



Actions to Mobilize Investment in Adaptation and Resilience

NOVEMBER 2025



Introduction

The projected economic losses from increasing extreme weather are substantial.

In the most affected regions, climate change could cause economic loss of up to 19% of GDP by 2050. In response, **adaptation and resilience** (A&R) efforts are climbing higher on global agendas. The critical next step is turning strategic intent into well-funded, prioritized, and actionable projects.

In many countries, the estimated investment needs are multiple times more than public sector budgets and financing capacity. All forms of capital, from public, private, multi-lateral development to philanthropic sources, will need to be deployed in adaptation in order to close the gap.

For private sector companies, the case for investing in A&R to protect their own businesses is compelling: some self-report benefit-to-cost ratios as high as 35:1.

At the same time, rigorous mitigation remains essential, as many adaptation solutions risk becoming ineffective or unfeasible if temperatures rise beyond 1.5–2°C. Without urgent mitigation, transformational adaptation—such as large-scale resettlement, livelihood shifts, and systemic change—may become unavoidable.

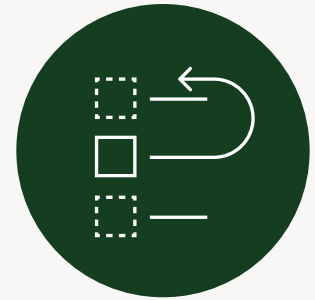
But unlocking investment at scale demands more than compelling numbers—it requires a coordinated ecosystem. This article outlines **what needs to happen** (ten decisive actions across five imperatives), **who needs to be involved** (clear roles for governments, businesses, financiers, and communities), and **how to make it happen** (through enabling systems such as orchestration platforms, policy alignment, and data standards).

The framework we share today brings these elements together—what, who, and how—into a coherent, actionable agenda for scaling adaptation solutions and driving lasting change.

Agenda

- 01** What Needs to Happen: Ten Decisive Actions for Scaling Adaptation and Resilience Impact
- 02** Who Drives It: Defining the Roles of the Stakeholders Across the Ecosystem
- 03** How to Deliver: Enabling Systems and Structures to Unlock A&R Impact

We've Identified Five Essential Imperatives to Mobilize Investments in Climate Adaptation



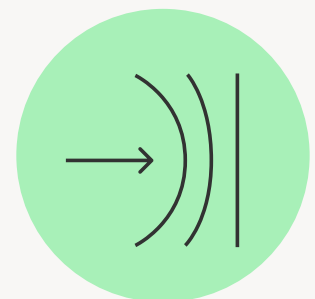
Set direction and priorities at the national level. Defining clear national adaptation priorities enables governments to align actions at all levels, guide investment, and signal readiness to private and public funders.



Build capacity to enable locally led adaptation. Strengthening local institutions, systems, and technical expertise is essential to design, deliver, and sustain adaptation efforts tailored to community needs.



Localize climate science, technology, and data to improve decision-making. Translating global climate data and tools into localized insights empowers decision-makers to assess risks and prioritize interventions.



Design solutions to maximize impact and minimize risk. Pursuing multiple benefits, contextualizing globally proven solutions, and avoiding maladaptation and transboundary risks are key to scaling adaptation effectively.



Establish investment rationale and mechanisms to unlock capital. Demonstrating the financial returns of resilience and deploying fit-for-purpose financing tools are critical to mobilize private, public, and philanthropic capital at scale.

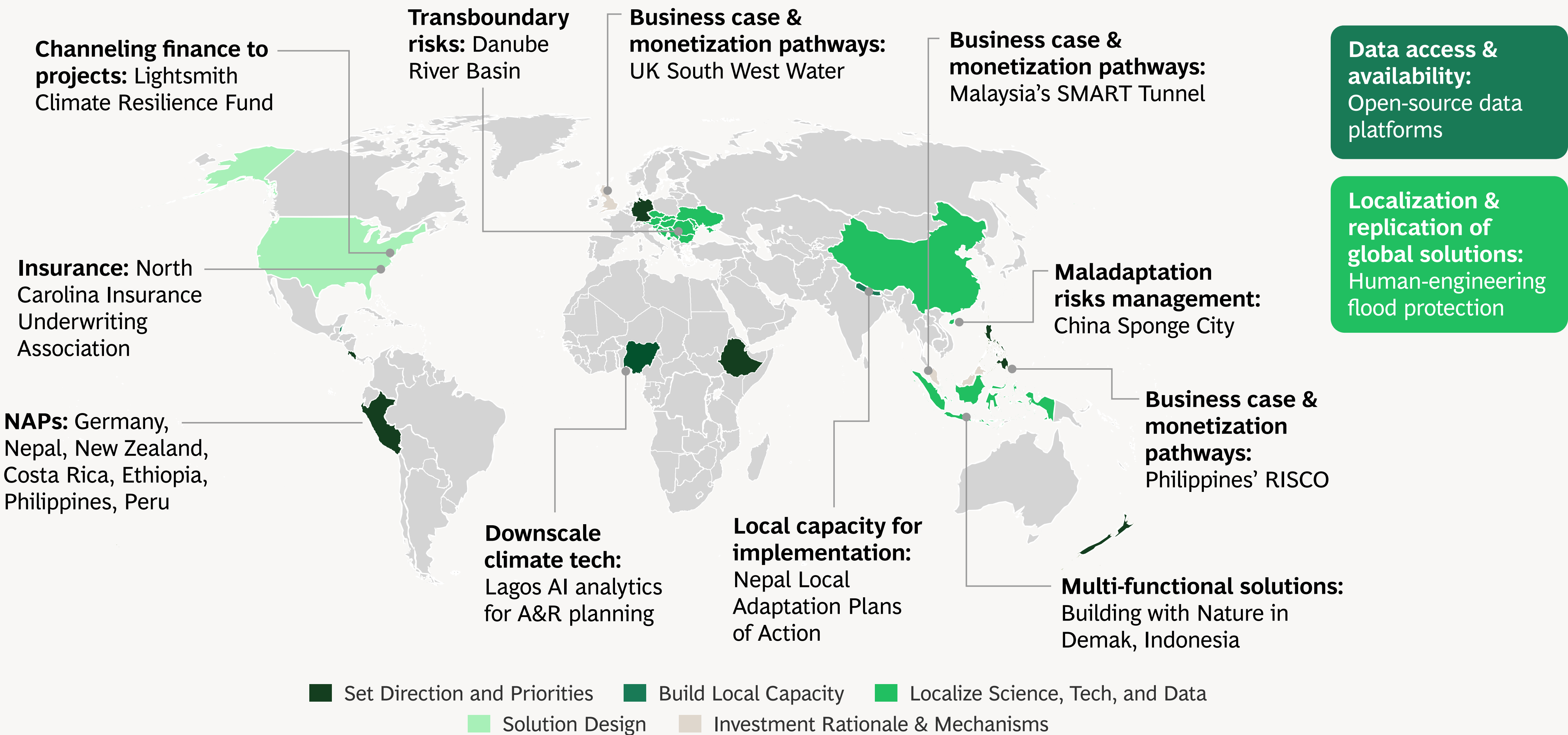
Ten Decisive Actions Behind These Imperatives Based on BCG Experience

Set direction and priorities through government-directed NAPs. Define national priorities, clarify institutional roles, and align public and private stakeholders behind a shared roadmap for adaptation	Balance localization and replication of global solutions. Leverage existing solutions and localize for specific contexts—balancing for time, cost, and effort while allowing contextualization of solutions
Build end-to-end capacity for locally led adaptation. Develop the technical skills, delivery systems, and institutional know-how needed at local levels to plan, implement, and maintain adaptation solutions effectively	Manage maladaptation and transboundary risks. Anticipate and reduce unintended negative consequences of adaptation efforts, incl. coordinating action across borders and shared ecosystems
Downscale climate tech and science into local planning. Adapt global models and technologies to local realities, enabling context-specific planning, innovation, and decision-making	Provide clarity on the business case and pathways to monetize economic and commercial value. Demonstrate the economic and financial value of adaptation by quantifying direct and indirect returns, with clarity on pathways to monetize
Ensure data access & availability. Provide timely, usable data—including projections, vulnerabilities, and cost-of-inaction insights—to guide planning, prioritization, and monitoring of A&R action	Channel multiple financing sources and instruments to investment-ready projects. Leverage both public and private sources, through PPPs and innovative mechanisms such as country platforms, for long-term adaptation outcomes
Provide balanced & multi-functional adaptation solutions. Bundle adaptation with mitigation and other co-benefits—social, economic, or environmental—to maximize impact and improve bankability	Make insurance fit-for-purpose for climate adaptation. Use parametric insurance, cat bonds, and credit enhancements to shift from disaster relief to proactive climate risk management—pricing risk, unlocking capital, and boosting resilience

- Set Direction and Priorities at the National Level
- Build Capacity to Enable Locally Led Adaptation
- Localize Climate Science, Tech, and Data to Improve Decision-Making
- Design Solutions to Maximize Impact and Minimize Risk
- Establish Investment Rationale and Mechanisms to Unlock Capital

Sources: BCG analysis.

These Decisive Actions Are Illustrated Through Case Studies



Sources: BCG analysis.

IMPERATIVE

Set Direction and Priorities at the National Level

1. Set Direction and Urgency Through Government-Directed NAPs

Governments may consider developing and implementing National Adaptation Plans (NAPs), under the UN framework, as living strategies that define national priorities, guide investment, and coordinate adaptation across sectors and levels of government. So far, more than 70 countries have submitted their NAPs.

NAPs can help align ministries and embed resilience into policy and planning. For funders, they often signal readiness through prioritized, credible, and investment-aligned roadmaps. For the private sector, NAPs can serve to provide clear direction for innovation and business development.

Critically, NAPs can help governments prioritize and sequence actions, ensuring that limited resources are allocated efficiently to areas with the highest cost of inaction—regardless of whether they face the greatest risks or offer the greatest opportunities. Such prioritization helps bridge the gap between high-level ambition and on-the-ground delivery.

In countries with strong NAPs—such as Germany, Ethiopia, and the Philippines—these plans are already advancing the alignment of national, provincial, and sectoral adaptation strategies and prioritizing actions in climate-vulnerable industries. They lay the groundwork for investment planning and private sector engagement, offering a model for how countries can translate climate ambition into concrete, coordinated action. The exhibit on the next page, **Seven Steps to Achieve an Effective National Adaptation Plan**, showcases the best practice approaches for developing NAPs and provides examples of how countries have demonstrated these approaches.

Seven Steps to Achieve an Effective National Adaptation Plan

Drawing on global guidelines for NAPs, BCG has defined a 7-step, best-in-class approach to A&R planning for governments

What good looks like in practice	
1	Clear purpose and strategy for developing a NAP
2	Comprehensive understanding of climate impact drivers (CIDs) & associated hazards
3	Climate risk and impact assessment across social, economic, and natural systems
4	List of potential A&R actions to address the identified risks
5	Assessment of tradeoffs and prioritization of A&R actions
6	Implementation success of prioritized A&R actions: execution plan, governance, and financing
7	An approach to monitor, evaluate, and adjust A&R strategy subsequently

Sources: UNFCCC; UNDP; NAP Global Network; IPCC; Global Center on Adaptation; UNFCCC NAPs; BCG.

Note: UNFCCC = United Nations Framework Convention on Climate Change. A&R = adaptation and resilience. M&E = monitoring and evaluation. NDCs = Nationally Determined Contributions. NAP = National Adaptation Plan.

IMPERATIVE

Build Capacity to Enable Locally Led Adaptation

2. Build End-To-End Capacity for Locally Led Adaptation

Effective adaptation requires local capabilities across the entire cycle from strategy to delivery. Even the best-designed NAPs rely on local institutions' ability to shape, implement, and sustain actions that reflect community realities. Yet, many countries still face gaps in technical expertise, systems, and authority. Investing in technical expertise, institutional readiness, and coordination systems at the local level is often as critical as financing itself, especially in vulnerable communities.

Case Study 1, Nepal's Local Adaptation Plans of Action (LAPA), demonstrates how bottom-up, inclusive capacity-building enables community-led adaptation that is integrated into local planning. By training municipalities and communities to assess vulnerabilities and set priorities, and then integrate them into local plans, LAPA has built lasting institutional capability for communities to design and sustain adaptation measures.

Building Capacity to Enable Locally Led Adaptation: Nepal

THE CHALLENGE

Nepal is one of the most climate-vulnerable countries in the world: intensifying floods, droughts, landslides, and glacial lake outburst floods threaten livelihoods, infrastructure, and natural resources



Nepal

THE SOLUTION

The **National Framework for Local Adaptation Plans of Action (LAPA)** was created to integrate climate adaptation into local and national plans through a bottom-up, inclusive, and flexible approach, while also building the institutional and technical capacity needed to sustain these efforts. The framework supports a range of activities that strengthen local capabilities in order to do the following:

- **Train and involve local officials and communities to prioritize and design adaptation actions**, balancing community needs with costs and benefits
- Prepare LAPAs based on these priorities **and embed them into local development plans** in coordination with Village Development Committees (VDCs) and municipalities
- **Strengthen district- and VDC-level institutions** to implement LAPAs, leveraging technical support and expertise from service providers to build long-term organizational capacity
- **Establish monitoring committees at district and VDC levels** to improve coordination, accountability, and data-driven decision-making
- Hold workshops and seminars across communities, villages, towns, and districts to **build awareness, foster participation, and institutionalize knowledge sharing** for local adaptation planning

THE OUTCOMES

- **Strengthened local institutions and governance** by embedding adaptation planning into municipal and village systems and budgets
- **Enhanced technical capacity** of municipalities and communities to assess climate risks, identify and prioritize adaptation measures, and integrate them into development planning
- **Directed 80+% of adaptation finance to the local level**, ensuring that resources reach vulnerable households and communities effectively and for most urgent actions
- **Empowered local communities** by integrating active participation and ownership in local adaptation planning and monitoring

IMPERATIVE

Localize Climate Science, Technology, and Data to Improve Decision-Making

3. Downscale Climate Tech and Science into Local Planning

Localized climate insights are the foundation for turning national priorities into practical plans. Global datasets and models are essential, but they need to be adapted to reflect the geography, vulnerabilities, and socioeconomic conditions of specific regions and communities. Without this localization, it is difficult to assess climate risks with precision, prioritize interventions, and/or design solutions that are both effective and investable.

In Lagos, Nigeria, the government downscaled global climate models to assess climate risks at a high degree of granularity. **Case Study 2** showcases how integrating these models with socioeconomic data allows decision-makers to identify local hotspots, prioritize adaptation investments, and present funders with a data-driven project pipeline.

Expanding Data Access and Availability

THE CHALLENGE

High-quality, hyper-local climate data is foundational to effective adaptation and resilience: it supports everything from early warning systems and infrastructure design to adaptation planning, insurance, and climate finance readiness

But adaptation plans are often **built on incomplete or overly generalized data**, leading to poorly targeted investments, increased risk of maladaptation, and communities remaining exposed to preventable climate hazards

THE SOLUTION

Emerging open-source or public platforms are making advanced climate and hazard data more accessible

- **Copernicus Climate Service:** Satellite and in situ environmental dataset supporting hydrology, marine systems, and land-use adaptation planning
- **NASA Climate Data Services:** Open-access Earth system data used in global and country-level resilience modeling
- **CMIP6 datasets:** Standardized global climate projections under future emissions scenarios, used in the IPCC Sixth Assessment Report
- **CLIMADA:** Integrates hazard, exposure, and vulnerability data for event-based risk modeling and cost-benefit analysis of adaptation actions
- **GIRI:** Probabilistic infrastructure risk modeling to estimate asset losses and prioritize resilient infrastructure investments
- **WFP PRISM:** Combines climate, socioeconomic, and food security data to support real-time, adaptive decision-making

These platforms offer powerful tools, but **to be effective, they must be paired with local capacity to interpret and apply data**. Key challenges include fragmented datasets, limited usability, gaps in sub-national coverage, and weak integration with local planning systems

THE OUTCOMES

- Enables **hyper-local risk assessments** such as flood and cyclone exposure at the district or city level
- Informs adaptation investment planning by **quantifying potential losses** and comparing the cost-effectiveness of different resilience options
- Strengthens access to climate finance by **improving the quality and credibility** of national adaptation reports and project proposals
- **Supports policy decisions** with real-time data

Sources: NASA; CLIMADA; CDRI; C3S; CMIP6; WFP; BCG experience.

Note: IPCC = Intergovernmental Panel Climate Change. CMIP6 = Coupled Model Intercomparison Project, Phase 6: the latest suite of global climate models used by the IPCC. GIRI = Global Infrastructure Risk Model and Resilience Index. WFP PRISM = World Food Programme - Platform for Real-Time Impact and Situation Monitoring.

4. Ensure Data Access and Availability

Localization requires high-quality, accessible data. Risk assessments, modeling, investment planning, and early-warning systems all depend on real-time climate, hazard, and vulnerability data. Yet, in many regions, critical data remains outdated or unavailable, leaving decision-makers without the tools to act effectively or attract investment. Emerging open-source data platforms are helping close this gap by making high-resolution climate, hazard, and vulnerability data more widely available. These tools support more informed planning and improve access to climate finance, but must be paired with local capacity to interpret and apply insights. **Case Study 3** highlights examples of open-source data platforms and how they can serve as powerful tools for hyper-local risk assessments, quantifying losses and supporting policy decisions.

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Design Solutions to Maximize Impact and Minimize Risk

Addressing climate adaptation challenges demands integrated solutions, localization of proven solutions, and proactive management of risks.

5. Design Balanced and Multifunctional Adaptation Solutions

Adaptation solutions can achieve greater impact when designed to achieve multiple benefits—including combining resilience with mitigation and social and economic development. These multi-benefit approaches are gaining momentum: financing for combined mitigation and adaptation projects tripled between 2018 and 2023 to nearly match standalone adaptation funding, according to the Climate Policy Initiative (CPI).

Such solutions are often more cost-effective, fundable, and durable. They help break down sectoral silos and support systems-level outcomes across climate, economy, and nature. Many resilience interventions inherently contribute to mitigation goals and related benefits. For example, investments in grid resilience not only help manage increased loads during heat waves, but also enable higher integration of renewable energy. Nature-based and urban infrastructure solutions—such as mangrove restoration, regenerative agriculture, agroforestry, green roofs, and permeable pavements—also offer powerful benefits for mitigation and ecosystem health.

Examples around the world illustrate this approach in action, with two cities in Indonesia demonstrating this in practice. The Building with Nature project (see **Case Study 4**) in Demak, Central Java, designed an integrated approach to build resilience against sea level rise and coastal erosion via semipermeable brushwood structures and mangrove restoration, and also by training farmers in sustainable mangrove aquaculture. Jakarta's Coastal Defense Strategy also integrates seawalls and drainage upgrades with groundwater management measures, soon to be complemented with mangrove restoration. In Kenya, solar-powered irrigation systems bolster agricultural resilience and provide surplus electricity to the national grid.

Localizing and Replicating Global Solutions for Flood Protection

	Market opportunity	Example of proven solutions	Maturity & deployment	Scaling enablers
Flood defense products	2024 market size \$2B–\$3B 2024–2030 CAGR 12%–15%	Fixed flood gates and doors: Sturdy and immobile protection for critical infrastructure Modular flood barriers: Portable barriers if fixed barriers are impractical	• Innovative sector, with several ventures scaling across OECD countries • Further deployment expected in flood-prone countries as leaders scale	• Cost reduction • Modularization and portability • Innovative delivery models, such as equipment leasing or use of “protection-as-a-service” models • Pooled procurement or subsidy programs
Flood diversion products	2024 market size \$14B–\$17B 2024–2030 CAGR 7%–10% EBITDA margin 25%–35%	Storm drains and piping: Stormwater collection and conveyance solutions Detention and retention basins: Hold or slow flood waters for controlled release Flood pumps: High-capacity systems that remove flood water and prevent property damage	• Mature sector with wide municipal use in North America and Europe • Opportunity for scaled deployment in rapidly urbanizing regions	• Localized engineering design • Operations and maintenance financing models • Off-grid compatibility • City-level financing tools

Sources: BCG and Temasek, *The Private Equity Opportunity in Climate Adaptation and Resilience*, May 6, 2025.

Note: OECD = Organisation for Economic Co-operation and Development.

6. Balance Localization and Replication of Global Solutions

Effective adaptation means responding to specific local climate risks, ecosystems, and social contexts. Yet, designing effective solutions does not always require starting from scratch. Many adaptation interventions—such as urban heat action plans, early warning systems, flood defenses, and nature-based buffers—are already proven and available. Success requires finding the right balance between replicating what works and tailoring it to local contexts.

For example, Vietnam’s mangrove restoration; Ahmedabad, India’s heat action plan; and the Netherlands’ wetland-based flood management program provide clear templates for similar contexts. **Recent Temasek and BCG research** underscores the potential to transfer flood protection technologies from developed to emerging markets by reducing costs and adapting delivery models. Leveraging proven models with appropriate adjustments can save time, cost, and effort.

These proven solutions can serve as the foundation for structured playbooks for key sectors—standardized adaptation models that help governments and investors replicate what works for specific climate risks. By codifying effective interventions and clarifying the conditions for replication, such models can accelerate adoption, reduce design costs, and support more consistent investment planning.

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7. Manage Maladaptation and Transboundary Risks

As solutions are scaled and adapted, care must be taken to avoid doing harm, both within and across borders. Poorly designed interventions may increase vulnerability instead of reducing it—a phenomenon known as maladaptation. For instance, coastal barriers can redirect flooding risks, and agricultural technologies introduced without suitable infrastructure can reduce resilience.

Engaging local institutions and communities is critical to sustainable adaptation. In China, Sanya’s Sponge City wetlands project (See **Case Study 5**) exemplifies the value of context-appropriate infrastructure, coordinated institutional roles, and community-integrated design.

Managing Maladaptation Risks: China

THE CHALLENGE

Sanya, a fast-growing coastal city on Hainan Island in southern China, faced **severe flooding due to monsoon-driven rainfall and tropical storms** that strained existing infrastructure



Hainan Island

THE SOLUTION

The municipal government implemented a nature-based Sponge City adaptation project, transforming 2 degraded flood-prone areas into multifunctional wetlands:

- **Dong'an Wetland Park** (68 ha): An inland site disconnected from natural hydrology redesigned to retain ~830,000 m³ of stormwater
- **Sanya Mangrove Park** (10 ha): A degraded coastal buffer zone restored through intertidal mangroves, ecotone terraces, and bio-swales to enhance shoreline protection and habitat function

To proactively manage maladaptation risks, the project embedded safeguards across 3 dimensions:

- 1 Infrastructural:** The project leveraged modular, nature-based systems suited to monsoon hydrology, minimizing runoff displacement and enabling natural absorption with low maintenance requirements
- 2 Institutional:** It was also integrated into China's national Sponge City policy with coordinated oversight from municipal, environmental, and planning authorities, ensuring regulatory alignment and clear roles for long-term operation and funding
- 3 Behavioral:** Finally, the project built strong local support by delivering highly valued public spaces, ensuring community satisfaction and sustained stewardship of the restored ecosystem

THE OUTCOMES

- **Marked reduction in urban flooding and surface runoff** with modeling showing lowered peak flows and reduced pressure on downstream flood systems
- **Native species returned, water quality improved, and habitat restored**, supporting birds, aquatic life, and plant diversity
- **High public satisfaction and daily use of the parks** with strong community feedback
- **Built rapidly at ~1/3 the cost** of typical urban parks, showcasing replicable efficiency across China's Sponge City pilots

Sources: Turenscape; Bai Zhen et al., "From An Ignored Grey Place to a Resilient Urban Wetland—Dong'an Wetland Park in Sanya, Hainan Province," Landscape Architecture Frontiers volume 6, issue 3, 2018; Stefan Rau, "Sponge Cities: Integrating Green and Gray Infrastructure to Build Climate Change Resilience in the People's Republic of China," ADB Briefs, November 2022.

Additionally, transboundary climate risks affect shared ecosystems, supply chains, financial flows, trade links, and migration—and they are growing in complexity. For example, the 2011 Bangkok floods disrupted automotive supply chains globally. The impacts of upstream decisions along shared river basins, such as Southeast Asia’s Mekong River, demonstrate the necessity of coordinated multi-country action.

Despite this, transboundary issues remain under-addressed in formal planning: fewer than 10 of the 70+ NAPs submitted to date meaningfully consider them. This is particularly concerning in regions such as the Hindu Kush Himalayas, often called the “Third Pole,” where reduced glacial melt threatens the water supply for over a billion people across nearly a dozen countries. The resulting water stress will impact hydropower, agriculture, food security, and urban resilience far beyond national borders. These biophysical risks demand joint monitoring, governance—and investment frameworks—but such mechanisms are still rare.

Some positive models are emerging. In Europe, 14 countries in the Danube River basin have built a long-term cooperation platform, enabling joint risk assessments, shared governance, and integrated investment planning (See **Case Study 6**).

Transboundary impacts also increasingly trigger cross-border migration. As highlighted in **BCG’s recent research with the University of Cambridge**, growing water stress is causing cross-border displacement in Southeast Asia, thereby intensifying pressure on labor markets, humanitarian systems, and regional stability. Proactive coordination is crucial to mitigating these broader developmental and security challenges.

Managing Transboundary Risks: The Danube River Basin

THE CHALLENGE

The Danube River Basin stretches over 2,800 km, spans 19 countries, and supports 80+ million people

Climate change is increasing the frequency and severity of floods, droughts, and heatwaves, with serious impact across borders



Danube River

THE SOLUTION

The European Union and 14 Danube countries established a cooperation framework anchored in the **Danube River Protection Convention** and coordinated by the ICPDR with strong support from the EU through legislation, funding, and technical alignment. Key elements include the following:

- 1 Basin-wide governance platform:** The ICPDR enables 14 countries and the EU to jointly set priorities, monitor risks, and coordinate action, ensuring accountability and sustained collaboration
- 2 Joint risk assessments and planning:** Countries co-developed joint strategic plans such as the Danube Flood Risk Management Plan, elaborated a basin-wide Climate Change Adaptation Strategy, and initiated basin-wide activities to tackle droughts, using harmonized methods and technical working groups
- 3 Shared data infrastructure:** Platforms such as the Danube Hydrological Information System and the TransNational Monitoring Network provide open, near-real-time and long-term data for water quality, flows, and hydrometeorology
- 4 National policies and funding:** EU countries align basin priorities with national river plans and access EU funds; non-EU countries benefit from coordinated technical support and co-financing

The basin-wide system continues to evolve through initiatives such as Danube Floodplain (reducing flood risk through floodplain restoration), DriDanube (enhancing drought risk management), Danube-ADAPT (harmonizing climate change adaptation), and Danube Water Balance (developing a water balance model)

THE OUTCOMES

- **Reducing flood risk** through transboundary coordinated planning, shared knowledge, and operative tools
- **Restoring critical wetlands and floodplains**, strengthening ecosystem resilience across borders
- **Enabling effective basin-wide data sharing** to inform national investments and EU climate reporting
- Collecting **cross-border adaptation** funding through aligned regional planning

IMPERATIVE

Establish Investment Rationale and Mechanisms to Unlock Capital

Attracting significant capital for adaptation requires a strong investment rationale and mechanisms that translate climate resilience into financial returns.

8. Clarify the Business Case and Pathways to Monetize Economic and Commercial Value

Adaptation delivers measurable value through tangible benefits. For governments, these benefits include avoidance of GDP losses, improved public health, more secure livelihoods, and enhanced ecosystem resilience. For businesses, adaptation safeguards assets, stabilizes supply chains, and protects workforce health while unlocking commercial opportunities in climate-smart infrastructure, resilient agriculture, and water services.

Yet, the investment gap is stark. According to CPI, developing countries' annual adaptation costs could exceed \$380 billion by 2030, yet only \$65 billion was mobilized in 2023—more than 90% of it from public sources.

Private and philanthropic capital remain largely untapped. A major barrier is the difficulty of directly linking resilience benefits to financial returns. Because these outcomes—many of which are tied to avoiding the cost of inaction or generating broader societal benefits—are challenging to quantify and monetize, the enabling investments are less attractive to private capital providers.

However, the following monetization mechanisms are showing how resilience can make adaptation investable.

- **User-paid revenue models**, where end users pay directly for services such as irrigation or energy. For instance, solar-powered irrigation systems can be deployed on a pay-as-you-go basis, while also feeding surplus electricity into the grid to generate additional income.

- **Contractually guaranteed cash flows**, where investors are repaid through long-term agreements with governments or utilities. An example is the use of availability-based payment models for flood diversion tunnels or dike reinforcements, as seen in the Netherlands and the US.
- **Asset value capture**, where adaptation measures increase the value of nearby land or infrastructure. Coastal protection projects, for example, can raise urban land values and attract private development. Such models have been explored or applied in Singapore, Jakarta, and the Netherlands.
- **Environmental credit and byproducts markets**, where nature-based solutions produce tradable credits or marketable byproducts. For instance, mangrove restoration projects can generate blue carbon credits, while seaweed farming offers both environmental benefits and commercial outputs.
- **Cost avoidance and efficiency gains**, where adaptation reduces long-term operational costs or damage. Watershed management is one such approach, as it can lower downstream water treatment costs by minimizing runoff and sedimentation, generating savings for utilities.

Monetization pathways leveraged for funding adaptation solutions can be seen from the following three real-life examples:

- Malaysia's SMART Tunnel utilizes a user-paid revenue model through tolls.
- The UK's South West Water incentivizes sustainable water practices by providing cost avoidance and efficiency gains to upstream landowners.
- The Philippines' Restoration Insurance and Financial Services Company (RISCO) finances coastal adaptation through support from carbon credit revenues.

Making the Business Case and Charting Monetization Pathways: Malaysia, the UK, and the Philippines

	Malaysia: SMART Tunnel	United Kingdom: South West Water	Philippines: RISCO
Solution	A dual-purpose tunnel in Kuala Lumpur serves as both a stormwater drainage system and a tolled expressway, reducing urban flood risk while easing traffic congestion	A nature-based water catchment management initiative where landowners upstream adopt sustainable land and water practices to reduce pollution and runoff into water supplies	Finances coastal adaptation in vulnerable communities by restoring mangroves , combining insurance, ecosystem restoration, and inclusive enterprise development
Business case	Protects urban infrastructure from flood damage (~\$24 million/year in avoided losses) while improving transport efficiency in a congested city center	Improves water quality and flow, reducing the need for expensive downstream water treatment and regulatory compliance costs for utilities	Generates revenue from 2 ecosystem co-benefits—flood risk reduction and carbon sequestration—while supporting mangrove-positive businesses that provide local livelihoods
Monetization pathway	Revenue generated through toll collection from private vehicles funds operations and maintenance and repays private investment via a long-term PPP concession	Payments for ecosystem services: South West Water, the water supply utility, pays upstream farmers directly, justified by long-term cost savings from improved water quality and reduced treatment needs due to sustainable farming practices	Offers parametric or risk-transfer insurance products to communities and businesses, provides low-interest loans to mangrove-linked enterprises (e.g., aquaculture, ecotourism), and sells verified blue carbon credits from restored mangrove ecosystems
De-risking measures/enablers	Backed by government support through co-financing and traffic demand, the tunnel guarantees to secure investor returns over the 40-year concession	Enabled by UK water regulator approval to include nature-based solutions in utility capital plans, spreading costs across water ratepayers and ensuring long-term funding	Initially backed by philanthropic and concessional capital, scientific modeling and feasibility work provides the confidence needed to engage insurers, carbon buyers, and enterprise partners

Sources: SMART Tunnel Company; Malaysian Highway Authority; South West Water – Upstream Thinking; The Earthshot Prize (2025), Unlocking Critical Finance for Climate & Economic Resilience; Global Innovation Lab for Climate Finance (2019), Restoration Insurance and Financial Services Company (RISCO).

9. Channel Diverse Forms of Capital and Financing Instruments into Investment-Ready Projects

Mobilizing finance at scale requires blending multiple forms of capital—public, private, and philanthropic—with varying risk-return expectations. To bridge risk-return gaps and unlock private investment, a wider range of financial instruments can be valuable. These include guarantees (such as for offtake) that de-risk early-stage or lower-return projects while preserving upside for commercial investors.

Emerging instruments such as resilience bonds and debt-for-climate swaps are also gaining traction. While still nascent, these tools offer scalable ways to reduce fiscal vulnerability and mobilize adaptation finance.

At the same time, many adaptation projects are not yet investment ready. They often lack the technical detail, feasibility studies, financial modeling, and/or structuring needed to access available finance. As a result, capital providers struggle to assess where and how to invest. Standardized adaptation playbooks—organized

around common climate challenges such as heat, flooding, or water stress—can help address this gap. By packaging technologies, delivery models, financing structures, and policy enablers into replicable project archetypes, they reduce transaction costs, simplify due diligence, and accelerate capital deployment.

To address this dual problem, new platforms and vehicles—some launched, others under development—seek to:

- build robust project pipelines, with credible risk-return profiles and implementation plans;
- match capital to project scale, risk-return profile, and broader public benefits; and
- coordinate across agencies and investors, bundling interventions by geography, theme, or delivery model, while helping reduce fragmentation and transaction costs.

Examples include country platforms that align planning, funding, and capacity. Additionally, blended finance vehicles, such as the Lightsmith Climate Resilience private equity fund (See **Case Study 7**), channel capital into companies providing resilience-enabling technologies—including climate analytics, risk modeling, and water systems—across emerging markets.

As investment momentum grows, stronger convening mechanisms—whether national, regional, or global—and a move toward more programmatic adaptation funding will be essential to steer capital toward impact at scale.

Channeling Finance Sources to Projects: Lightsmith Climate Resilience Fund

THE CHALLENGE

Many resilience solutions—especially tech-enabled or early-stage business models—remain significantly underfunded by private capital

Lightsmith launched the first **private equity fund focused exclusively on climate resilience**, demonstrating how blended capital can support private-sector innovation in adaptation, complementing public finance for infrastructure and public good solutions

THE SOLUTION

The fund was built on a clear thesis: climate resilience is an **overlooked, fast-growing market with attractive risk-return potential**. It addresses 3 key barriers to private investment:

- 1 Market clarity:** Targets a ~\$170 billion global opportunity in sectors such as agri-tech, water, and risk analytics
- 2 Risk-return alignment:** Uses concessional public capital (e.g., GCF, EIB, AIIB) to de-risk private investment from insurance firms, family offices, and institutional investors
- 3 Execution:** Demonstrates investability through real deals with high-growth companies, delivering measurable outcomes

THE OUTCOMES

- Raised and deployed ~**\$185 million with a 50/50 public-private capital mix** across a diversified portfolio of resilience-focused businesses
- Attracted **25+ investors** combining public climate institutions with private capital sources. Investments include:
 - Parsyl (cargo insurance)
 - AiDASH (AI satellite analytics for utilities)
 - Solinftec (precision agriculture)
 - CADMUS (energy & water consulting)
 - SOURCE Global (water from air)
 - WayCool (agricultural technology)
- **De-risked private investment** into adaptation sectors historically overlooked by mainstream finance

10. Make Insurance Fit-For-Purpose for Climate Adaptation

Insurance can play a dual role: providing support after disasters and proactively enabling climate resilience and investment quality. When structured effectively, insurance can also offer early signals of where climate risks are becoming economically unsustainable, highlighting where further adaptation or public intervention is needed.

- **Post-Disaster Safety Net.** Insurance can provide rapid payouts to support response, recovery, and rebuilding with longer-term resilience in mind. Parametric insurance is particularly effective in this role, with payouts triggered by predefined climate thresholds. Programs such as the InsuResilience Global Partnership and the African Risk Capacity have helped expand access across vulnerable countries. In India, the Self Employed Women's Association has piloted a parametric heat insurance product for informal women workers, offering timely compensation during extreme heat events. Catastrophe bonds have also helped governments mobilize disaster response funding quickly: for instance, the Philippines received a \$52.5

million payout under a World Bank-issued sovereign catastrophe bond following a typhoon in December 2021.

- **Proactive Enabler of Resilience.** Insurance instruments can do more than underwrite risk. They bring data, models, structuring, and risk prevention expertise that can improve project design and financial feasibility, particularly for large-scale or blended-finance projects—instruments that embed adaptation incentives directly into financial structures. Some insurance tools are beginning to incorporate these incentives into traditional structures. For example, the North Carolina Insurance Underwriting Association issued a \$600 million catastrophe bond that includes a resilience feature: each year, a slight additional spread is paid into a dedicated resilience fund, reinforcing investments in community-level risk reduction (See **Case Study 8**).

- **Signal of Adaptation Limits.** As climate risks intensify, insurance pricing and availability offer a practical lens for understanding how these risks are perceived and absorbed by private markets. Insurance reflects the market’s capacity and willingness to bear uncertainty, and when climate-related events become too frequent, severe, or unpredictable, insurers may sharply raise premiums or withdraw coverage—signaling a “soft limit” where private market risk tolerance has been reached. These “soft limits” do not imply physical hard limitations of adaptation solutions, but rather point to where private market solutions are no longer viable without public intervention or deeper systemic adaptation. Insurers’ growing reluctance to underwrite certain risks—such as wildfires in California or floods in South Asia—underscores the need for early engagement with the insurance sector to assess risk thresholds, define viable coverage, and guide resilient investment choices.

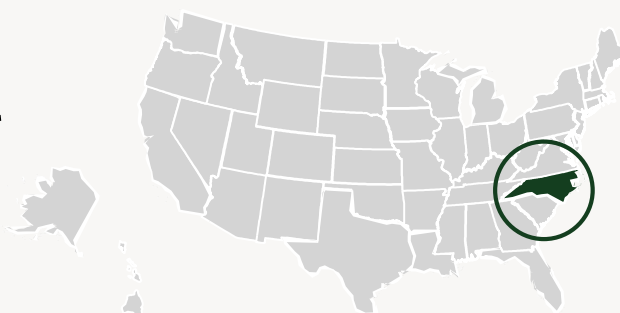
Innovating in Insurance: United States

THE CHALLENGE

North Carolina's coastal regions face escalating storm risk, with hurricanes growing more frequent and severe. As a result, insurance losses have mounted, driving up premiums and straining the capacity of reinsurers to absorb risk

In North Carolina's high-risk areas, coverage is provided by the **North Carolina Insurance Underwriting Association (NCIUA)**, a publicly legislated insurer of last resort that offers insurance to homeowners and property owners when private carriers will not. While it plays a critical role in protecting vulnerable properties, NCIUA faces growing challenges in maintaining affordability and long-term sustainability as climate risks escalate

North Carolina



Source: Artemis.

THE SOLUTION

To manage its growing hurricane risk, NCIUA issued a **catastrophe bond** through Cape Lookout Re Ltd. that includes a resilience-linked feature:

- 1 On top of the standard interest rate, NCIUA pays a 0.35% annual resilience premium into a dedicated account
- 2 If storm losses stay below 60% of the bond's trigger threshold, this premium is returned to NCIUA at maturity
- 3 Returned funds are reinvested into risk reduction measures, such as grants for Fortified Roof upgrades

This model incentivizes NCIUA to reduce risk across its portfolio by **encouraging policyholders to adopt resilience measures**, such as strengthening roofs or elevating homes, and improving overall community preparedness. Over time, this structure can help **lower storm damage and insurance costs**

Catastrophe bonds are a type of insurance-linked security that allows governments and/or insurers to transfer disaster risk to the capital markets. Investors provide upfront capital, which is held in a collateral account. If a predefined disaster event occurs (based on physical triggers or loss thresholds), the capital is used to cover the issuer's losses. If no trigger occurs, investors get their principal back with interest

THE OUTCOMES

- Secured **\$600 million** in reinsurance from global capital markets, NCIUA's largest cat bond to date
- Introduced the **first resilience-linked trigger** in a catastrophe bond, aligning financial protection with proactive adaptation
- Demonstrated how insurance instruments can move from post-disaster payout to **pre-disaster resilience financing**

Who Drives It: Defining the Roles of the Stakeholders Across the Ecosystem

All stakeholders have a role to play in scaling adaptation—and coordinated action is essential to unlock impact.

No single actor alone can address the scale and complexity of climate risks. Governments, investors, insurers, civil society, and solution providers must work in concert, with each contributing their unique capabilities—from policy direction and capital mobilization to innovation and on-the-ground delivery.

Clarifying these roles is a critical step toward effective orchestration, enabling more targeted collaboration, reducing friction, and helping align efforts around shared outcomes—accelerating the shift from planning to implementation.

The stakeholder heatmap presented here serves as a conceptual framework to illustrate the relative role each stakeholder can play across the ten decisive actions. In practice, the role of each actor will vary by geography and context—shaped by governance structures, market maturity, and institutional capacity.

All Stakeholders Have a Role to Play

National governments

Anchor adaptation by setting direction through NAPs, creating enabling policy and fiscal frameworks, deploying de-risking instruments, and **strengthening data infrastructure** to support effective, locally informed investment

Subnational governments

Translate national priorities into context-specific action by identifying local risks, embedding resilience into planning and services, engaging stakeholders, and **building frontline capacity** to bridge policy and implementation

Communities & civil society

Ground adaptation in real needs by contributing lived experience, shaping plans through participatory processes, and building trust and ownership that enhance long-term resilience

Corporates

Embed resilience into strategies and core business operations to protect assets and supply chains while **collaborating with public and private partners** to co-invest in adaptation efforts

A&R solution providers

Design, deliver, and scale technical solutions across sectors—from engineering and infrastructure to nature-based systems and digital tools—aligning technical innovation with local context and investment viability

SMEs

Drive locally tailored adaptation by piloting and scaling solutions such as resilient crops and water systems, leveraging innovative finance, and **collaborating through cooperatives** to pool resources and expand impact

Catalytic capital providers

De-risk adaptation investments by **providing grant capital, technical assistance, and guarantees**, supporting pipeline development, advancing metrics and tools, and validating early-stage solutions

Development finance institutions

Deploy **concessional and blended capital** to close risk-return gaps, finance large-scale adaptation projects, and crowd in private investment while supporting **project preparation, policy dialogue, and long-term investment strategies**

Institutional investors

Deploy long-term capital by integrating resilience into portfolios, reallocating assets to reduce climate risk, and **financing large-scale adaptation** through instruments such as resilience bonds and nature-based solutions

Commercial banks

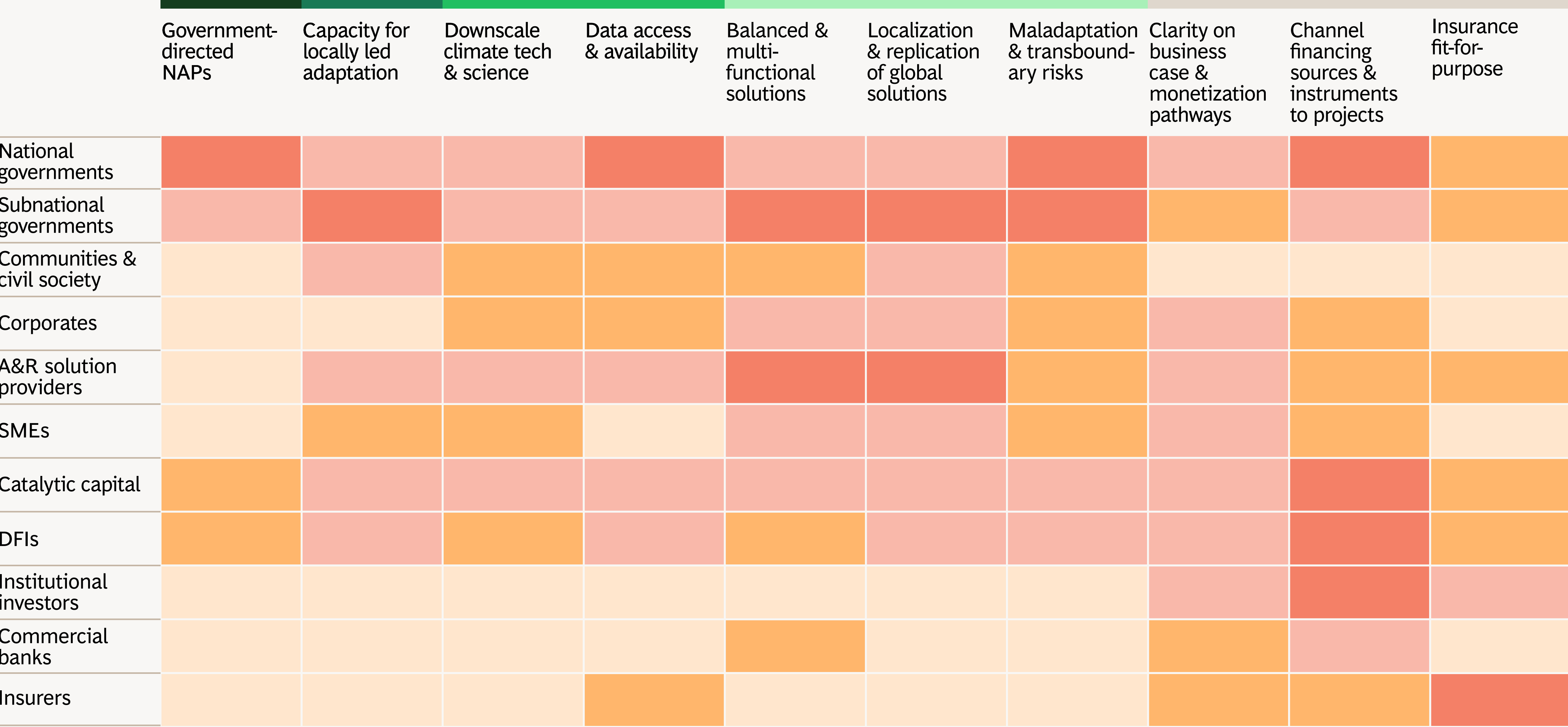
Finance adaptation by embedding climate risk into lending, offering resilience-linked products, and **extending credit** to SMEs and local projects, while partnering on blended finance with development finance institutions to scale solutions

Insurers

Manage climate risk by providing post-disaster safety nets through parametric and catastrophe coverage while improving investment conditions by pricing risk, lowering capital costs, and **making adaptation more bankable**

Any other relevant stakeholders who are specific to context

Unlocking Scale Depends on Effective Coordination Across All Actors



Source: BCG analysis.

Leading role Material role Supporting role Provide input as needed

National Governments

National governments can play a central role in shaping the adaptation ecosystem—setting national priorities, enabling policy and regulatory frameworks, and mobilizing resources. They lead the development of NAPs, coordinate across ministries, and provide direction to subnational actors. Through public investment and fiscal policy, they can help channel finance toward adaptation priorities and de-risk private capital flows. Governments also invest in national data systems and support local capacity development. In areas such as solution design, insurance, and transboundary cooperation, their leadership can be catalytic, assuming strong cross-ministerial coordination and sustained policy attention are sufficient in order to unlock full impact.

Subnational Governments

Subnational governments—states, provinces, and municipalities—are critical actors in turning national adaptation priorities into locally grounded action. They can play a frontline role in identifying localized climate risks, engaging communities, and integrating adaptation into infrastructure, land use, and service delivery. Their proximity to populations and ecosystems makes them well-positioned to design and implement context-specific solutions that reflect on-the-ground realities.

They can also help shape robust project pipelines by coordinating local stakeholders, bundling investments, and supporting data collection and monitoring. In many cases, they lead on innovation and demonstration projects that can be scaled nationally. As such, subnational governments are central across the adaptation value chain—from planning and design to implementation and long-term stewardship.

Communities & Civil Society

Communities and civil society organizations are at the heart of effective, inclusive adaptation. They bring deep knowledge of local conditions, climate impacts, and social dynamics—ensuring that adaptation strategies reflect real needs and lived experiences. Community members often act as early responders to climate risks, stewards of local ecosystems, and co-designers of locally appropriate solutions.

Civil society plays a key role in convening actors, facilitating public participation, and holding institutions accountable. They help embed adaptation in local planning processes, prevent maladaptation through ground-level insights, and build trust between governments, funders, and communities. By shaping project priorities, supporting implementation, and sustaining long-term engagement, communities and civil society are essential to locally led adaptation that delivers durable, equitable impact.

Corporates

Corporates are central to scaling adaptation through both demand and delivery. On the demand side, they must protect assets, operations, supply chains, and workforces from physical climate risks. On the delivery side, they help pilot, scale, and mainstream adaptation solutions, particularly those that align resilience with commercial advantage.

They generate proprietary data, develop internal risk models, and influence both policy and finance by shaping market signals. Corporates also help quantify and communicate the business case for adaptation by identifying avoided losses, operational continuity, and competitive advantage. Many corporates already co-finance adaptation projects or develop insurance solutions, with opportunities for broader participation—particularly in shaping financing structures and co-investing in shared resilience.

A&R Solution Providers

A&R solution providers are the engine behind adaptation implementation. They design, develop, and deploy the technologies, infrastructure, and nature-based solutions that turn plans into action. These providers play a pivotal role in translating risk assessments into bankable, scalable projects—often working at the intersection of technical innovation, local relevance, and financial viability.

Their solutions generate critical climate and environmental data, inform public and private decision-making, and improve project readiness. They help governments and investors understand performance, monetization potential, and long-term cost-benefit. To scale impact, they must also design for replicability, work with communities and governments on tailoring solutions, and align with financing structures and insurance tools.

SMEs

Small to midsize enterprises (SMEs) are essential frontline actors in delivering locally relevant adaptation solutions. As key drivers of innovation and last-mile delivery, they are uniquely positioned to understand local risks, customer needs, and viable delivery models—whether in climate-smart agriculture, water systems, or advisory services.

They test and scale adaptation products using innovative financing mechanisms, such as pay-as-you-go, microfinance, or cooperatives. SMEs are also a critical partner in replication efforts, translating proven solutions into diverse geographies and contexts. By partnering with each other through cooperatives or collaborative platforms, they can pool resources and expertise to achieve greater scale in delivering adaptation solutions.

Catalytic Capital Providers

Catalytic capital providers play an outsized role in unlocking innovation, building capacity, and de-risking adaptation investment. Their flexible, risk-tolerant funding enables governments, communities, and private actors to pilot new models, build foundational systems (such as data infrastructure or local institutions), and demonstrate early proofs of concept. They are instrumental in scaling high-impact solutions, developing monetization pathways, and funding project preparation and design stages that commercial funders often avoid. By taking the first loss or supporting blended finance structures, they help crowd in private capital while maintaining a focus on equity, inclusion, and long-term impact.

DFIs

Development Finance Institutions (DFIs) are pivotal in bridging the gap between public interest and private investment in adaptation. Through concessional financing, technical assistance, and blended structures, they help build pipelines, scale innovation, and crowd in commercial capital. DFIs play a leading role in designing and deploying financing instruments that make adaptation solutions bankable, from guarantees and first-loss layers to early-stage capital for project preparation. They also support data infrastructure, regional coordination, and policy dialogues that create enabling conditions for investment. Critically, DFIs are positioned to support both government-led planning and private-sector implementation, making them a key linchpin across the adaptation ecosystem.

Institutional Investors

Institutional investors—including pension funds, sovereign wealth funds, and endowments—hold large pools of long-term capital and are uniquely positioned to accelerate adaptation investment at scale. Their primary role is to channel finance into resilient infrastructure, nature-based solutions, and adaptation-linked assets. By integrating physical climate risk into portfolio analysis, these actors can shift capital away from vulnerable assets and toward resilience-positive opportunities. Institutional investors also play a material role in shaping the business case for adaptation, using their influence to demand clear risk-return metrics, monetization pathways, and long-term value strategies from investees.

Some are engaging in resilience bonds or sustainability-linked instruments or investing in funds focused on water security, infrastructure adaptation, and climate-smart agriculture. Their involvement in insurance-linked securities (for example, catastrophe bonds) is also growing, making them key enablers of risk transfer and financial resilience. While they do not typically design or implement projects, institutional investors can send

powerful market signals that influence project structuring, regulatory reform, and investment readiness across the ecosystem.

Commercial Banks

Commercial banks are essential enablers of adaptation finance, especially at the national and local levels. They play a leading role in channeling capital into resilience projects by lending to SMEs, municipalities, and infrastructure developers. Through tools such as resilience-linked loans and blended finance structures, banks help de-risk investments and mobilize broader private sector participation.

Beyond safeguarding their own balance sheets, banks play a vital role in financing solutions on the ground—extending credit to SMEs and community-level projects for climate-smart agriculture, resilient infrastructure, and other locally led initiatives.

Partnerships with multilateral development banks (MDBs) and DFIs further expand banks' capacity to fund both the protection of existing systems and the development of innovative adaptation solutions through blended finance structures.

Insurers

Insurers play a pivotal role in assessing climate risk, designing innovative propositions, and translating physical risks into measurable financial terms that

improve the feasibility of adaptation projects. Their data, modeling, and risk-assessment expertise can guide governments and investors toward more robust project design, smarter risk allocation, and stronger investment quality.

As climate risks evolve, insurers' insights also provide an early view of where vulnerabilities are intensifying and where additional adaptation or public support may be needed. By engaging early in planning and investment processes, the sector can help steer system-wide resilience strategies, turning risk management into a proactive driver of adaptation.

Delivering the decisive actions will require purposeful orchestration across stakeholders. National and subnational governments provide direction, enabling policies, and data; corporates, SMEs, and communities drive innovation and implementation on the ground; MDBs, DFIs, philanthropies, and foundations catalyze capital and build pipelines; and banks, institutional investors, and insurers mobilize and channel finance through complementary instruments. No single group can succeed in isolation—each must play its part in a coordinated system in which roles reinforce one another. Together, these efforts create the conditions for the decisive actions to move from principle to practice, laying the groundwork for an integrated agenda to unlock adaptation investment and deliver impact at scale.

How to Deliver: Enabling Systems and Structures to Unlock A&R Impact

Translating adaptation priorities into investable, scalable solutions requires more than knowing what needs to happen to build climate resilience and who should do it.

It also demands the right delivery infrastructure—the mechanisms that coordinate action, ensure accountability, and align investment decisions with on-the-ground realities. Even the best NAP or private sector strategy will stall without the enabling systems to support implementation.

We've outlined a non-exhaustive set of practical steps that can help countries, funders, and partners put the decisive actions into practice:

1. Align Policy and Planning Across Levels

Fragmented mandates and competing priorities can derail adaptation efforts. Horizontal coordination (for example, across ministries) and vertical alignment (for example, national to local) are essential. NAPs can provide a unifying framework, but must be matched with delivery mandates and mechanisms at subnational and sectoral levels. Cross-sector working groups, shared data platforms, and harmonized budgeting processes can help create this coherence.

2. Strengthen Governance Processes

Delivering effective adaptation requires more than technical solutions—it demands strong governance. This includes clear institutional mandates, transparent decision-making, and the integration of social and environmental safeguards to prevent maladaptation. Processes that support participatory planning,

cross-border coordination, and climate justice can enhance long-term accountability and legitimacy. Resilience can also be embedded into national financial governance through climate-responsive budgeting, procurement policies, and fiscal risk forecasting.

3. Institutionalize Orchestration Mechanisms

Embed orchestration within formal institutions to provide long-term platforms for coordination. Effective orchestration mechanisms—such as dedicated climate investment units or adaptation country platforms—need clear mandates, staffing, and budget to align planning, funding, and execution across stakeholders. Public financial management systems can be adapted to support these efforts, ensuring that resources are aligned with resilience outcomes over time.

4. Build Enabling Infrastructure for Private Sector Engagement

Develop the tools and platforms that enable scalable private participation. From pipeline matchmaking to standardized

project archetypes and adaptation taxonomies, delivery infrastructure helps reduce transaction costs, accelerate due diligence, and unlock private innovation.

5. Build Strong MEL Systems

Adaptation requires continuous feedback and adjustment. Monitoring, Evaluation, and Learning (MEL) systems help track what works, where course correction is needed, and how investments translate into real-world impact. Well-designed MEL frameworks also build funder confidence and support knowledge transfer across regions. Incorporating standardized tools—such as resilience taxonomies and rating systems—can also improve comparability, guide capital allocation, and strengthen global learning. Embedding MEL from the start is key to adaptive and scalable implementation.

These enablers provide a starting point to help ensure adaptation investment is coordinated, credible, and positioned to deliver meaningful impact.

Conclusion

Delivering adaptation at scale requires clarity on what needs to happen, who must be involved, and how to enable progress.

This paper outlines ten decisive actions that provide a shared agenda for action—reinforced by clear stakeholder roles and the enabling systems needed to coordinate, finance, and implement them effectively.

These are not isolated elements, but rather mutually reinforcing levers that strengthen the systems, structures, and incentives needed to move from climate adaptation plans to implementation. At the same time, we must be clear-eyed about the limits of adaptation. Resilience measures are most effective when paired with ambitious mitigation pathways that keep temperature rise within 1.5–2°C, making parallel progress on mitigation not just important, but essential. As temperatures rise and thresholds are crossed, many regions may need to go beyond incremental adaptation toward transformational adaptation that fundamentally reshapes systems, livelihoods, and infrastructure.

This is a bold agenda—but an achievable one. And the cost of inaction is far greater than the challenge of scaling what is needed. The window for climate adaptation is not in the distant future—it is now.

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