign, sub-sovereign, and quasi-sovereign entities.

Using a structure that **combines** concessional and commercial capital, alongside foreign exchange and technical assistance facilities, GAIA aims to **mobilise private investment** into climate-resilient infrastructure and other underfunded sectors.

GAIA's ToC captures the role of blended finance structures in mobilising capital and de-risking for climate adaptation projects, and the pathway to real economy impact.

Beyond establishing commercial viability, such financing is then intended to lead to systems-level impact, given the sovereign-tilt of underlying investments.

This ties the thesis for investing in climate adaptation to the instrument and structure of choice, in order to illustrate where and how progress and impact can be measured.

More information can be found in MUFG's case study in the Climate Adaptation and Resilience in Asia Case Study Library (2026).

Market highlight: BlueOrchard's ToC explores the role of insurance in increasing climate resilience for vulnerable communities

BlueOrchard Impact Investment Managers | Member of the Schroders Group

Problem	Area of control		Area of influence	Area of interest
	Input	**Output**	**Outcome**	**Impact**
Increasing economic losses from natural disasters: Economic losses caused by natural disasters have risen significantly in recent decades, with climate change expected to further exacerbate this trend.	Initial capital provided by KfW on behalf of BMZ.	As a result of raising capital, more investable capital is available to support broader outreach across its target markets.	**Improved outreach:** The strategy's investment helps investees to scale up their services to reach more clients, especially women, poor households, and small businesses that are not covered by climate insurance.	**Improved gender equality:** The fund supports, the most vulnerable population, which is predominantly female. By providing support and access to this underserved population, we contribute to closing the gender gap.
Limited capacity to cope with disasters: Developing countries face challenges in responding to and recovering from natural disasters as their capacities are often limited.	Grant facility funded by BMZ for Technical Assistance (TA) and Premium Support (PS).	As a result of investment activities, financial institutions and insurance companies have more liquidity available to serve poor and vulnerable households and small businesses alongside the climate insurance value chain.	**Increased resilience of the most vulnerable:** By focusing specifically on the poor and climate vulnerable, BlueOrchard ensures that product innovation in the private sector accounts for this hard-to-reach group with a dedicated gender focus, thereby enhancing the resilience of vulnerable individuals, particularly women.	**Enhanced capacity to cope with climate-related disasters:** By increasing access to climate insurance, population in developing countries are better equipped to cope with disasters.
Limited insurance access in developing economies: Many developing economies have limited insurance coverage, hindering their ability to effectively manage and recover from natural catastrophes, and relying heavily on public emergency assistance.	Fund management, investment and technical assistance expertise with focus on climate insurance.	As a result of TA, capacity building activities are implemented to increase climate insurance awareness, market intelligence, availability of data, and increase capacity of investees.	**Inclusivity** of the specific needs and limitations of vulnerable economic segments are considered to develop products alongside the climate insurance value chain.	**Increased economic growth:** By reducing the adaptation finance gap and improving the ability to avoid economic losses in the case of natural disasters, the fund contributes to increased economic growth.
Gender & climate: Women are disproportionately impacted by negative climate events due to persistent gender inequalities that limit their mobility or access to resources and information.	**Activities** • Raises capital from private sources using a blended finance approach • Invests in private sector entities in emerging markets • Invests along the insurance value chain • Provides capacity building support through its TA • Allocates grant money for temporary premium subsidy through the PS	As a result of PS, new or innovative products can be introduced and can grow faster. Transparent Reporting		

BlueOrchard's Climate Adaptation Insurance Strategies seek to **improve access to insurance** for low-income and vulnerable households, as well as micro, small and medium enterprises in developing countries to **reduce their vulnerability to climate change**.

BlueOrchard's ToC demonstrates how capital can be channelled to support insurance innovation and adoption, with the end objective of enhancing the capacity of vulnerable communities to cope with climate-related disasters.

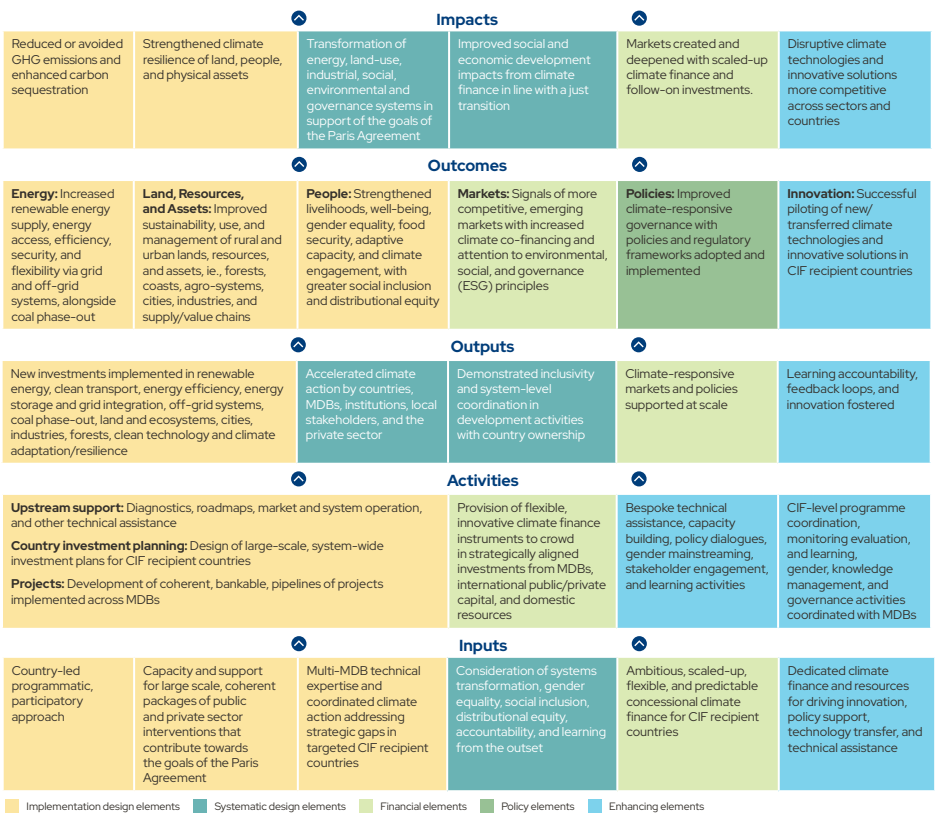
Beyond raising and deploying capital, BlueOrchard adopted a whole-of-ecosystem approach where it invests across the insurance value chain and provides capacity building to ensure that consumers fully understand the importance of adopting insurance.

This helps to solve for both supply and demand bottlenecks and ensures that interventions are sustainable for the long term.

More information can be found in BlueOrchard's case study in the Climate Adaptation and Resilience in Asia Case Study Library (2026).

Market highlight: CIF's ToC uses multiple impact pathways to capture the cross-cutting nature of climate resilience

CIF Impact: Accelerated transformational change and climate financing that enables progress towards net-zero emissions and adaptive climate-resilient development pathways, in a just and socially inclusive manner



CIF is a multilateral concessional climate finance vehicle founded in 2008 with **US$12.5 billion pledged** from 14 contributor countries, deployed through six partner MDBs across more than 80 countries and **mobilising over US$8 of co-financing per US$1 invested.**

Impact pathways construct supports cross-cutting CA&R outcomes

Beyond the foundational ToC framework, CIF's ToC organises change along **five overlapping impact pathways** — Implementation Design, Systemic Design, Financial, Policy, and Enhancing Elements — colour-coded across the diagram. This construct deliberately recognises that climate outcomes emerge from the interaction of programmatic delivery, systems shifts, financial mobilisation, policy reform, and **cross-cutting enabling activities**.

For CA&R specifically, the value of multi-pathway framing is that adaptation outcomes — inherently cross-cutting and rarely attributable to a single intervention — can be tracked along whichever pathway carries them, rather than forced into the project-level attribution logic that adaptation typically resists.

Bringing together strategic intent, approach, and measurement

CIF's ToC paper covers the IMM objectives outlined earlier.

Strategic intent is anchored in CIF's diagnosis of upstream barriers and articulated through six named impacts.

Designed approach is set out through the inputs and activities layers, specifying CIF's country-led, multi-MDB, programmatic model and the concessional instruments used to crowd in co-finance.

Measurement is built in through explicit assumptions, barriers, and risks at each level, where CIF flags that *"the transition from Outcomes to Impacts might be more challenging to realise than transitions between other levels"*, highlighting the attribution challenge within CA&R measurement.

Source: 1 Climate Investment Funds (2022): Theory of Change for the Climate Investment Funds.

Building credible CA&R impact: Practical steps today, stronger systems tomorrow

Impact measurement and monitoring (IMM) in CA&R

CA&R measurement is still emerging

Adaptation and resilience cut across environmental, social, and economic issues, so frameworks and metrics are still evolving.

Start with what is measurable, but do not stop there

Many funds begin by tracking activities and outputs. This is a practical first step, but stronger systems are needed over time to measure outcomes consistently.

The main challenges are already clear

These include long time horizons, fragmented approaches, difficulty measuring risks that did not happen, and the lack of a simple universal metric like carbon emissions.

What can be done today?

Respond now: achieve near-term outcomes

Use a Theory of Change and the Five Dimensions of Impact

Set out how the investment is expected to reduce climate risk, and tailor expectations to the type of capital, sector, scale, and hazard context.

Embed CA&R into the investment process

Screen for climate risk, set baselines before investment, and use KPIs that reflect adaptation outcomes, not just generic performance metrics.

Build sector-specific Theories of Change

Link adaptation actions to clear business and resilience outcomes, so that claims of impact are more credible and measurable.

Prepare for the future: enable systemic change

Align on clearer resilience metrics as an industry

Metrics should show whether interventions reduce climate risk by strengthening the ability to cope, adapt, and transform over time.

Take a systems approach to impact

Adaptation impact often happens through multiple pathways – including implementation, finance, systems change, and policy – and cannot always be attributed to one project alone.

Improve alignment on metrics and data

Greater consistency in indicators, data collection, and reporting is needed to make results more transparent, comparable, and decision-useful.

Strengthen public-private-philanthropic coordination

Better collaboration is needed on financing, delivery, metrics, and data to move from fragmented efforts to system-level resilience.

Context-specific IMM also helps to build the bottom-up evidence base that contributes to the shared global vocabulary established at COP30, through the 59 Belém Adaptation Indicators.

Conclusion

A call to action for climate adaptation and resilience

7 key building blocks for building lasting CA&R at scale

Catalyse action

1 CA&R as growth engine and value driver (demand)

CA&R is not only defensive but a source of new markets and competitive advantage. Embedding CA&R into everyday operations and scaling investable solutions today can build momentum for broader industry and system transformation.

2 Strategic capital mobilisation across the spectrum (supply)

Financing CA&R requires leveraging all forms of capital. Blended and innovative finance can help unlock investment, but only when grounded in strong fundamentals. Successful deployment depends on viable business models, robust data, and execution capacity.

Inform decisions

3 Climate risk pricing and resilience valuation

Climate risks and resilience benefits - including avoided losses and induced economic, environmental, and social impacts - remain systematically undervalued today, distorting investment decisions. Embedding avoided losses and broader impacts into pricing and valuation is key to unlocking capital at scale.

4 Clear, impact-linked decision pathways

Clear impact pathways are essential to crowd in capital for CA&R. Given that outcomes in Asia are highly local and diverse, scaling requires credible causal pathways from action / investment to resilience impact, such as those anchored by Theories of Change (ToCs), and supported by standardised frameworks and comparable indicators rather than uniform metrics.

5 Shared data and knowledge foundations

Closing critical data and capacity gaps is essential to improve risk understanding and decision-making in CA&R. However, data cannot exist in siloes - coordinated investment in localised but interoperable data systems will unlock better pipeline development and capital allocation.

Lay foundations

6 CA&R-aligned financial systems

Financial services are a foundational enabler of resilience across firms and communities, whether by funding climate adaptation and resilience (e.g., expanding access to capital or financing ecosystem services), or building financial resilience (e.g., by enabling risk transfer and building safety nets that are critical to absorb and manage climate shocks).

7 Cross-sector collaboration and delivery for scale

Lasting CA&R outcomes depend on coordinated action across public, private, and community actors. Stronger collaboration mechanisms, whether among governments, philanthropists, investors, or businesses, can reduce fragmentation and enable faster, more effective deployment and action at scale.

A whole-of-ecosystem activation is required, with key roles for all stakeholders to play

With CA&R gaps remaining substantial globally, the key constraint lies not in where capital is deployed across sectors and regions, but in how effectively it is used. Greater coordination and collaboration across sectors is therefore essential to reduce fragmentation, unlock synergies, and enhance the overall efficiency and impact of limited capital.

	Philanthropy	Private industry	Public sector
1 CA&R as growth engine and value driver	• Catalyse early-stage technology, markets, and business models • Support ecosystem development in underserved segments	• Integrate CA&R into core business or investment strategy • Develop CA&R-linked products, services, and business models	• Create long-term demand signals and incentives to value resilience • De-risk emerging markets such as through guarantees
2 Strategic capital mobilisation across the spectrum	• Provide catalytic funding to crowd in private capital, e.g. via blended finance • Support pipeline development in high-risk markets	• Deploy capital to CA&R opportunities (labelled or embedded) across asset classes • Participate in blended finance structures to extend CA&R allocation	• Use policy tools to mobilise private capital for CA&R (e.g. tax incentives, capital relief measures, deployment requirements) • Deploy public budgets strategically to crowd in private investment (e.g. matching, co-financing)
3 Climate risk pricing and resilience valuation	• Support pilots for resilience-based pricing and valuation models • Build evidence base for policy and private sector adoption	• Integrate climate risk and induced benefits into pricing, underwriting, and funding decisions	• Communicate policies and valuation frameworks • Mandate disclosure of climate risks and impact on financials (e.g. avoided losses, revenue uplifts)
4 Impact-linked decision pathways	• Support standardisation of CA&R impact frameworks and measurement • Build evidence base for causal pathways (e.g. counterfactuals)	• Align capital allocation with CA&R ToCs and defined outputs/outcomes • Participate in standardised reporting frameworks and industry working groups to strengthen comparability and alignment	• Support establishment of common CA&R standards, indicators, and reporting frameworks • Mandate disclosure of resilience outcomes in public and private finance
5 Shared data and knowledge foundations	• Support open-access datasets and capacity building efforts • Enable access to, and sharing of, data and digital infrastructure	• Develop and scale data platforms and analytics tools • Share data via industry working groups or consortiums	• Establish common data standards and governance frameworks, ensure interoperability • Invest in foundational public data infrastructure
6 CA&R-aligned financial systems	• Provide first-loss capital and guarantees to unlock CA&R financing • Bridge access gaps and expand financial inclusion	• Develop products for risk transfer and resilience financing • Integrate climate risk into lending and portfolio management	• Build and regulate risk transfer systems (e.g. parametric products, insurance pools, disaster finance) • Strengthen CA&R-related financial system frameworks
7 Cross-sector collaboration and delivery for scale	• Convene multi-stakeholder platforms and coalitions	• Participate in industry coalitions and share (non-competitive) operational learnings • Seek co-investment opportunities to enable systemic solutions	• Lead national and regional coordination platforms, working in tandem with private and philanthropic sectors

Where do we begin?

Start today
Individual and collaborative action within current system

- **Build, deploy, and scale high-potential CA&R solutions** across priority sectors and markets
- Mobilise capital through disciplined **blended and catalytic finance**
- Improve **pricing and valuation** of climate risks and resilience benefits
- Build **shared data systems** and climate risk intelligence to improve decision-making
- Anchor **decisions based on clear pathways** from action to CA&R impact

Scale tomorrow
Enable systemic change to create a stronger enabling environment

- Embed CA&R into **financial systems, regulation, and market infrastructure**
- Create and institutionalise new **CA&R market categories and investment asset classes**
- Standardise **climate risk pricing, disclosure, and valuation of resilience dividends** to unlock investable business models
- Translate intent and action into systems-wide, **measurable CA&R outcomes**
- Establish cross-sector infrastructure to **align capital, data, policy, and innovation for CA&R at scale**

Download more reports

Discover more insights through our deep-dive report on strengthening agri-food resilience in SEA and 50 case studies of companies and funders shaping the business case and impact pathways in this space

Explore the dashboard

Map ~US$100B of CA&R financing over the past 5 years and explore over 250+ solution categories for actors across the capital spectrum

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