CLIMATE ADAPTATION AND RESILIENCE IN ASIA:

Pricing Risk, Sizing Opportunities, Financing Solutions

CIIP Centre for Impact Investing and Practices

IN PARTNERSHIP WITH TEMASEK Invesco Alliance Bioversity & CIAT Impact SF

SUPPORTED BY Dalberg

1 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[a]	Global public companies face **US$1.3T** annual climate costs by 2030s, of which Asian companies face costs of over **US$336B**	Since 2000, natural disasters have affected a total of **3.7B people in Asia**, vs. **1.1 B in the rest of the world**

Figure 1. Climate-related disaster costs
(2000-2025)

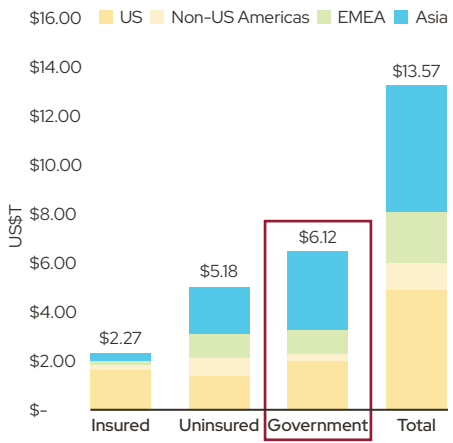


Figure 2. Global annual cost of physical risks
Medium climate change scenario (2.1-3.5°C by 2100)

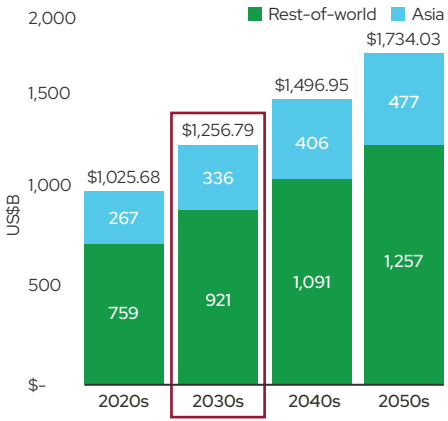
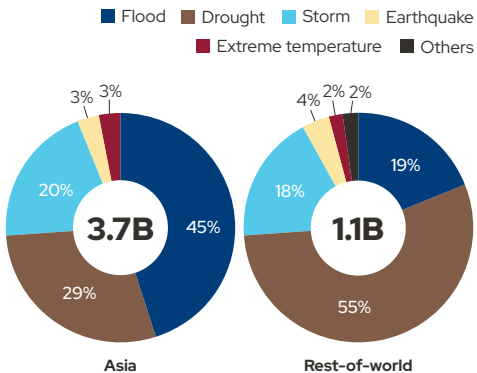


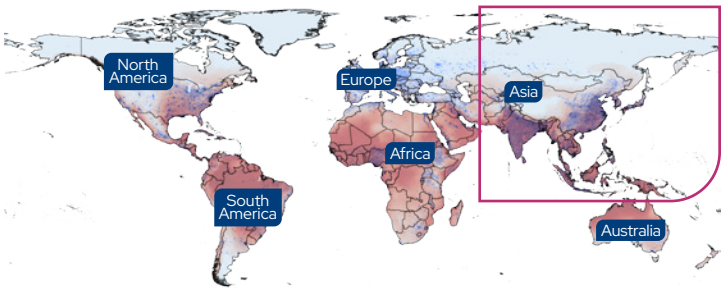
Figure 3. Number of people affected from disasters in Asia and rest of the world
(2000-2026 cumulative)[b]



Note: a Asia covers broadly East Asia, South Asia, and Southeast Asia; please see main report for complete list; **b** Data accessed March 2026; **c** Sources are omitted in this document for brevity. For a complete list, please refer to the main report, "Climate Adaptation and Resilience in Asia: Pricing Risk, Sizing Opportunities, Financing Solutions" (2026) by CIIP, in collaboration with Temasek, Invesco, and ImpactSF, with support from Dalberg.

2 Asia faces significant climate resilience risks

Figure 4. GDP exposed to climate hazards in the future (2020-2040)



GDP 2020

High
Mid
Low

Composite climate risk

High
Mid
Low

Figure 5. Population within 2 feet of high tide in cities with over 300,000 residents as of 2026

Population

5 million
1 million
100,000

2x
faster warming in Asia than global

7
Asian economies rank among the top 20 globally for severe economic and social losses from climate-related events over the past 2 decades

17%
loss in GDP for SEA by 2050 under a 2°C warming scenario, the highest globally

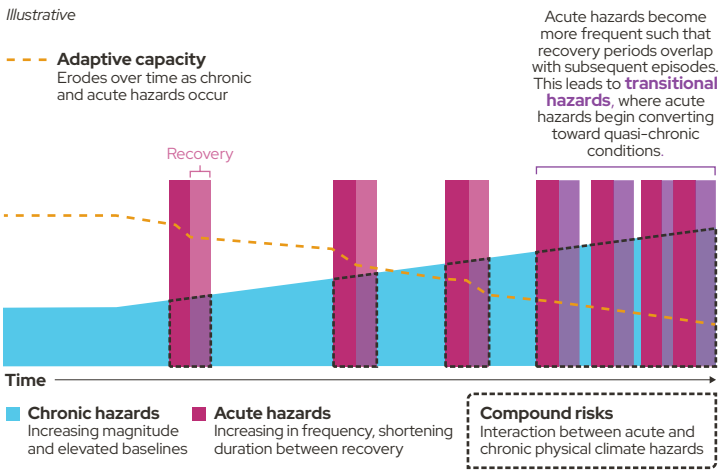
75%
of global financing gap by 2030 is concentrated in Asia

3 Amidst eroding adaptive capacity, global climate adaptation and resilience (CA&R) financing gaps remain stark

Compounding climate risks are eroding adaptive capacity

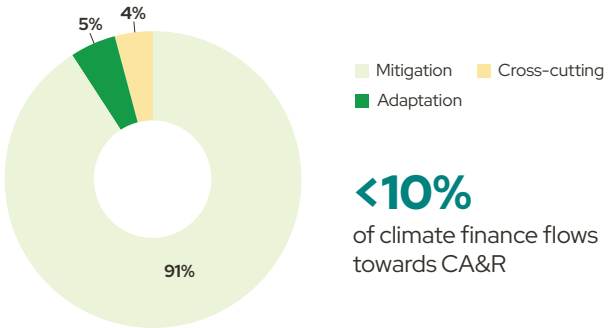
The interconnection between physical climate hazards is creating compounding risks. For example, chronic hazards such as extreme heat gradually weaken system resilience, while acute events like floods and storms cause sudden disruptions and are occurring more frequently, producing outcomes that exceed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

As such, climate hazards must be addressed collectively through a systems approach.



CA&R financing gap is stark and growing

Figure 6. Global climate finance flows in 2023



<10%
of climate finance flows towards CA&R

US$310–365B p.a.
needed for adaptation finance in developing markets by 2035, with additional **~US$250B p.a.** needed to meet private sector needs[a]

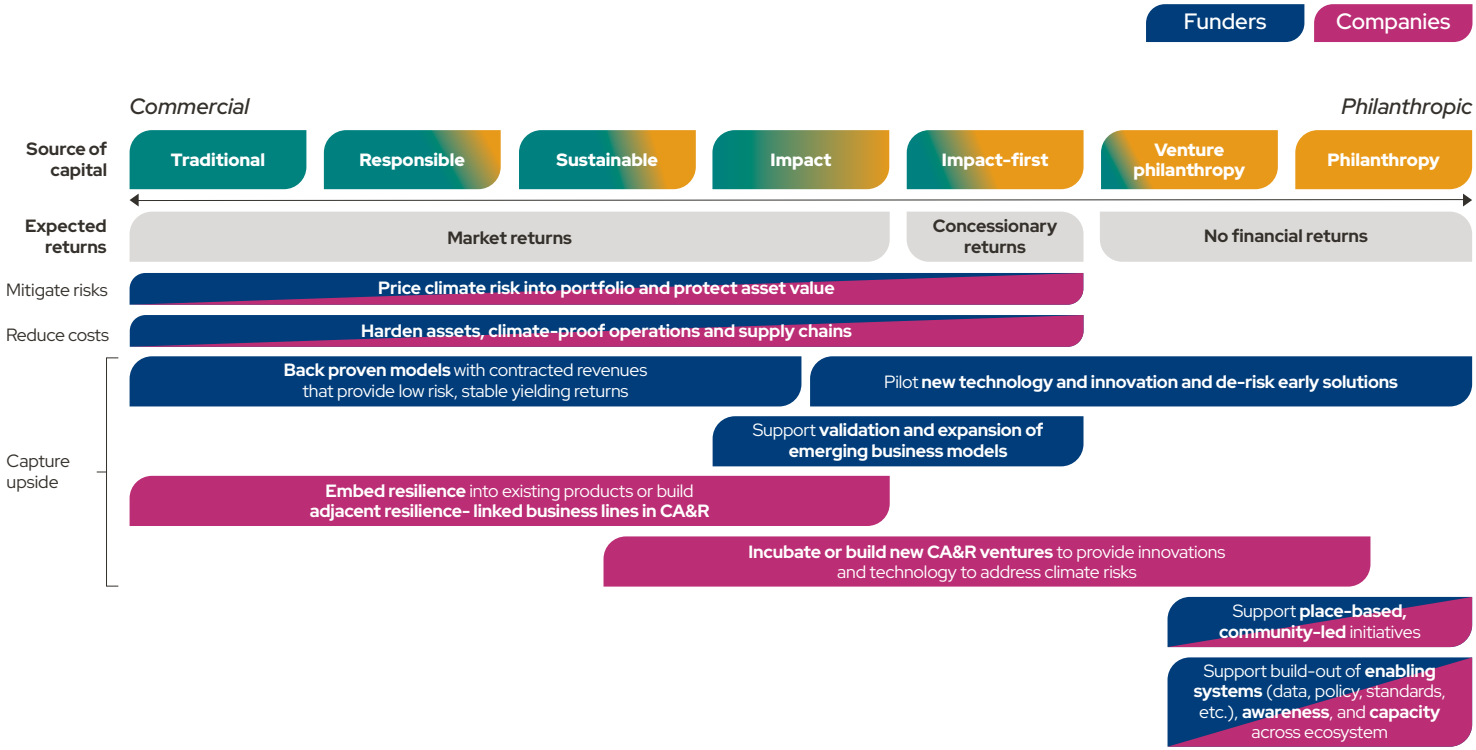
US$1.2T+ p.a.
needed **by 2050** to achieve developed-economy resilience standards globally[b, c]

US$26–50B p.a.
average adaptation financing p.a. globally **today**[a]

<11%
currently funded by private capital

Note: a Current fund flows and needs by 2035 are in constant 2023 prices; **b** US$1.2 trillion by 2050 is expressed in 2020 prices; **c** 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.

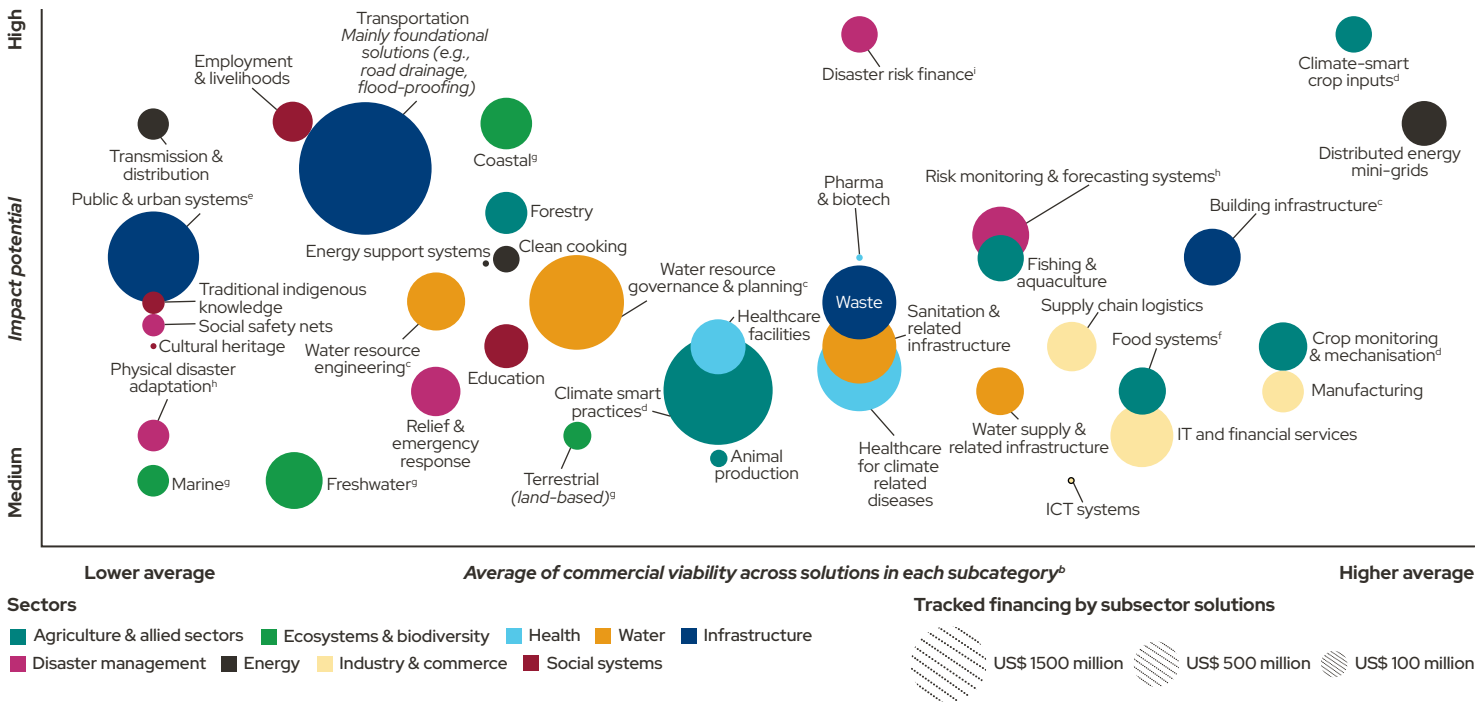
4 Private sector action is critical: coordination across the spectrum of capital is needed



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

5 The opportunity landscape in Asia is diverse

Figure 7. Indicative commercial viability, impact potential and tracked funding flows for solutions across CA&R sub-sectors[a,j]
US$M (2021-25 cumulative); data for 2025 is partial



Note: a This is an indicative and directional mapping that not 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 main report.

6 250+ priority CA&R solution categories identified

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**

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

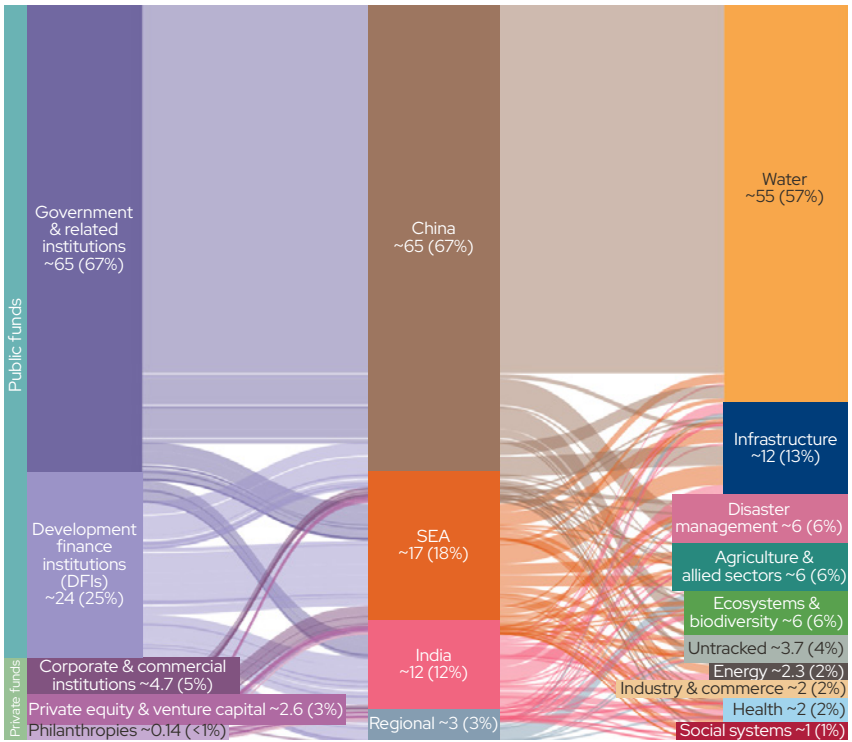
Financial services

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 Financing flows shown reflect funding towards pure-play CA&R solution providers and may undercount flows to companies offering more diversified portfolios of products.

7 Today, private capital participation in CA&R remains limited

Figure 8. Global flow of CA&R financing across Asia, by funder and sector[a,b]
Total: US$96B (cumulative 2021-25)



More than 90% of tracked CA&R financing stems from public sources, such as governments and Development Finance Institutions (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**.

Today, private capital is concentrated in highly commercially viable solutions (e.g., energy systems and industrial retrofits), where revenue streams are clear and risks are lower. However, strong government activity also signals emerging opportunities for broader private sector participation and investment.

Note: a Data is accurate as of extraction in Dec 2025 – Jan 2026; **b** Asia for this analysis includes East Asia & Pacific, South Asia, and Southeast Asia; 'Regional' refers to transactions where funding data is only at a regional level (e.g. Asia), where market-level granularity for public fund flows towards CA&R is not available.

8 CA&R financing must be aligned: there are entry points across funder types

Example solutions (non-exhaustive)

Commercial — *Philanthropic*

Source of capital: Late-stage capital | Early-stage capital | Philanthropic capital

Expected returns: Market returns | Concessionary returns | No financial returns

Late-stage capital — Market returns

1. **Fund 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
   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
   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
   Climate-resilient building materials, bio-inputs and soil health stimulants
4. **Back established incumbent businesses and scale CA&R product lines.** Enable utilities, insurers, infrastructure operators, and diversified corporates to expand and institutionalise CA&R products, services, and embedded resilience offerings across portfolios
   Cross-cutting practice relevant across all sectors, e.g., smart water metering

Early-stage capital — Concessionary returns

1. **Validate scalable digital technologies with cross-sector potential.** Support development of asset-light digital solutions, and hybrid digital-physical resilience systems with emerging scalability
   Digital route optimisation for waste collection, blockchain-based traceability platforms
2. **Expand platforms that enable distribution and adoption of solutions.** Scale distribution pathways to improve access to existing but under-adopted solutions
   Phygital direct-to-consumer marketplace for climate-resilient produce
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
   Carbon credit programmes, parametric insurance for crop, livestock, and aquaculture
4. **Enable the cross-regional transfer and localisation of promising 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
   Biofortified climate-resilient crops

Philanthropic capital — No financial returns

1. **Work with local governments to build ecosystem capacity.** Build institutional capacity as well as shared data and knowledge infrastructure
   Nature-based flood management systems, early warning systems, climate hazard registries and databases
2. **Partner with private sector to support first-of-a-kind technologies and accelerate early solutions to reach scalability.** Pilot, prototype, and proof-of-concept deployment for adaptation solutions that have yet to reach market viability, support these solutions to be adopted at scale
   Climate-smart crop diversification, climate-smart disease surveillance
3. **Support place-based, community-led resilience initiatives.** Enable community preparedness systems, ecosystem restoration, and behavioural or trust-based interventions that require non-market delivery channels such as NGOs, public systems, and community networks
   Planned coastal retreat and managed relocation programmes, community-based fisheries co-management
4. **Enable last-mile delivery of proven technologies**. Support scaling and delivery of critical financial and community services to vulnerable groups
   Round-the-clock microgrids, renewable energy-powered cold rooms

9 The good news: There is emerging interest from funders in the space

Survey completed by

165

Asian funders between September 2025 and March 2026[a]

Representing

>US$1T

AUM or funds managed globally

Figure 9. Type of organisation

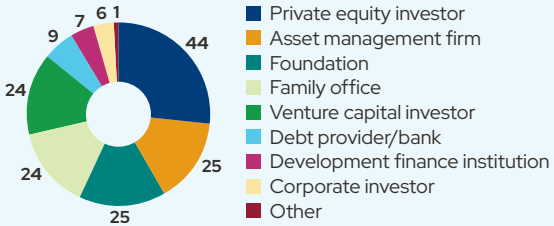
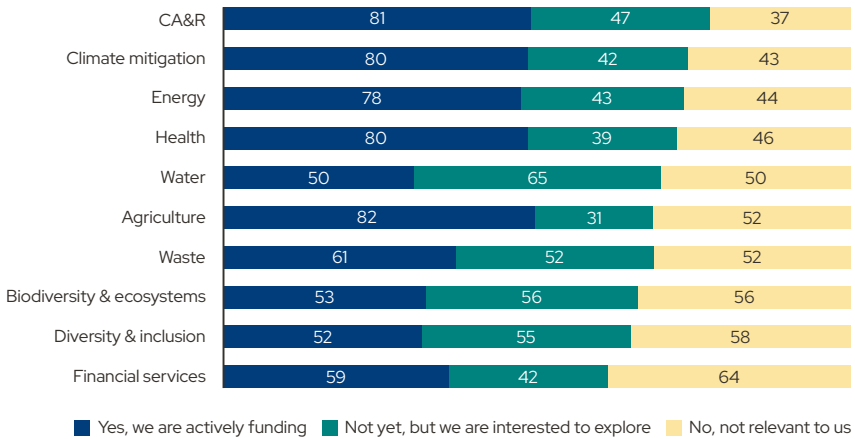


Figure 10. Top 10 GIIN impact categories by funder activity and interest (n=165)

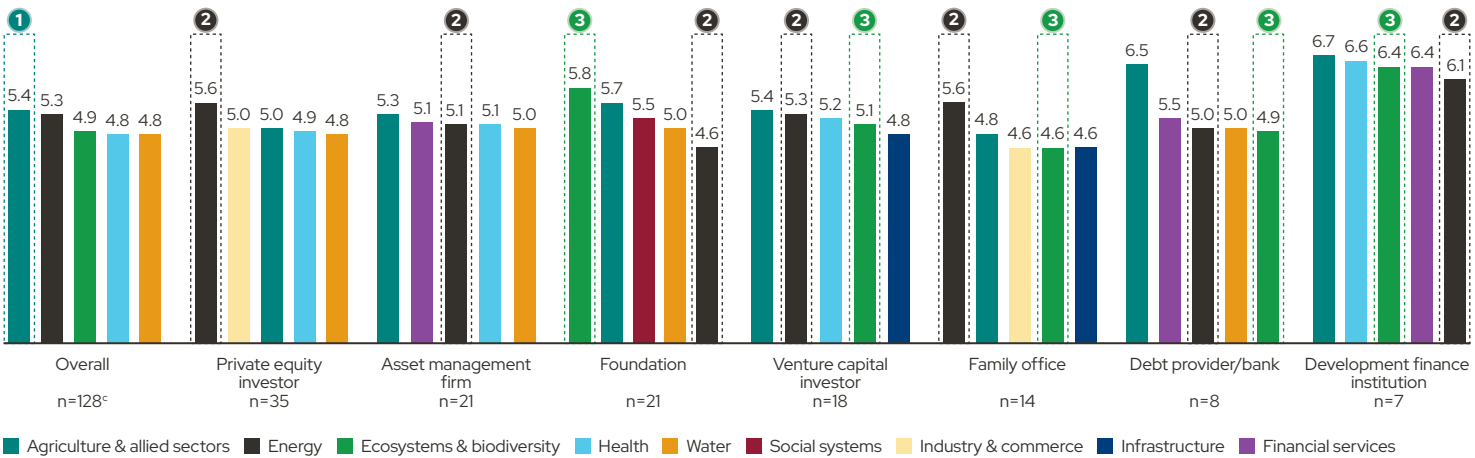


CA&R emerges as the leading impact theme with the highest combined active and exploratory interest, followed by **climate mitigation and energy**

Note: a 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 in main report.

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

Figure 11. 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.

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**.

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 returns. Despite this, it is notable that **VCs** also show relatively high interest in this sector.

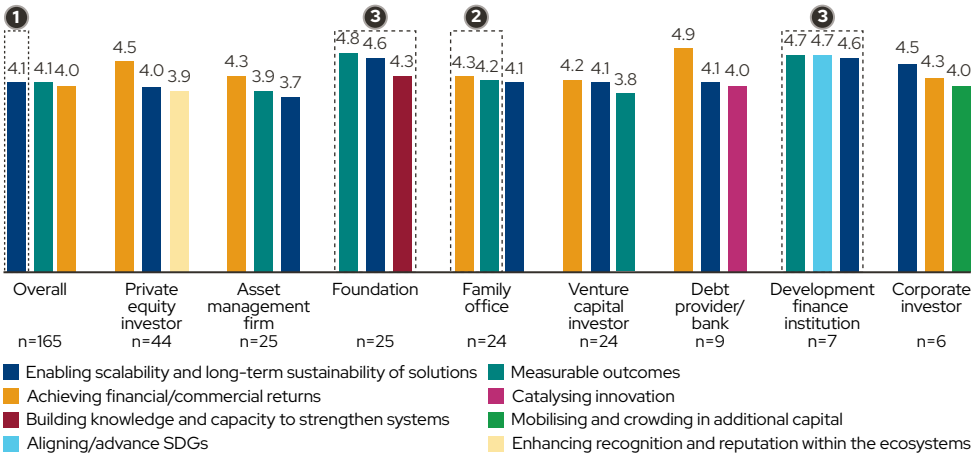
Solutions have either low or emerging commercial viability today. At sub-sector levels, **freshwater solutions has the most funding, though terrestrial solutions have the highest commercial viability**, suggesting potential for greater capital allocation.

Note: a 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 in main report; **b** Corporate investors are not included in the breakdown as the number of corporate investors active and/or interested in CA&R is fewer than 5; **c** 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.

11 Scalability and long-term sustainability, measurable outcomes, and financial returns were identified as key drivers of impact funding decisions

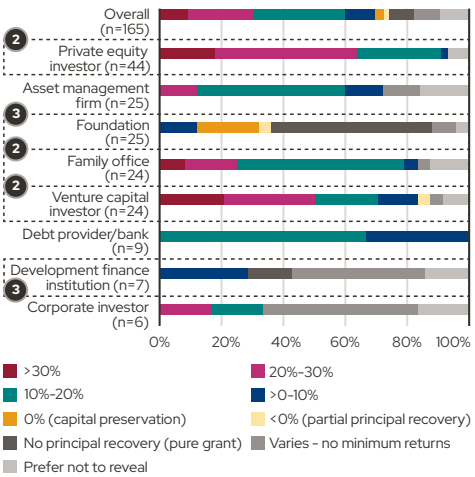
On top of scalability, commercial players prioritise returns while DFI and Foundations focus on measurable outcomes

Figure 12. Top 3 impact funding decision priorities by types of funders (1 = not important at all, 5 = extremely important)[a]



Majority of funders expect minimum returns between 10% and 30%

Figure 13. 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: a 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 in main report.

12 Innovative financing, capacity building and data, and macro levers are key to address challenges

1 Innovative financing

- 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
- Smaller projects can be bundled in single investment vehicles to increase scale and improve risk-return profiles
- Instruments such as blended finance can mitigate regulatory and political risks while offering downside protection
- Experienced fund managers can lead, leveraging their track record to reduce private investors' capability gaps
- Transactions can be structured to bring together diverse funders with aligned interests to co-fund transaction components matched to their expertise, broadening partnerships opportunities

2 Capacity building and data

Funders:

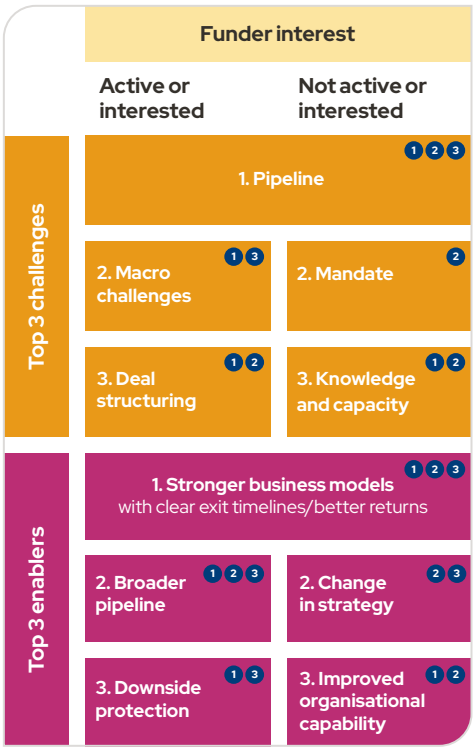
- Standardised core metrics can be embedded into due-diligence and disclosures to improve risk assessment, reduce transaction costs, and measure impact (funders' second-highest priority influencing funding decisions is measurable outcomes)

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

3 Macro levers

- Integration of climate adaptation strategies into government planning and budgeting across ministries is crucial given the complex system effects of climate change. This will also help to provide regulatory certainty for industry and investors
- 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



13 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[a,b]

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.

Note: **a** Theory of Change (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; **b** The Five Dimensions of Impact as defined by the Impact Management Project is a widely recognized framework for assessing the positive impact of investments.

14 Unlocking full potential requires coordinated ecosystem action to scale solutions and capital

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 adaptatation investments can be made clearer, climate resilience and public-good benefits not internalised.

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

Download our reports

Discover insights into CA&R needs and opportunities across Asia, informed by ~250 industry stakeholders, alongside a deep dive on agri-food resilience in SEA and 50 case studies

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

Collaborate with us

Join us to build a more climate resilient world, together

Note: This highlights document was produced in May 2026. All information in this document is provided on an as-is basis for general information and may not be relied upon for any purpose.