The Adaptation & Resilience Innovation Playbook

DECEMBER 2024 – WEBINAR

Tailwind

About Tailwind

Tailwind

Tailwind is an advisory and investment firm focused on accelerating the development and deployment of climate adaptation and resilience solutions.

Emilie Mazzacurati and Katie MacDonald launched Tailwind because they saw the urgent need for a climate adaptation innovation ecosystem. They have spent their careers building, investing in, and growing companies, products and programs into global successes.

Tailwind is dedicated to addressing **3 market failures**:

1. **Capital Gap** – Lack of sufficient investor capital available to A&R innovators.
2. **Demand Gap** – Lack of clear demand from A&R solution buyers.
3. **Ecosystem Gap** – Lack of adequate support for innovators from academic and innovation support organizations.

OUR WORK

Advisory

We provide consulting services to private sector clients and conduct philanthropically funded work to build the field of adaptation innovation.

Investment

We place investments into early-stage climate adaptation startups with technologies and services we have conviction in.

Thank You

Funders

We are grateful to the groundbreaking funders who supported our vision to publish this report as both a foundation and catalyst to drive innovation and investments into adaptation & resilience.

- **Autodesk Foundation** – Jean Shia, Beth Foster-Chao
- **Battelle** – Melinda Sych
- **Breakthrough Energy Fellows** – Ashley Grosh, Meghan Bader, Taylor Carvalho
- **Lyda Hill Philanthropies** – Matt Crommett, Olivia Strader
- **Shockwave Foundation** – Paul Traina, Jeny Wegbreit

Partners

Vibrant Data Labs was a central partner for the research underlying the startup and investor data. Special thanks to Eric Berlow, Jay Hirschton, and Lara Reichmann for all your time and collaboration.

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Team

This project was supported by two exceptional individuals who were critical contributors to this report: **David Babikian** and **Brooke Zhang**. We thank them for their extensive contributions.

Thank you to the **Urban Future Lab at NYU** for being Tailwind's headquarters for this project!

Definitions: Adaptation & Resilience Solutions

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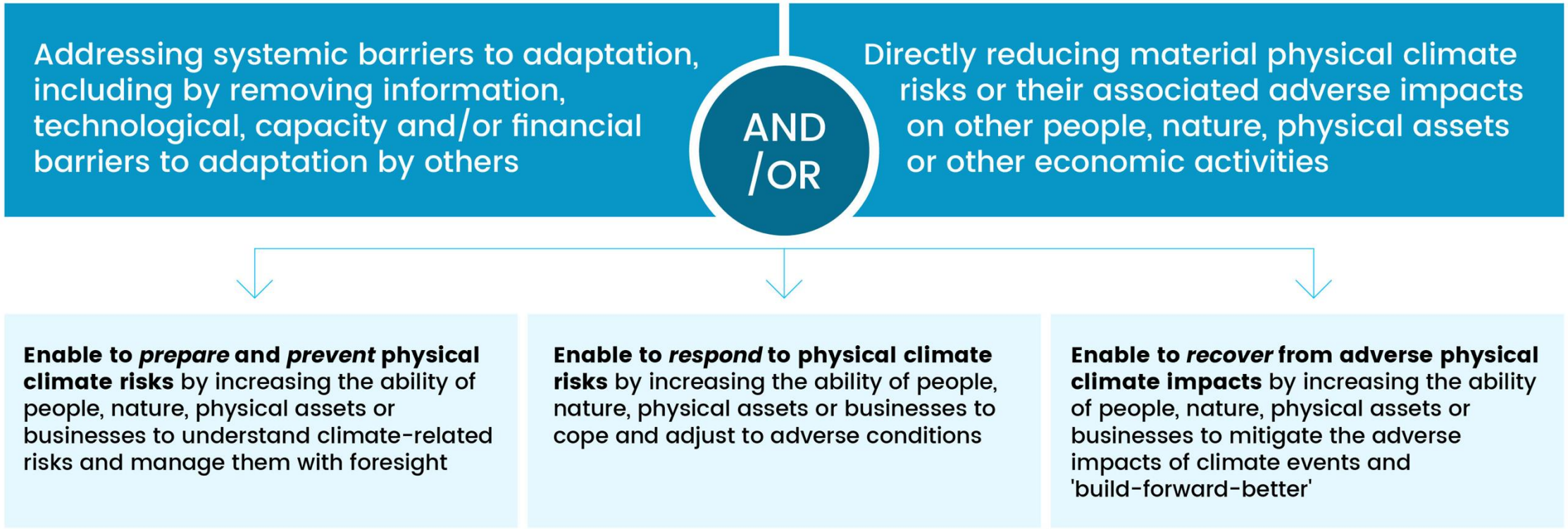
Adaptation and Resilience (A&R) Solutions are products or services that prepare, prevent, respond to and/or enable recovery from climate shocks and stressors.



Source: GARI, 2024

Taxonomy: A&R Sectors

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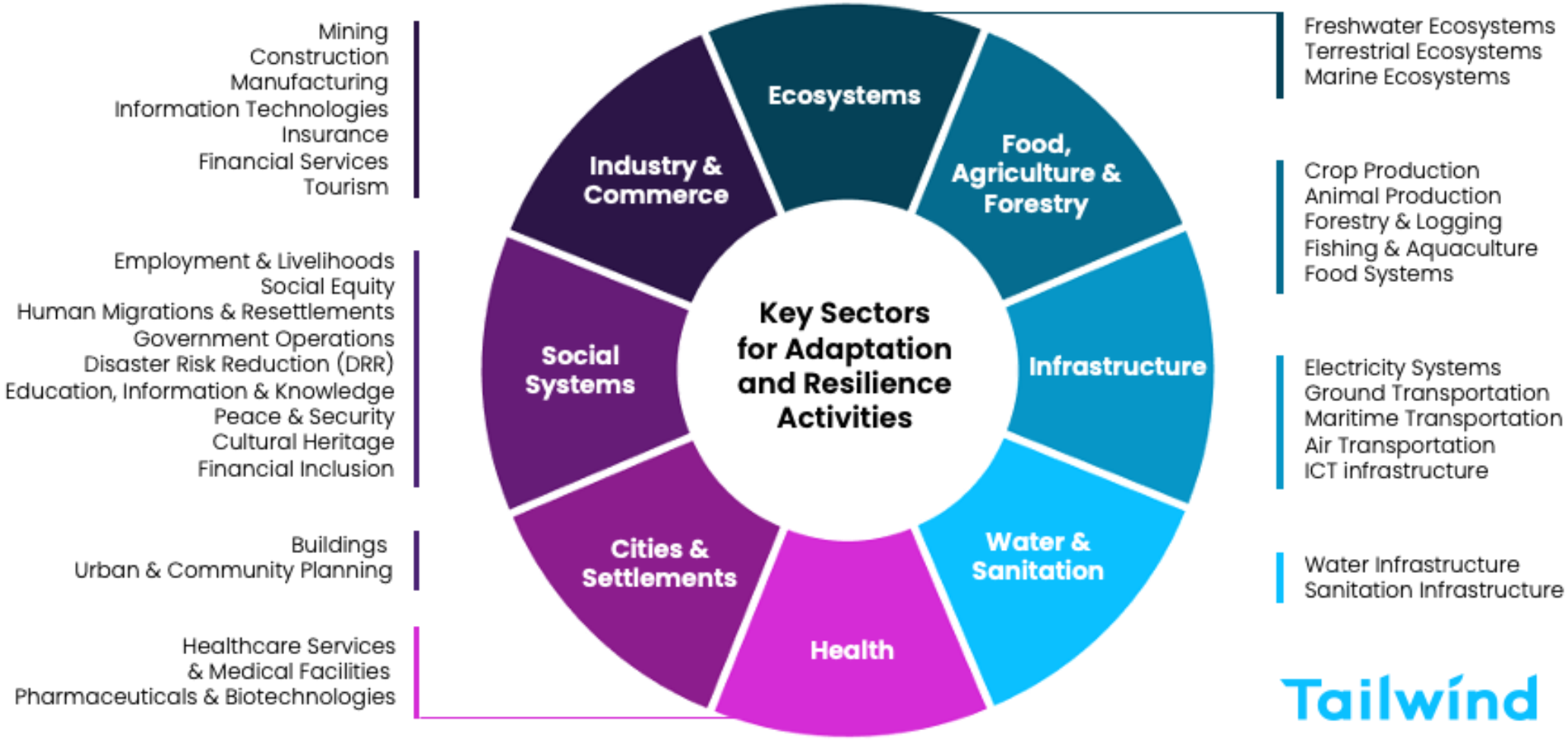
Climate change is affecting lives and livelihoods, economic, social and cultural assets, and ecosystems globally. The Tailwind taxonomy provides a structured breakdown of key sectors where A&R activities and solutions are needed.

See tailwindclimate.com/taxonomy for the full taxonomy, including detailed examples and mapping to common economic taxonomies.



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Jean Shia, Autodesk Foundation

FUNDER REMARKS

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DEMAND OVERVIEW

Global Demand: Overview

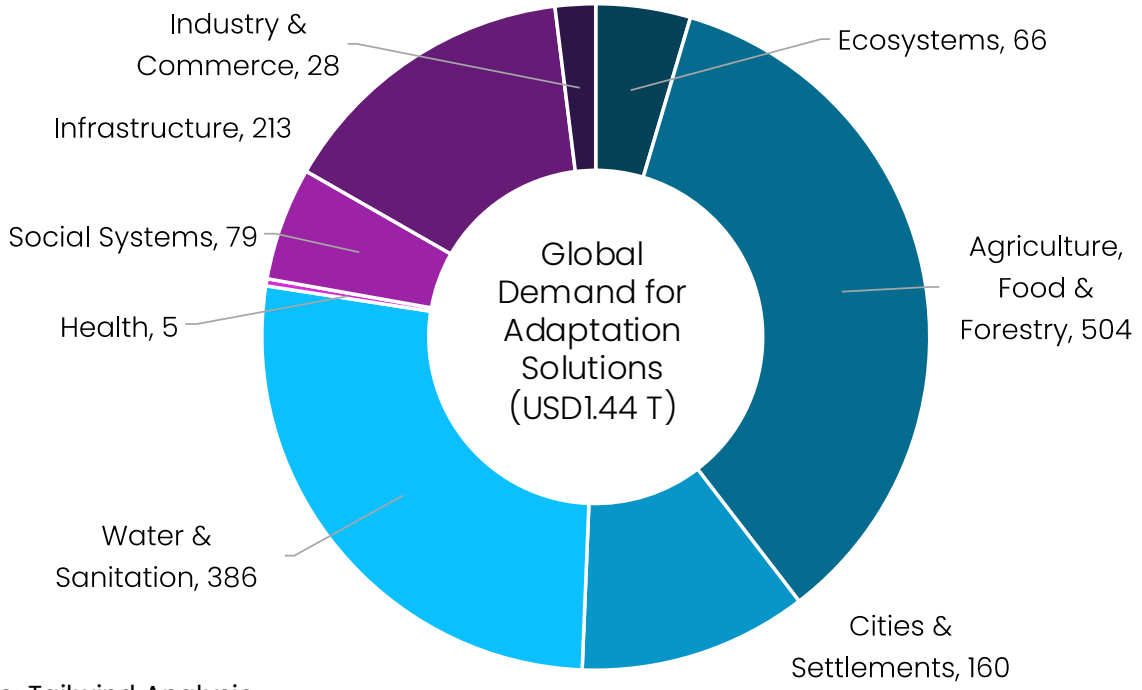
Governments and consumers drive USD1.4 T worth of spend on A&R solutions and activities globally.

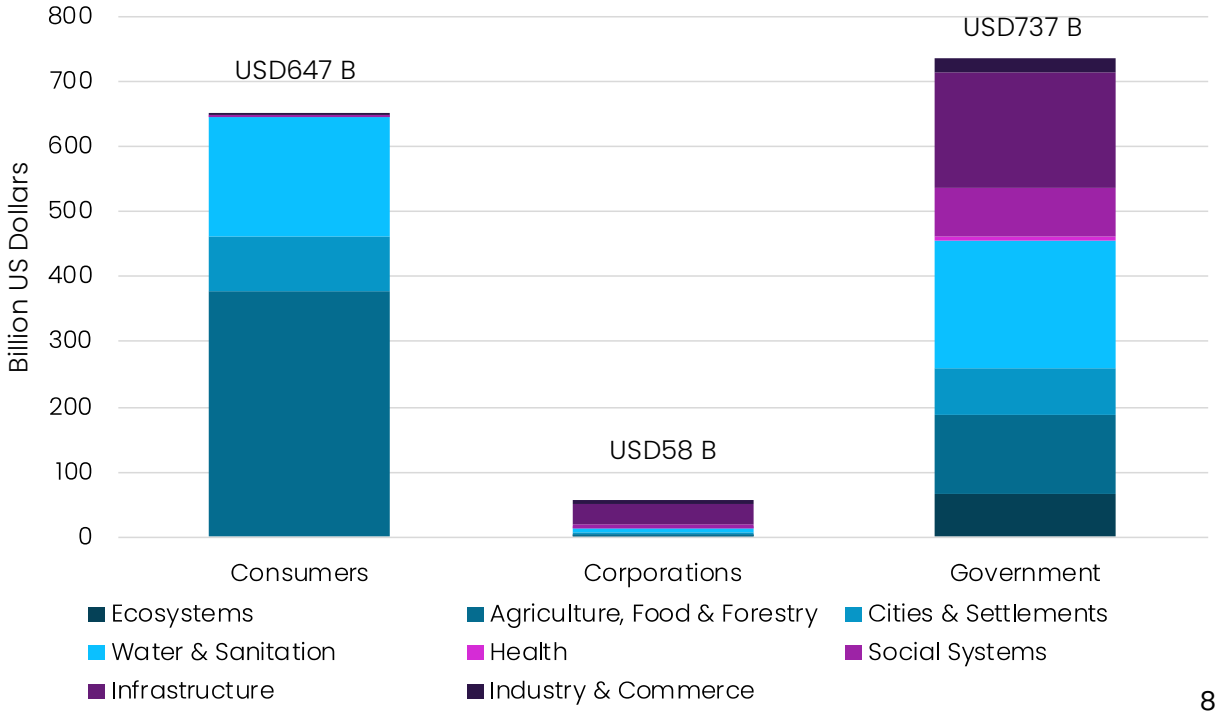
We found USD737 B of government spend on adaptation globally. While still insufficient compared to projected investment needs, and likely an underestimation, this shows governments are rapidly accelerating their investments to protect their communities. Looking at market spend for products likely to be used to adapt to the impacts of climate change, **we estimate USD647 B A&R spend from consumers**, showing that homeowners and smallholder farmers are not waiting for standards or regulations to invest in protecting their homes and their land.

We tracked **USD58 B of corporate spend across a sample of 80 large corporations and aggregate transaction data from CPI**. The number is orders of magnitude smaller than what is needed to address current and projected climate risks.

Philanthropic giving for A&R is estimated at USD650 M, less than 0.05% of global financial flows.

Global demand for adaptation solutions is primarily focused on Agriculture, Food & Forestry (35%) and Water & Sanitation (27%), and to a lesser extent **Infrastructure (15%)** and **Cities and Settlements (11%)** (which includes residential and commercial real estate). **Demand for solutions in Health (0.35%), Ecosystems (5%) and Social Systems (5%) is lagging**. They remain likely to be driven by government spend and smaller than the other sectors.





Source: Tailwind Analysis

Government Demand: Overview

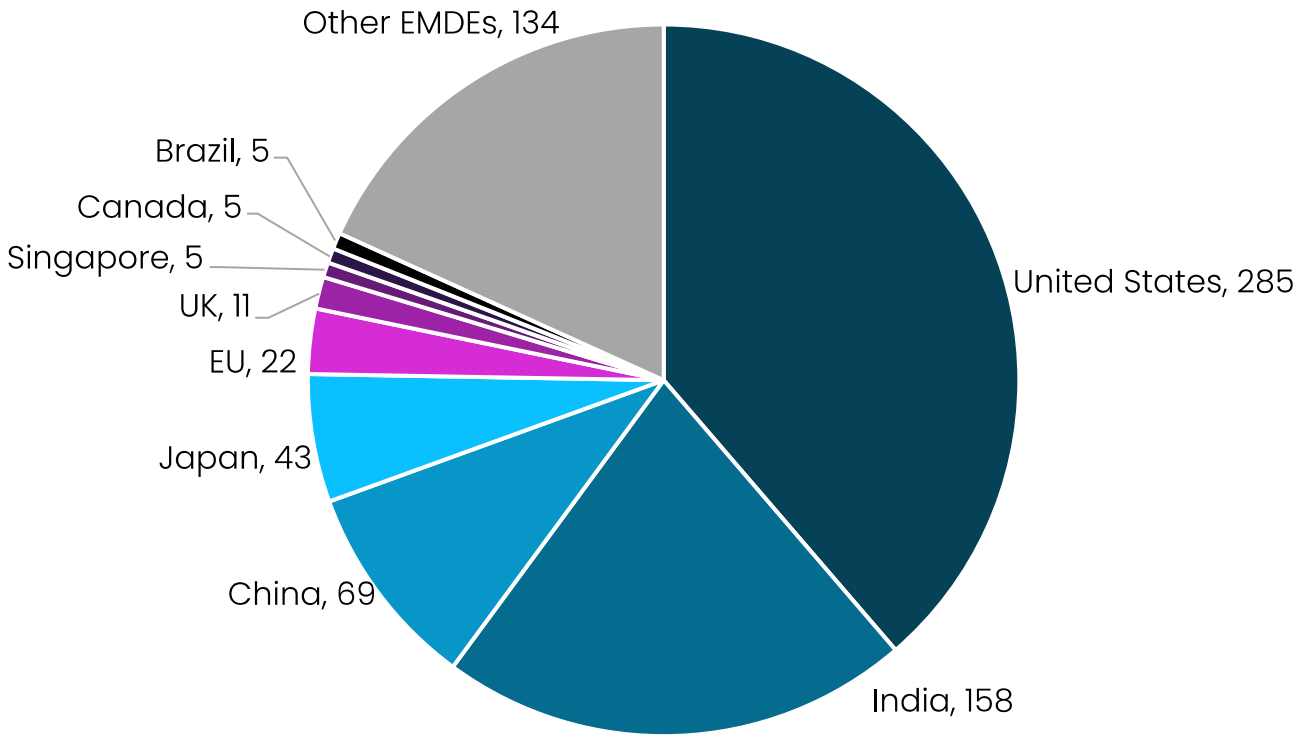
Tailwind

Public adaptation spend reached USD737 B in public programs and projects globally in 2023.

Through desktop research and literature review, we were able to identify **USD 737 B worth of public budget focused on adaptation** in the world's largest economies.

Our tally is far from being exhaustive – there is no single source of truth for government spend on adaptation, which remains generally very poorly tracked and measured (OECD 2024, CPI 2024). Notably, while we included a few local governments in the US, we did not research local spend in any other countries. **Many A&R investments are already being or will be conducted by local governments** (CPI 2023).

Of the countries we researched, we found an even split between industrialized economies and emerging markets and developing economies (EMDEs). However, this hides the fact that **only USD14.5 B goes to Least Developed Countries, and 2% (USD1.5Bn) to Small Island Developing States**, where the needs are the greatest (CPI 2024). Developing countries' financing needs are estimated between USD215 and USD387 B per year (UNEP 2024).



Data in billion USD

Data sources: We performed extensive desktop research for the US, the EU and Japan, and more limited research for the UK, Canada, India and Singapore. We relied on CPI research for Brazil and Other EMDEs (for which *we include dual benefit financing as A&R*), and WRI for China. Sources are detailed in the following slides and in Appendix.

Data limitations: Our research did not include other countries (not even domestic spend in the EU27) nor regional or local governments. When 2023 data was not available, we used 2022 or 2024 as a proxy.

Consumer Demand: Overview

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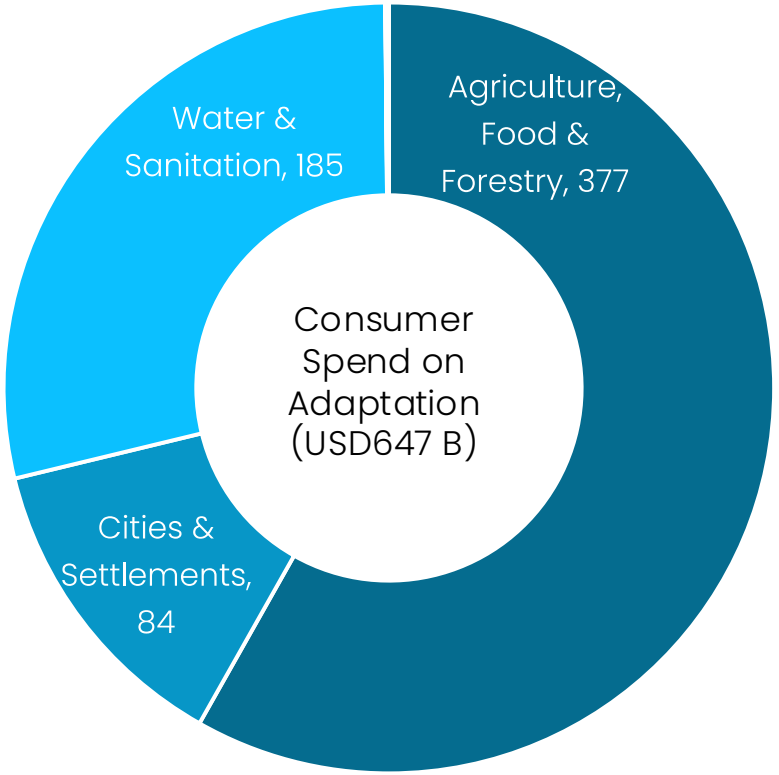
Globally, households spend USD647 B annually to protect their homes and livelihoods.

Building on CPI's analysis of consumer demand for A&R products (CPI 2024), **we estimate global consumer demand at USD647 B annually.**

Consumer demand for A&R currently takes two main forms:

- **Products and services to protect their home** from extreme weather disasters and keep it livable in a hotter, drier climate – Ex. flood protection, stormwater management, sanitation, hurricane-proof roofs, fireproof materials, insulation materials, rainwater harvesting, water filters, etc.
- **Products and services to protect their land** – Ex. subsistence farming.

We expect demand for additional products will develop over time to protect personal safety and health.



Smallholder Farmers

An estimated two billion people live in smallholder farming households, which contribute 35% of the world's food supply (World Bank, CPI).

Smallholder farmers in developing countries spend **USD368 B** on adaptation solutions, equivalent to **20-40% of their own income** (IIED).

Self-funded project areas include climate/weather adaptation information, pest and irrigation technologies, and crop diversification.

With an **average individual spend of $838 per year on adaptation**, innovations targeting this industry require scalable, low-cost frameworks with strong distribution networks (IIED).

Corporate Demand: Outlook

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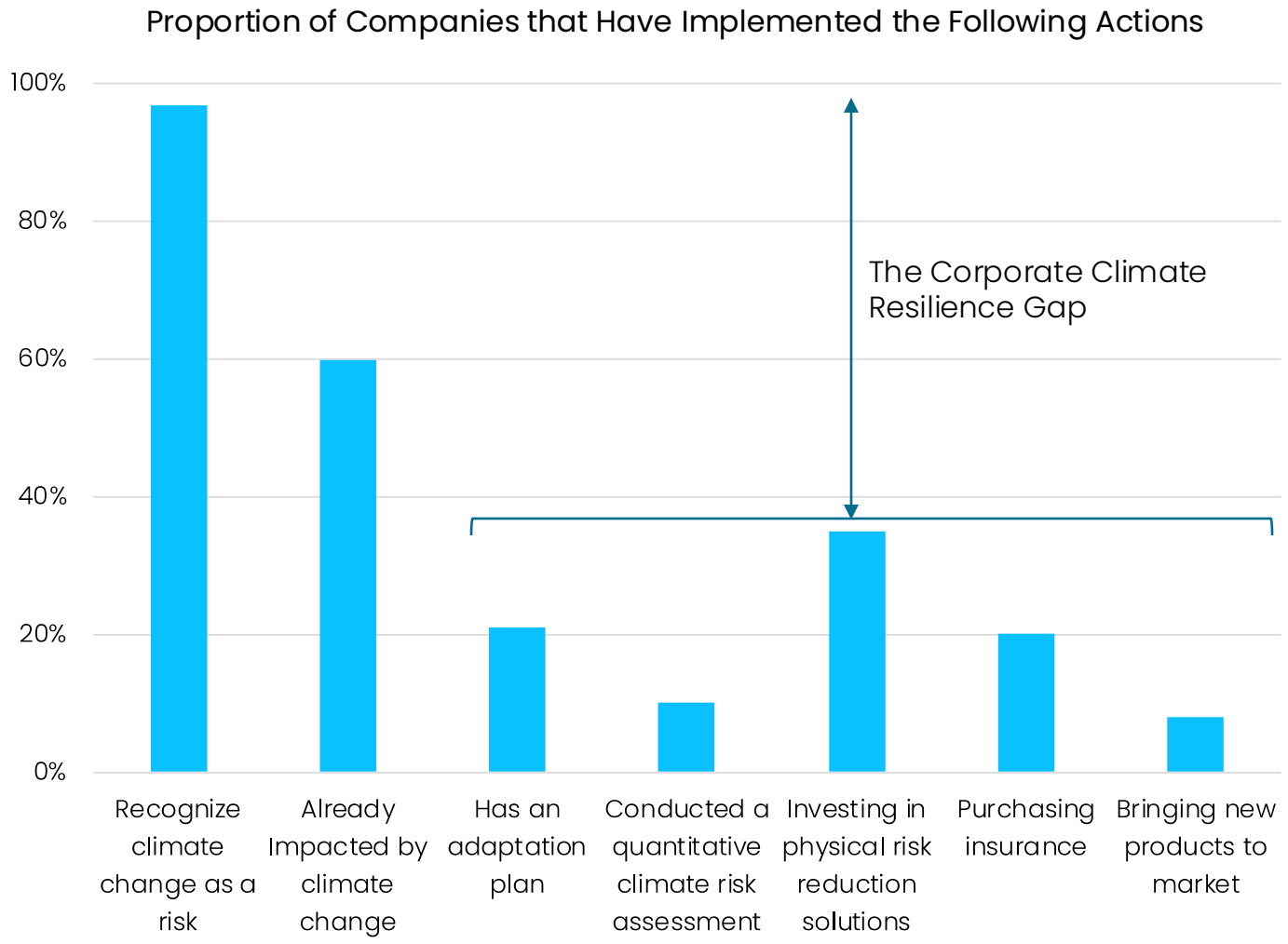
Corporations need help advancing more mature adaptation and resilience strategies and investment plans.

The discrepancy between costs of climate change (actual and projected) and investments in climate resilience indicate that **we are in very early days for the B2B adaptation solutions market.**

To mature from reactive to proactive climate risk management, corporations will need the following:

- **Improved access to climate data, earth observation and sensor data** to identify and monitor climate risk
- **Support identifying adaptation options and access to financial tools**, including identifying novel technologies and nature-based solutions, and tools to calculate the ROI of adaptation measures
- **Enhanced physical risk reduction solutions** for floods, water scarcity, extreme heat, and wildfire impacts on physical assets, workforce and local infrastructure
- A broader set of **financial risk transfer solutions** as a stopgap for unavoidable risks
- **Support identifying opportunities to innovate** to grow revenue through new A&R products and lower costs of climate risk management



Source: EIB 2024, EDHEC 2024, S&P 2023

SUPPLY OVERVIEW

Adaptation Startup Landscape

Tailwind

Pure play adaptation startups make up 12% of all climate tech startups but receive only 3% of the funding, USD4.5 B.

Tailwind partnered with Vibrant Data Labs to train an AI model to identify A&R startups and map them to the Tailwind Taxonomy. This effort allowed us to develop the **first detailed analysis of investment trends and bright spots for A&R in the startup ecosystem** by sector and funding stage over time.

Pure play A&R ('Adaptation') startups make up 12% of all funded climate tech startups, but receive only 3% of total funding, USD4.5 B total.

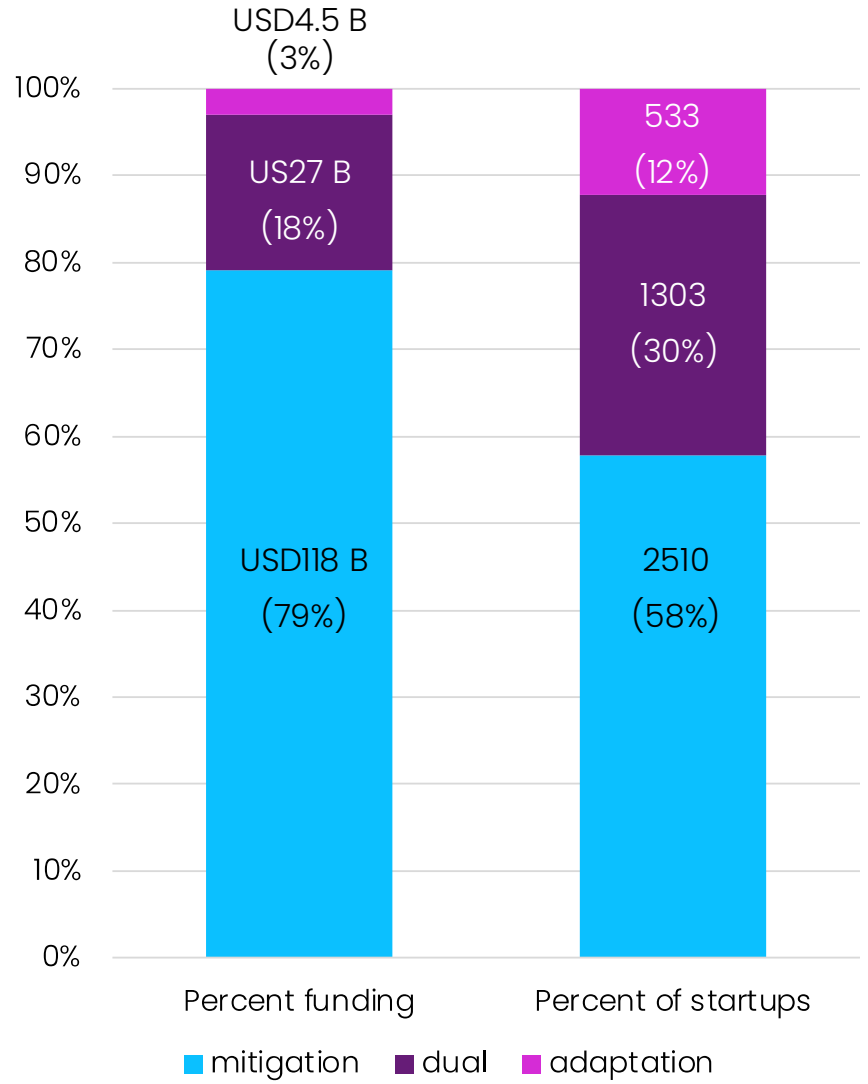
→ Adaptation startups include technologies that support climate risk and resilience activities but have little or no mitigation benefits, like climate risk analytics, insurance, disaster preparedness and recovery, flood prevention and mitigation, human cooling technologies, etc.

However, many mitigation startups also have adaptation co-benefits.

→These include very active sectors within the climate tech ecosystems, such as food and ag tech, grid resilience and microgrids, and energy and water efficiency.

Dual benefit startups constitute 30%of all climate tech startups, and receive 18% of total funding, USD27 B.

All in all, we find **42% of climate tech startups have A&R benefits,** even if it's not their primary focus.



VIBRANT DATA LABS

Source: Data from Crunchbase. Analysis and charts by Tailwind and Vibrant Data Labs.

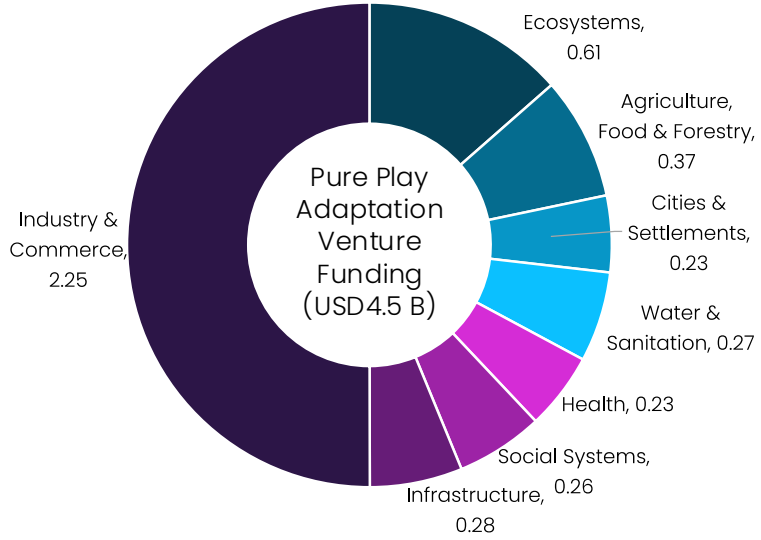
Startup Growth Trends

Tailwind

Water infrastructure and IT dominate pure play. Agriculture, forestry, and food dominate dual.

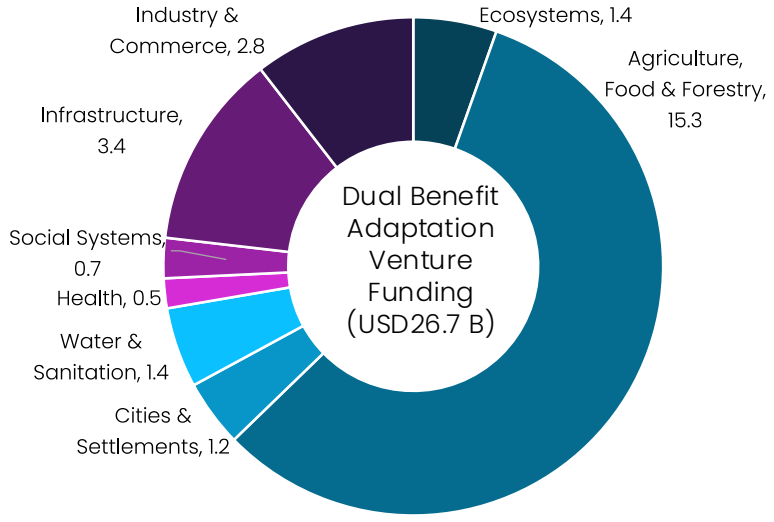
Pure Play Adaptation Trends

- **Industry & Commerce** makes up 50% of investments in pure play A&R startups (USD2.25 B). This includes climate risk analytics, earth observation, sensors and AI/digital solutions, as well as industrial tech, insuretech, fintech and construction tech.
- **Ecosystems** is the second most active sector, with USD610 M of investments in firetech, water management and oceantech.
- 71% of venture investments into adaptation companies go into digital solutions, AI and earth observation solutions, with les than 16% in physical risk reductions.



Dual Adaptation + Mitigation Trends

- Dual benefit startups received USD26.7 B in funding over 2019-2018, almost 6 times more than pure play adaptation companies.
- **Agriculture, Food and Forestry** dominate this category, due to a very active ecosystem in ag and food tech. Here we include regenerative ag, indoor farming, alternative proteins and smart irrigation.
- **Grid resilience** (Infrastructure), Manufacturing (which includes **industrial energy and water efficiency**), and Water & Sanitation also received substantial funding.



Supply: Technologies

Tailwind

Funding for pure play A&R goes overwhelmingly to software and data solutions.

We sorted pure play A&R startups in four categories:

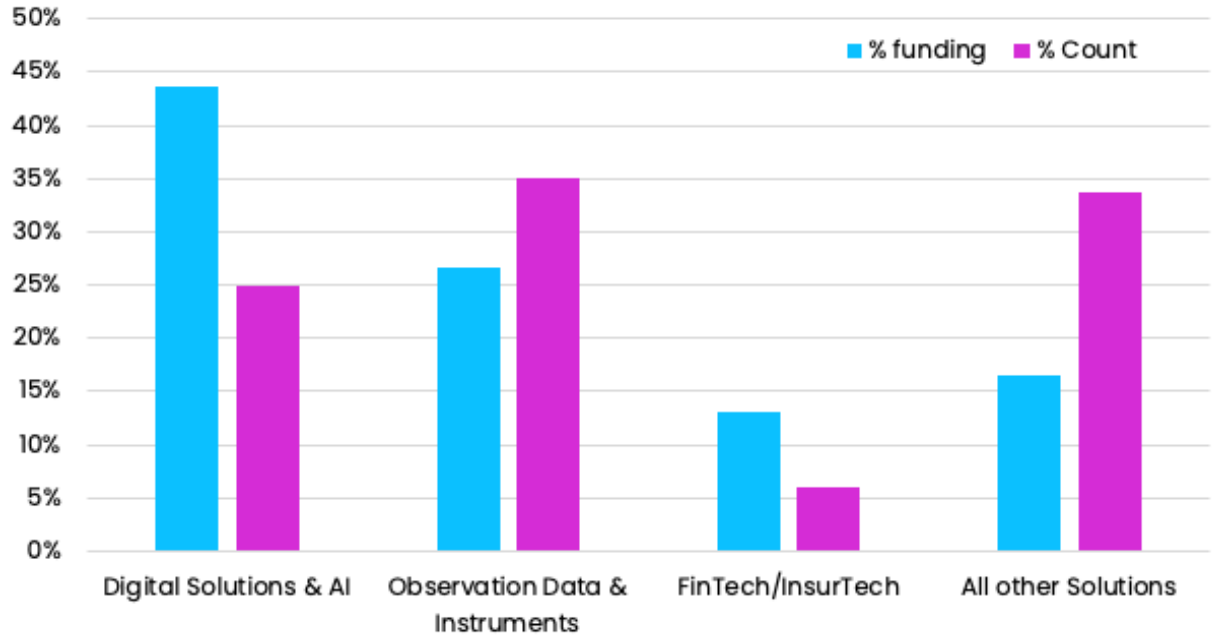
- **Digital Solutions & AI**
- **Earth Observation & Sensors**: Including mixed hardware/software solutions including satellites, drones, sensors, wearables, and IoT
- **FinTech/Insuretech**
- **All Other Solutions**: Including physical risk reduction technologies (e.g. materials, equipment, medications, filters, etc.) and non-financial services

Investments overwhelmingly go towards Digital Solutions & AI (44%) and Earth Observation & Sensors (27%). The latter includes a hardware component (satellites, drones, or sensors), but the value resides primarily in the data and insights generated. Both categories are key enablers of A&R - for risk identification, detection, to prevention and early warning systems.

In contrast, **only 16% of investments are directed towards physical risk reduction products and services**, even though one third of the companies are in this space. Hardware investments are frequently more challenging for VCs given their longer time to commercial maturity, but the nature of climate impacts calls for products that physically mitigate risks. Increased funding in this category will be needed.

FinTech/InsurTech receives a relatively greater proportion of funding compared to the volume of startups, but very few startups are in this space yet, despite the massive needs in the insurance sector.

Software v. Hardware Investments in Pure Play A&R



VIBRANT DATA LABS

Source: Data from Crunchbase. Analysis and charts by Tailwind and Vibrant Data Labs.

Supply: Successful Business Models

Tailwind

A&R startups often rely on creative sales channels to overcome challenges with limited customer budget, lack of awareness or buyers' procurement constraints.

Lesson 1: Product benefits sell (…not adaptation itself).
Customers are interested not necessarily on being 'more resilient' but in the benefits of A&R products such as the following:

Food & Water Access	Energy Reliability	Positive Health Outcomes	Reduced Business Risk	Positive Safety Outcomes

Lesson 2: The end user is not always the customer.
Target users or beneficiaries of an A&R solutions can be hard to reach, less inclined to try new solutions or not able to afford them.

Lesson 3: Innovation brokers and channel partners matter!
Reaching government, private sector, and consumer customers requires creativity and engagement with the right partners. B2G models are especially hard – working with partners experienced with public procurement and with the right technical expertise can open more doors. *Don't be afraid to be a subcontractor!*

Business Model	Example A&R Channels
B to **G**	Engineering firms, government contractors
B to **B**	Distributors, engineering firms, consultants, OEMs
B to **C**	Distributors (ex. home improvement), banks

Metalmark

Metalmark works with distributors and building system integrators to get their high performing air filter product into private and government HVAC systems.

Pano AI

Pano AI detects wildfires thanks to their cameras in remote areas. They sell their services to utilities, who provide the data to local fire departments, shortening the time to suppression for everyone's benefit.

NatrX

NatrX partners with engineering firms to integrate its novel bio-material into local governments' and corporate customers' coastal infrastructure projects.

Supply: Innovation Opportunities in Insurance

Tailwind

Insurance innovation is needed to both properly price risk, and finance risk reduction and adaptation solutions.

New insurance products (ex. micro, parametric insurance), new distribution mechanisms (ex. community-embedded insurance), and new financing approaches (ex. public and private financing) are starting to transform the insurance industry.

FloodFlash

FloodFlash offers a parametric flood insurance product that enables policyholders to leverage a claims-free process to recover from flooding.

Their process sets an agreed-upon trigger depth with their customers. When that level of flooding occurs, they use sensors to verify, allowing policyholders to receive an immediate payout.

Product

City of Isleton (CA) Flooding Initiative

Spearheaded by the CA Department of Insurance and funded by the CA Department of Water Resources, this community-based parametric flood insurance initiative allows for Isleton to, in the event of a flood of pre-determined depth, provide payouts to Isleton residents.

This program has been funded by a two-year, $200,000 grant.

Distribution

California Wildfire Fund

California's Wildfire Fund leverages public and private funds to address financial risks posed by utility-caused wildfires. The program helps cover claims from catastrophic fires linked to their equipment.

The program aims to ensure rapid compensation for victims while stabilizing utility finances and incentivizing utilities to invest in fire prevention and safety measures. It is funded through contributions from utilities, ratepayers, and the state.

Capital Stack

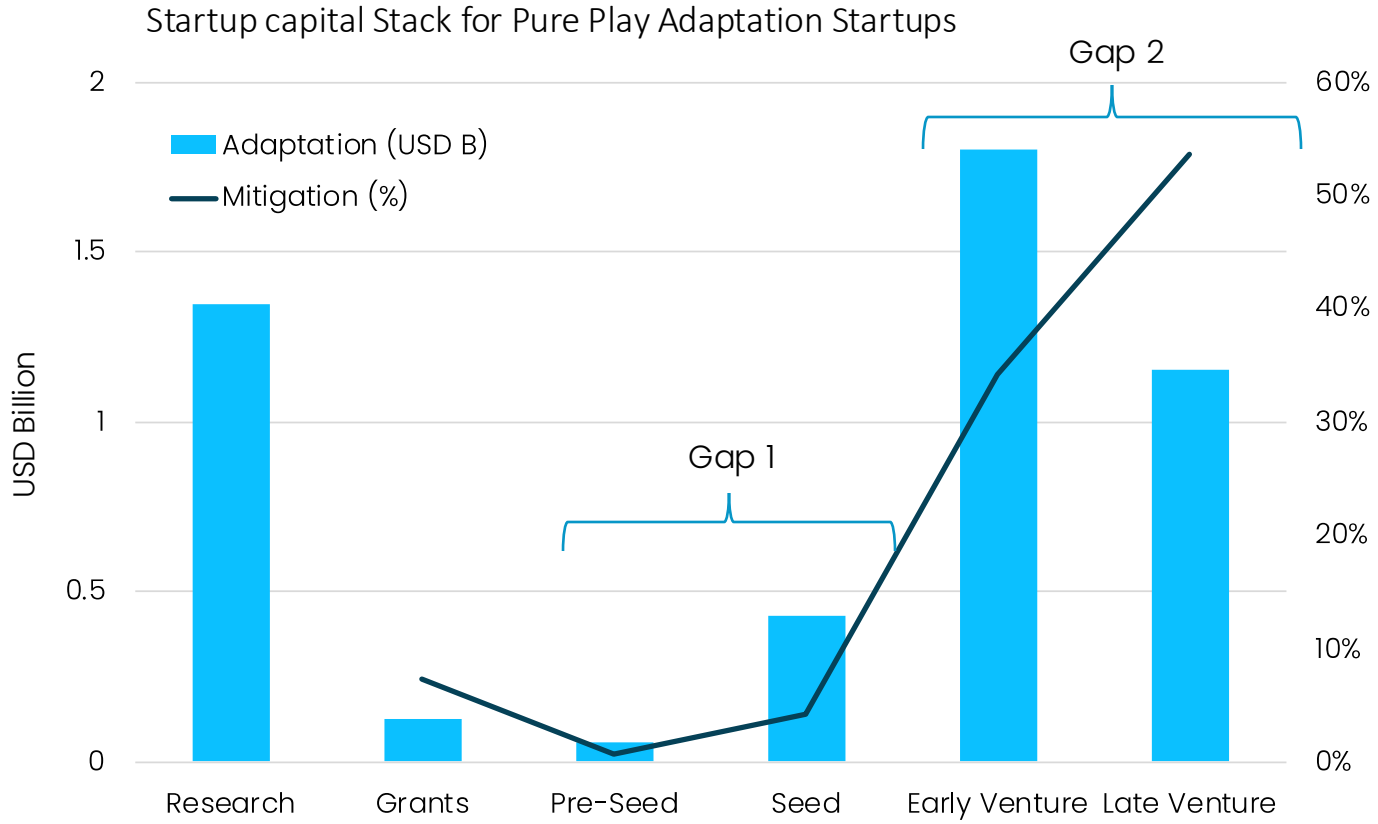
CAPITAL STACK OVERVIEW

Capital Stack: Startup Capital Needs

Tailwind

A&R innovation investment remains glaringly low for innovators at all stages, with a huge gap for startup formation (pre-seed) and product development (seed) and insufficient capital for all venture rounds.

Our findings on capital availability between 2019 and 2023 reveal that there is very little capital for innovators translating research into new businesses. Once products have been tested, venture funding can be hard to come by.



**Research dollars are for 2023 only, while funding stages numbers are cumulative for 2019-2023*
Percentages apply to the sum of equity rounds and grants, excluding debt.

Investment Trend Lines:

- **Capital Gap 1**: Like the initial capital gap in climate tech 1.0, we see a **dire need for more funds at the pre-seed and seed stages. This represents the most serious capital gap for A&R companies.**
- **Capital Gap 2**: While the early **venture and late venture** funds available trend upward from the pre-seed and seed funding gap, **they are relatively much smaller** compared to a 'healthy' capital stack, illustrated by the mitigation percent funding. Late-stage rounds are particularly limited.

VIBRANT DATA LABS

Source: Tailwind and Vibrant Data Labs analysis

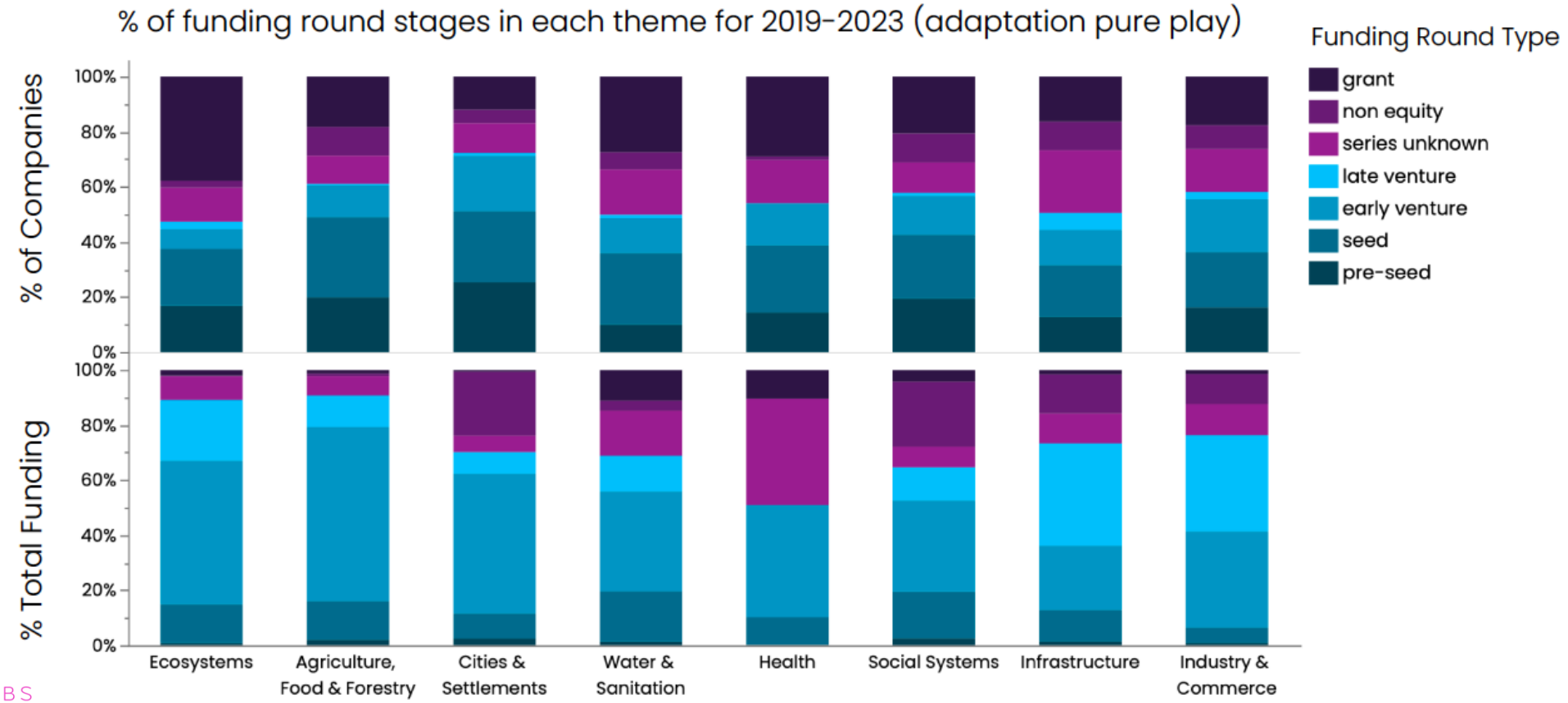
Capital Stack: Pure Play Startups

Tailwind

Pure play startups receive almost no late-stage venture funding, and seed capital is desperately lacking.

A closer look at funding by sectors and by stage for pure play startups shows similar trends. In particular:

- Insufficient grant funding for Cities & Settlements, Agriculture, Food & Forestry, and Infrastructure
- Insufficient early-stage venture capital available for Infrastructure
- Insufficient late-stage venture capital available for almost every theme but especially for Health, Cities & Settlements, Water & Sanitation, and Social Systems with some bright spots in Infrastructure and Industry & Commerce.



VIBRANT DATA LABS

Capital Stack: Top Pure Play A&R Investors

Tailwind

Specialized A&R VC funds are emerging with a focus on climate hazards (fire tech, water tech).

We reviewed the top investors and funders by number of pure play adaptation deals and found the following results:

Average median check sizes in this sample were USD4 M for private investors and USD319 K for public investors. The top 10 private investors have 21% pure play deals in their portfolios while public investors have 29%.

Top 10 Private Funders	Top 10 Public Funders
Convective Capital	National Science Foundation
Alumni Ventures	Department of Energy
Echo River Capital	Department of Agriculture
Mazarine Ventures	U.S. Environmental Protection Agency
MassVentures	NOAA
Gaingels	US Department of Commerce
Urban X	Maine Technology Institute
Sand Hill Angels	California Department of Food and Agriculture
Third Sphere	Small Business Innovation Research (SBIR)
Lowercarbon Capital	Massachusetts Clean Energy Center

Standouts

Over the last five years, several boutique firms focused on adaptation have emerged. The following two represent the firms with the highest % of adaptation deals (relative to portfolio size) in our study.

1. **Convective Capital**: Founded by Bill Clerico in 2022, Convective is a venture firm focused on investing in firetech with portfolio companies including Pano and Overstory.

2. **Mazarine Ventures**: Launched in 2018, Mazarine Ventures is focused on investing in early-stage technology companies with innovations that address risks relating to water and/or wastewater. Portfolio companies include Flume Water and WaterClick.

Capital Stack: Top Dual A&R Investors

Tailwind

Many climate tech funds are 'accidental' A&R investors, who hold portfolios with A&R benefits even if they are not explicitly a part of their investment theses.

We reviewed the top investors and funders by number of dual benefit A&R deals and found the following results: Average median check sizes in this sample were USD12 M for private investors and USD652 K for public investors. The top 10 private investors have 32% dual deals in their portfolios while public investors have 51%.

Top 10 Private	Top 10 Public Funders
SVG Ventures	National Science Foundation
Breakthrough Energy Ventures	Department of Energy
S2G Ventures	Department of Agriculture
Alumni Ventures	Maine Technology Institute
Cavallo Ventures	Massachusetts Clean Energy Center
Innova Memphis	California Department of Food and Agriculture
IndieBio	ARPA-E
Prelude Ventures	California Energy Commission
Lowercarbon Capital	Iowa Economic Development Authority
Fall Line Capital	New Jersey Economic Development Authority

Standouts

We found the standout private investors in this category with the highest % of dual deals in their portfolios were overwhelmingly focused on agriculture within their funds. Three of the top five were affiliated with a corporation.

SVG Ventures
- AUM: USD50 M - USD75 M
- Number of Investments: 215
- Portfolio focus: Agtech
- Strategic Investor?: Yes (Kagome Co. Ltd.)

Cavallo Ventures
- AUM: Unknown
- Number of Investments: 53
- Portfolio focus: Agtech
- Strategic Investor?: Yes (Wilbur—Ellis, Inc.)

S2G Ventures
- AUM: USD2 B+
- Number of Investments: 167
- Portfolio focus: Agtech
- Strategic investor?: No, but linked to the Walton Family / Walmart

Building Up the A&R Capital Stack

Tailwind

Public and private funders need to work in lockstep to increase funding across the capital stack.

To scale A&R companies, **we need more capital at every stage of startup funding, but especially at the pre-seed and seed stages**. Making sure sufficient pre-seed and seed stage funding exists will enable us to catalyze companies into subsequent venture stages. In the chart below we outline which funders we believe have a primary responsibility to fund at a given stage and which funders can help advise those funders.

Funder Type	Research & Development	Pre-Seed	Seed	Early Venture	Late Venture
Government	**Funding role** – Government is the largest funder of R&D and must continue to ramp up directed A&R R&D funding.	**Funding role** – Non-dilutive government grants are essential to A&R companies' growth. Public money for accelerators and incubators is essential.	**Consultative role** – Public funders have unique insights into what needs funding that can inform use of other types of capital and ensure long-term impact. The public sector is often also a buyer of A&R solutions, meaning they will fund projects as they exit the late venture stage. This makes private sector collaboration with government essential, as technologies scale.		
Philanthropic	**Consultative role** – Philanthropic funders have unique insights into what needs funding that can be used to inform use of public funds.	**Funding role** – Philanthropic funders can provide non-dilutive grants to catalyze companies and incubator or accelerator programs.	**Funding role** - Philanthropic capital has a critical role to play in the creation of impact and market rate funds investing in A&R.		
Private Investment	**Consultative role** – Private investors (especially those who may be eventual buyers) can advise R&D spending to maximize the venture's success.	**Consultative role** – Private investors can support public and philanthropic investors by providing insight into where private capital will and won't fund startups and programs.	**Funding role** – Private investors have the right resources and mandate to cover all venture phases of the capital stack.		

INNOVATION ROADMAP OVERVIEW

Recommendations: For Entrepreneurs

Tailwind

We need visionary founders to step up and ensure that adaptation companies are created to help humanity become resilient to climate change.

New companies are needed to make communities and the economy resilient to climate hazards. Here is what we need from the people who will build those companies:

1. **Focus on Hidden Gems and Blind Spots** – In this report we outline where there is high and mounting customer demand but not enough innovation and company creation happening. We encourage entrepreneurs to look at these places carefully and apply energy accordingly. For example:

Bright Spots = Places to improve on existing tech (medium need)	**Hidden Gems** = Places to create and scale new businesses (medium need)	**Blind Spots** = Places to create and scale new businesses (high need)
Ex. Improving upon existing indoor cooling technologies	Ex. Creating solutions that make ground transport resilient	Ex. Creating new solutions for post-disaster recovery

2. **Get Creative with Capital and Business Models** – As more money comes into this space to fill capital gaps, we encourage entrepreneurs to engage a broad coalition of capital partners and channel partners to fund product development and bridge the gap to customers. Look at what successful companies in this space are doing, then build your own path to market.

3. **Get the Right Help** – Whether its lining up customer discovery interviews with experts in a field unfamiliar to you or bringing in a policy expert to help understand sales to governments, we encourage founders to seek insight from those closest to the problem you're trying to solve. This includes engaging communities to make sure what you are building for people will be effective and accessible to them.

ES: Innovation Roadmap

Tailwind

Across the adaptation space, there are many opportunities for innovators to develop solutions to meet existing and mounting customer demand.

Bright Spots

Water Infrastructure: Solutions enabling efficient water sourcing, distribution, utilization, and enabling resilient sanitation infrastructure.

Agriculture, Forestry & Food: Solutions driving the resilience of crop production, livestock production, forest products, and food systems.

Infrastructure (Electric): Solutions enabling grid resilience and reliability as well as solutions enabling power reliability.

Infrastructure (ICT), Industry: Solutions such as risk analytics, modeling and insurtech startups dominate these categories.

Cities & Settlements: Solutions enabling building cooling and thermal efficiency.

Dimension	Rating
Demand	High
# Active Startups	High
$ VC Invested	High
# Acquisitions / Exits	High

Hidden Gems

Cities & Settlements: Flood tech solutions for buildings, coastal resilience solutions, and other building hardening solutions.

Infrastructure (Transportation): Solutions that can enable the resilience of ground, maritime, and air transportation assets and systems.

Industry: Insurtech and climate risk intelligence solutions for real estate and corporations with at-risk physical assets.

Agriculture, Forestry & Food: Solutions that improve soil and microenvironmental health.

Ecosystems: Solutions for wildfire prevention, detection and suppression. Nature-based solutions for flood management and shorelines.

Dimension	Rating
Demand	High
# Active Startups	Med
$ VC Invested	Low
# Acquisitions / Exits	Low

Blind Spots

Health:

- Solutions to predict, prevent and treat respiratory, cardiovascular, and other negative health-related outcomes to heat, fire, and other climate hazards.
- Solutions to predict, alert, and track disease transmission of vector and waterborne illnesses.
- Solutions for body cooling (such as wearables and cool patches).

Social Systems: Early warning systems and solutions for post-disaster recovery. Temporary shelters and pre-fabricated / resilient housing.

Water Infrastructure: Solutions to enable air water capture and water access in areas of drought.

Dimension	Rating
Demand	High (latent)
# Active Startups	Low
$ VC Invested	Low
# Acquisitions / Exits	Low

Recommendations: For Corporations

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Corporations need to invest in risk reduction solutions for themselves and the communities where they operate.

Corporations hold massive risk related to climate change that threatens to upend business as usual in many industries. We think about opportunities for corporations in two major buckets: 1) What are you doing to **protect your business** from climate hazards? 2) What are you doing to **remain competitive** in a world that needs adaptation and resilience products and services? Here is our advice on these 2 fronts:

<table>
<tr><th>Protect Your Business</th><th>Remain Competitive</th></tr>
<tr><td>Make sure you have a climate adaptation and resilience plan within your business informed by a quantitative risk assessment, estimates of costs, and risk mitigation measures.</td><td>Join the 827 publicly traded companies developing their own adaptation products for their customers. Leverage internal innovation resources to make this happen.</td></tr>
<tr><td rowspan="2">Invest in physical risk reduction solutions and enhanced insurance coverage for your assets and operations, as well as for your workforce, local infrastructure and your broader value chain.</td><td>Engage in external innovation to find adaptation technology providers who can work with you to build new solutions and improve your existing technology offerings.</td></tr>
<tr><td>Invest in adaptation solutions relevant to your industry so you can take advantage of this growing market while growing the success of strategic investment activities.</td></tr>
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Recommendations: For Funders

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We need visionary funders to step up and ensure that the programs and funding exist to make the necessary adaptation innovation and impact possible.

The data is clear, we need more capital going into adaptation and resilience companies, especially the ones translating research into businesses and building products at the earliest stages. Our 'Building up the A&R Capital Stack' slide lays it out, but here is the summary of what we think different funders can do to grow this space.

All Funders

- We need more sector-focused **accelerators and incubators**. These programs de-risk capital by making it more likely that companies succeed and make it to their next funding source. Funders can come together across capital types to support these programs.
- We also need better **tools for measuring the impact** of solutions in this space, establishing **clear metrics frameworks** for the private sector, and making sure they avoid **maladaptation** outcomes.

Recommendations to Funders by Capital Gap:

Capital Gap	Necessary interventions
#1: Pre-Seed to Seed	We need **philanthropy** and **government** to provide grants and concessionary capital vehicles to pre-seed and seed stage companies.
#2: Early Venture to Late Venture	We need **private investors** to a) increase ambition in this space, and b) increase capital allocation to adaptation companies.

Recommendations: For Policymakers (1/2)

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We need the public sector to step in and provide funding that can start and scale climate adaptation solutions to protect both communities and the economy.

Regulation

We need robust policies and plans to enshrine resilience and adaptation goals into law. This is the most direct way to ensure the protection of communities and the economy and to ensure that climate adaptation innovation will be funded by the public sector. Here are a few examples of policies we'd like to see at each level of government that could stimulate the climate adaptation innovation ecosystem.

- **Global:** We need a 'First Movers Coalition' type initiative for adaptation and resilience to bring the private sector together to fund A&R innovation.
- **Federal:** We need a National Adaptation Plan and a whole-of-government approach to tackling climate hazards.
- **State:** We need all states to have robust adaptation and resilience plans and plans for individual hazards where needed (such as heat, fire, flooding, etc.).
- **City:** We need cities to pass local policies that ensure adaptation and resilience action and funding.

Standards and Definitions

We need governments to work with and guide the private sector by defining standards for what good adaptation solutions should look like and how they should be evaluated:

- **Definitions:** We need standard definitions and taxonomies for climate resilience and adaptation solutions integrated into policies and funding programs.
- **Metrics:** We need funding and consensus building on metrics and measurement approaches to evaluate solutions' impacts.
- **Climate Risk Standards:** We need best practices and standards for climate risk assessment and modeling.
- **Maladaptation Guidance:** We need requirements in public programs that ensure adaptation projects are designed and executed in a way that minimizes maladaptive impacts.
- **Insights into Community Needs:** We need publicly available data that gives insights into which communities are most acutely impacted by climate hazards. We also need clear community engagement standards for government contractors.

Recommendations: For Policymakers (2/2)

Tailwind

We need the public sector to step in and provide funding that can start and scale climate adaptation solutions to protect both communities and the economy.

Publicly-Funded Research and Innovation Funding Programs

National, State, and City governments all play a role in funding innovation. The following types of publicly-funded resilience innovation programs are sorely needed in most places. These programs include:

(1) **Research Grants**: Funding university research that stimulates more innovative A&R solutions that can become companies.

(2) **Entrepreneurial Fellowships:** Funding programs that help researchers found companies and translate science out of the lab

(3) **Accelerators and Incubators:** Funding innovation programs that help researchers translate research into new A&R companies and validate potential product designs, value propositions, and business models.

(4) **Company Grants and Investments:** Funding pre-seed and seed-stage companies with both grant-based and investment-based funding vehicles. Funding venture stage and project stage companies through green banks and other economic development programs.

(5) **Piloting Programs and Demonstration Sites**: Funding programs and sites that allow A&R companies to test their solutions in the real world and collect data on their performance.

Example Public Sector Innovation Programs

The following publicly-funded climate innovation programs are examples of programs that, while currently mitigation-focused, could be effective at scaling adaptation solutions.

Funder	Program(s)
MassCEC	Catalyst, AmplifyMass, IncubateMass
ARPA-E	SCALEUP Program
US Navy	Elemental Impact Accelerator
US DOE	Activate Fellowship

ES: Enablers of Change

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There are a few enablers of change we think are important for A&R companies to consider as they grow. These elements can play a big role in whether companies achieve the impact they seek.

Ecosystem programs remain few and far between for climate adaptation companies. There are only a handful of A&R-focused accelerator and incubator programs (11) in contrast with 150+ mitigation/decarbonization-focused programs. **The ecosystem needs more programs supporting A&R entrepreneurs to scale.**

Measuring the impact of adaptation companies remains a challenge. There is no "one-size-fits-all" adaptation measurement framework or metric (akin to net zero), but numerous metrics already exist for measuring the success of an A&R solution. **Consensus on which metrics matter most and how best to measure success locally is critical to driving impact.**

Policies and regulatory frameworks are missing to incentivize adaptation solutions. We need more explicit incentives, financing programs, and adaptation mandates from subnational and national governments if we want to see a robust climate adaptation innovation sector that equips governments with the solutions needed to protect society and the economy. **Work must be done to define adaptation and adaptation spending as a priority across governments.**

Avoiding maladaptation is essential so solutions do not unintentionally increase vulnerability to climate change or make a system more susceptible to climate-related risks. These risks include increased emissions, social vulnerability, ecosystem damage, and financial inequality. **Investors and solutions providers need tools and best practices to manage maladaptation risks and engage communities where these risks are most pronounced.**

Q&A

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Tailwind

Building a Resilient Future

Emilie Mazzacurati
+1.415.420.0074
emilie@tailwindclimate.com

Katie MacDonald
+1.339.927.1543
katie@tailwindclimate.com

www.tailwindclimate.com
www.tailwindclimate.com/playbook