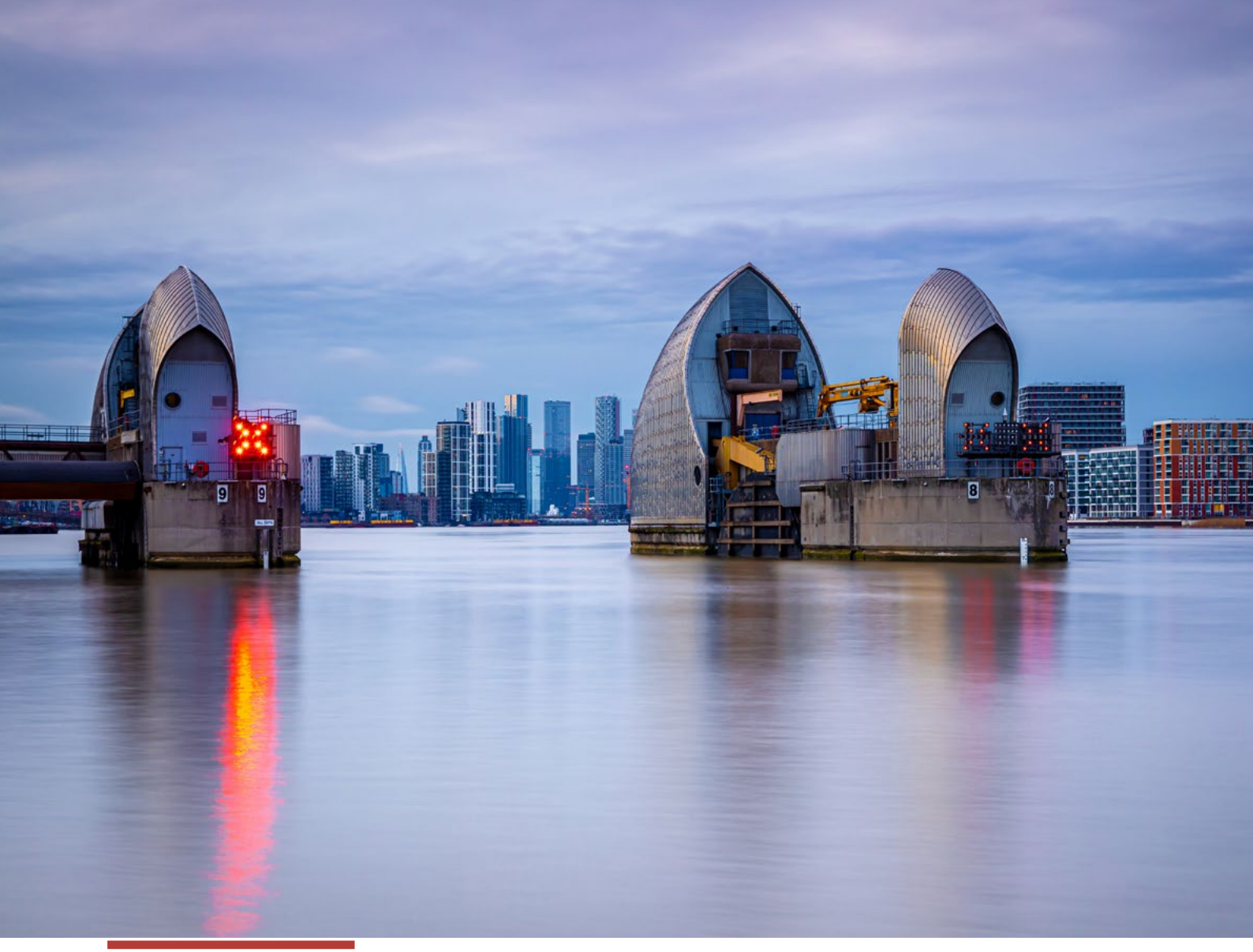

# Tracking and Mobilizing Private Sector Climate Adaptation Finance

September 2024

CLIMATE POLICY INITIATIVE

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# ABOUT CPI

CPI is an analysis and advisory organization with deep expertise in finance and policy. Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. CPI has seven offices around the world in Brazil, India, Indonesia, South Africa, the United Kingdom, and the United States.

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# EXECUTIVE SUMMARY

CPI has developed a methodological and data approach to improve tracking of private sector adaptation finance. These efforts have increased private adaptation finance tracked by more than four times from the approximately USD 1 billion previously tracked in CPI's Global Landscape of Climate Finance (GLCF) on average annually for the period 2019 to 2022 for the same set of private sector institutions. By applying the new methodology – including a bespoke taxonomy for identifying adaptation-relevant private finance – the tracking in this report now captures annual average flows of USD 4.7 billion from the private sector to adaptation-relevant activities. [1]

Unlike public actors, who are increasingly expected to report on adaptation finance, there is no mandatory reporting mechanism around adaptation and resilience (A&R) for private actors. Though some have signed up to reporting frameworks concerning decarbonization and net zero (such as CDP and GRESB), no such framework exists for adaptation or for investment in climate solutions writ large.

The lack of data on private adaptation finance yields significant uncertainty regarding progress on addressing climate vulnerabilities and leaves public and private decision makers without critical information on where they should target existing and additional investments. **Limited data and reporting on private adaptation finance also reinforce the common narrative on the scarcity of viable business models for adaptation.** Public finance is critical, but if adaptation is framed solely as a public issue, we risk missing the tremendous potential of the private sector to mobilize the levels of capital required to meet global adaptation investment needs.

Informed by this gap, the work represented in this report has two central goals:

1. **To develop a taxonomy for private adaptation finance tracking** that is comprehensive, descriptive, and in harmony with wider efforts in the community, building upon existing attempts to define and classify adaptation finance in both a public and private context. The objective of this work is to structure the taxonomy so that it can be increasingly incorporated into CPI's existing tracking of climate finance, including the GLCF.
2. **To build a machine learning model and dataset that expand the scope of trackable private adaptation finance.** The model (which is ultimately intended to be open source) will allow CPI—and ideally the broader community, including policymakers and capital allocators in the private sector—to more readily assess the adaptation relevance of investments. The dataset builds upon prior adaptation finance tracking approaches, with the inclusion of additional data sources and the application of machine learning tools to efficiently and accurately categorize finance flows according to the taxonomy developed.

1 CPI's global climate finance tracking methodology prioritizes primary data on project-level investment due to its relevance to impact on the real economy.

## GOAL 1: TAXONOMY DEVELOPMENT

Given existing taxonomies' limited applicability to private adaptation finance tracking, we developed new criteria for this tracking exercise. We classified flows as adaptation finance if they went to an activity that met all of the following criteria:

1. The activity's end users or beneficiaries (people, assets, etc.) are located in a setting with material physical climate risks/impacts.
2. The activity materially reduces physical climate risks to the project or investment in which the activity occurs, materially reduces physical climate risk in other economic activities, or addresses systemic barriers to adaptation.
3. The contribution to adaptation—i.e., adaptation-related outcomes—can be defined and qualitatively and/or quantitatively measured.
4. The activity adopts the best available knowledge to provide solutions that do not lead to maladaptation of the direct user or the system in which the user operates and that manage against significant harm to other social and environmental objectives.

In order to apply these criteria, we developed an adaptation taxonomy that can be used to track private adaptation finance. It classifies climate adaptation activities according to a set of seven themes which are derived from the adaptation taxonomies developed by Tailwind and Climate Bonds Initiative (CBI) and are modified for the purpose of tracking financial flows. The intention here is to develop a consistent approach to identifying adaptation finance flows for private actors.

Within each theme, the taxonomy identifies a set of adaptation sectors, subsectors, and activities. The activities are intended to be: (a) collectively exhaustive of all the adaptation activities that would potentially receive trackable private financing and (b) mutually exclusive to the greatest extent possible. The taxonomy is a living document that is open to revisions in structure as well as the addition of missing sectors, subsectors, or activities.

The taxonomy tags each activity (165 activities in the September 2024 release) with the following elements:

**Table 1:** Taxonomy Elements

| Topic | Purpose |
|---|---|
| Secondary Theme | While each activity is allocated to a single primary theme in the taxonomy, those that could reasonably belong to an alternative are assigned a secondary theme. |
| Activity Type | Each activity is classified as either (a) a product or service, (b) an enabling activity, or (c) intelligence. |
| Adaptation Likelihood | This indicator describes our confidence that any project matched to the given taxonomy activity could be considered an adaptation effort without further context. We categorize this likelihood on a three-point scale of low, medium, or high. |
| Maladaptation or Significant Harm Risk | Identifies if an activity has a high potential of either: (a) being considered maladaptive or b) causing significant harm to other social and environmental objectives, even when minimum compliance and industry standards are followed. |

| Topic | Purpose |
|---|---|
| Cities Relevance | Corresponds to any activity that significantly enhances cities' adaptive capacity and resilience to climate-related risks. Activities are included if they are usually located within city boundaries or aim to address a climate risk faced by cities. |
| Gender Relevance | Corresponds to any activity that significantly and disproportionately benefits women or other marginalized genders. Almost all activities can be implemented in a way that is gender-responsive, but the tagging of gender relevance is intended to identify activities that nearly always contribute to gender equity. |
| Mitigation Co-Benefit | Corresponds to any activity that directly and significantly reduces the potential release of greenhouse gas (GHG) emissions (e.g., wildfire management) or directly captures existing GHG emissions (e.g., resilient soil management). |
| Climate Hazards | Corresponds to the hazards that an activity either directly or indirectly addresses. Associating each activity with the climate hazard it is addressing will allow taxonomy users, including CPI, to comment upon the relative financial flows mitigating each risk, as well as providing important information for assessing adaptation relevance. |
| Private Actors | The taxonomy associates each activity with the private actors that are likely to significantly contribute to its investment. This will facilitate more efficient data collection, as the assessment will allow CPI to narrow the range of data sources investigated for each activity. |

## GOAL 2: MACHINE LEARNING MODEL DEVELOPMENT AND EXPANSION OF A DATASET OF PRIVATE ADAPTATION FINANCE FLOWS

Informed by the structure provided by the taxonomy, the process for creating the private adaptation finance data followed a five-step approach:

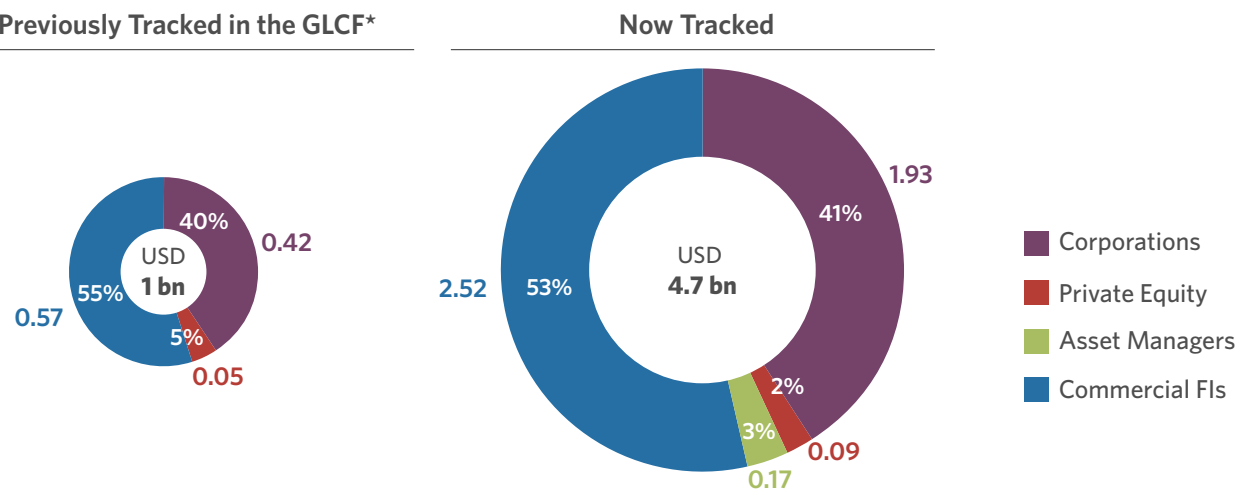
- **Step 1: Data Scoping.** Available data sources are identified based on various criteria such as theme, activity, and actor type. This stage focuses on collecting comprehensive data, including direct financing information, aggregated market data for specific products, and corporate A&R policies.
- **Step 2: Data Collection.** Data is prioritized by its importance and the scale of investment it represents. The collection involves ingesting raw data, which can be obtained through data sharing agreements, direct downloads, or web scraping.
- **Step 3: Data Tagging.** Following collection, a subset of this data is tagged according to a taxonomy to facilitate model training, a process referred to as Data Tagging.
- **Step 4a: Classification Model Development.** The tagged data then feeds into the Classification Model Development stage, where a machine learning model is developed to classify projects, companies, and funds according to the CPI private adaptation taxonomy.
- **Step 4b: Data Processing.** Simultaneous with model development, data processing involves standardizing and combining data from all sources to create a uniform dataset, including adaptation activity attribution. Upon completion of processing data sources into a cohesive dataset, the classification model is applied over project names and descriptions to classify projects according to the CPI adaptation taxonomy.
- **Step 5: Data Analysis.** Finally, the processed and standardized data is analyzed in the Data Analysis stage, which focuses on examining the private adaptation finance dataset to extract insights, trends, or other valuable information.

We followed this approach to evaluate climate adaptation finance flows from the seven private institution types we evaluate as most likely to be financing adaptation given their ubiquity in

the financial markets, engagement with one another, and exposure to climate risk. While these institutions do engage with one another and while capital flows between institution types, the analysis in this report is conducted at the institution level in order to more coherently assess each institution's involvement in adaptation finance.

The private sector actors involved in adaptation finance we consider for this work are: commercial banks, asset managers, private equity (PE) / venture capital (VC) firms, pension funds, insurers, corporations, and households and consumers. Through the methodological and data work represented in this analysis, **we have increased the annual average tracked private adaptation finance for the period of 2019 to 2022 from our prior finding of USD 1.0 billion to USD 4.7 billion.** The most substantial improvements in tracking have come from data on asset managers, commercial FIs, individuals [consumers] and households, and corporations. Figure 1 summarizes the advancement in tracking achieved in this analysis.

**Figure 1:** Private Adaptation Finance as Tracked in the GLCF and in this Report and Extrapolative Analysis of Untracked Finance (annual average 2019-2022)




*excluding Philanthropy

***Consumers and Households:*** *Tracked (in Section 4.2.7) but not aggregated as not project level data.*
***Venture Capital:*** *Tracked (in Section 4.2.3) but not aggregated as not project level data.*

### Extrapolative Untracked Private Finance: Unknown Amount

**1. Asset Managers**

We now track USD 165 million annually at project level, likely a significant underestimate.

**2. Commercial FIs**

We now track USD 2.52 billion annually at project level, which is likely close to accurate order of magnitude at project-level but is missing enterprise-level and intermediated finance.

**3. Consumers and Households**

No finance tracked at the project level, USD 48-61 billion (high likelihood adaptation) at transaction-level. Likely close to accurate order of magnitude at transaction-level.

**4. Corporations**

We now track USD 1.93 billion annually at project level, likely a moderate underestimate missing especially indirect corporate investment in supply chains, infrastructure upgrades, and internal process innovation.

**5. Insurance**

None tracked – significant gap. Without detailed reporting on coverage or investment of institutional capital, it remains difficult to gauge the extent of insurers' current contribution.

**6. Pension Funds**

None tracked – significant gap. True scale of involvement is difficult to assess from the current data environment (in the context of USD 47.9 trillion in pension assets across the major 22 pension markets in 2023).

**7. Private Equity/Venture Capital**

Now tracked USD 92 million annually project level and USD 6.3 billion annually in venture-level investment. Likely significant underestimate of project-level PE investment and moderate underestimate of venture-level VC investment.

Under the new approach, for the first time, tracked adaptation finance from the private sector can also be disaggregated by the likelihood of adaptation relevance. We find that 5% of finance tracked has a high likelihood of being adaptation-relevant (per the approach described in Section 3.1.3), 79% has a medium likelihood, and 16% has a low likelihood. We also find that a total of 27% of tracked finance holds potential for maladaptation or significant harm risk (described in Section 3.1.4), fairly proportionately distributed across the likelihood of adaptation relevance.

As noted in Figure 1, even with the advancement made in this report, significant gaps remain in tracking private adaptation finance, and a handful of institutions—most notably insurers and pension funds—remain very difficult to track. The most significant data tracking challenge for each institution is captured below.

1. **Asset Managers:** Difficulty in scoping and collecting data on asset manager investments in companies and linking that investment to the climate adaptation contribution of companies.
2. **Commercial FIs:** Difficulty collecting data on corporate lending (and associated opacity of activities of recipient corporations).
3. **Consumers and Households:** Because of the nature of consumer and household expenditures, aggregate project-level data collection is very difficult. Thus, non-project-based market size estimates are critical, but this type of data is challenging to validate and often prohibitively expensive to acquire.
4. **Corporations:** Lack of transparency on climate adaptation-relevant activities funded via corporate capital raising, management, and deployment.
5. **Insurance:** There is very limited reporting on capital allocated from insurers in their role as major institutional investors towards e.g., climate-resilient infrastructure, water management, and other adaptation-related projects.
6. **Pension Funds:** Difficulty scoping and collecting any data on pension fund investments to link that investment to the climate adaptation contribution of activities or enterprises financed.
7. **PE/VC:** There is a lack of available data on VC in emerging markets and developing economies (EMDEs) (most notably China, given the likely magnitude of flows).

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# 1. INTRODUCTION

Adaptation finance tracked in the Global Landscape of Climate Finance (GLCF) in 2023 reached an all-time high of USD 63 billion annual average for 2021/22, growing 28% from the annual average in 2019/20. This growth still falls far short of the estimated needs for adaptation of USD 212 billion per year by 2030 for developing economies alone. Public actors dominate tracked adaptation finance: private sector adaptation finance tracked by CPI is approximately USD 1.5 billion, only 1.5% of the total USD 63 billion in tracked adaptation finance in 2021/22 on annual average. The actual amount of private sector investment in adaptation is likely significantly higher than the finance captured within CPI's tracking work. Severely limited reporting of private sector adaptation finance creates significant challenges in tracking overall adaptation flows.

No climate adaptation finance tracking effort to date has successfully captured aggregate investment in the following categories: adaptation-focused SMEs; finance from private equity (PE) / venture capital (VC) firms to adaptation-related early-stage companies; insurance premiums that incentivize resilient construction; consumer spending on adaptation solutions and technologies; or corporate balance sheet finance for adaptation of corporate assets. As discussed in Section 4.1 Summary of Findings, these underreported categories are of special interest because there is anecdotal evidence that they attract adaptation finance, but no systematized method of tracking their financial flows.

The lack of available data on private sector adaptation finance yields significant uncertainty regarding current progress on addressing climate vulnerabilities and leaves public and private decision makers without critical information about where to target investment. **Limited data and reporting on private sector adaptation finance also reinforce the common narrative that there are limited or no viable business models for adaptation.** Public finance is critical, but if adaptation is framed as a public finance issue alone, we risk missing the potential to mobilize the private capital required to meet adaptation investment needs.

The limitations of tracking adaptation finance stem from its highly heterogeneous nature, which yields the following challenges:

- **Context dependency**, where an investment's classification as adaptation finance is partly dependent on the local climate vulnerability context. This contrasts with the tracking of mitigation finance, which is largely agnostic to the climate vulnerability of the geography in which it is deployed.
- **A lack of standards and reporting requirements** means that private actors are not incentivized (via regulation or public demand) to report adaptation finance and may not have the tools or capacity to identify it as such.

Private sector companies do not currently identify their investments as "adaptation." Those who invest in adaptation often do so without explicit climate-related intent, through revenue-oriented activities such as lowering water costs, reducing crop loss from heat, and mitigating disaster-related losses. As a result, applying public sector approaches to adaptation tracking (discussed in Section 4) is virtually impossible for private actors. This is because public sector approaches have a process-based approach that typically requires both the identification of climate risks and a statement of intent for a project to be considered adaptation.

In the absence of a central definition, this work defines private climate adaptation finance as financial flows to activities that aim to either:

(a) Directly reduce the physical risks posed by climate change (i.e., climate risks such as heat-resistant crops); or

(b) Enable systems and people to better respond to those physical risks (e.g., through parametric crop insurance).[2]

Given the importance of accurate tracking of private sector adaptation finance and the challenges in doing so outlined above, the work represented in this report has two goals:

1. **Develop a taxonomy for private adaptation finance tracking** that is comprehensive, descriptive, and in harmony with wider efforts in the community, building upon existing attempts to define and classify adaptation finance in both a public and private context. Structure the taxonomy so that it can be increasingly incorporated into CPI's existing tracking of climate finance—including the GLCF.

2. **To build a machine learning model and dataset that expand the scope of trackable private adaptation finance.** The model (which is ultimately intended to be open source, via GitHub repository) will allow CPI—and ultimately the broader community, including policymakers and capital allocators in the private sector—to more readily assess the adaptation relevance of investments. The dataset builds upon prior adaptation finance tracking approaches, with the inclusion of additional data sources and the application of machine learning tools to efficiently and accurately categorize finance flows according to the taxonomy developed.

Until private actors are required to report on adaptation finance, tracking organizations—including CPI—must develop and test a broad range of methods for sensibly estimating and assessing private sector adaptation finance.

2 This definition of climate adaptation finance most closely follows that advanced by the MDBs in the Joint Methodology for Tracking Climate Change Adaptation Finance report (Joint MDB Working Group, 2021).

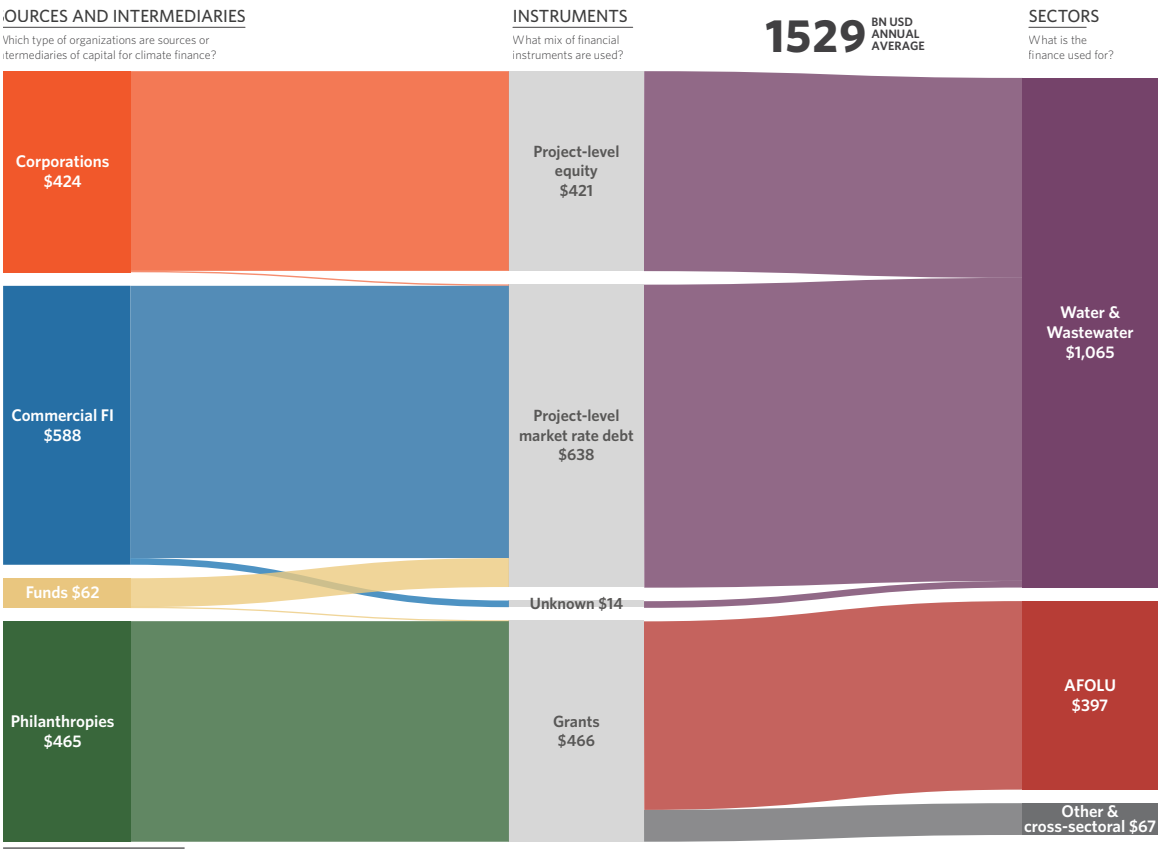
# 2. CONTEXT: ANALYTICAL AND METHODOLOGICAL UNDERPINNINGS

## 2.1 CPI'S CURRENT APPROACH: SUMMARY AND LIMITATIONS

According to CPI's tracking of global adaptation finance flows for over a decade through the GLCF, almost all tracked investments (98%) are, and have been, from public actors. Of the limited private capital tracked at the project level—a biennial average of USD 1.5 billion in 2021/22—commercial financial institutions (FIs) provided 38%, philanthropies 31%, corporations 28%, and private funds 3% (see Figure 2).[3] This limited pool of tracked private adaptation finance captured by the GLCF consists of: (i) Philanthropic grant funding to AFOLU (agriculture, forestry, and other land use) projects, as reported through the OECD-DAC climate finance database; and (ii) private commercial financing for water and wastewater-related projects.

Consistent with their mandate, some philanthropies channeled adaptation finance in the form of grants, almost all of which went to the AFOLU sector. The other private actors channeled their adaptation finance through project-level market rate debt (60%) and project-level equity (40%), exclusively to the water and wastewater sector. This latter pool of adaptation investments is largely for the construction and operation of desalination plants which tend to be cost intensive.

**Figure 2:** Overview of Tracked Private Adaptation Finance Flows (USD million, 2021–2022)




3 CPI's global climate finance tracking methodology prioritizes primary data on project-level investment due to its relevance to impact on the real economy.

Unlike public actors, which are increasingly expected to report their adaptation finance, there is no mandatory reporting mechanism around adaptation and resilience(A&R) for private actors. Though various private actors have signed up to reporting frameworks concerning decarbonization and net zero (such as CDP and GRESB), no such framework exists for adaptation or broader investment in climate solutions.

The lack of such an adaptation framework is largely due to the absence of universal outcome metrics for adaptation against which to measure and manage progress (unlike emissions reductions in the mitigation context). In an alternative scenario, regulators would mandate reporting on adaptation activities by the private sector, particularly activities of primary investment into A&R solutions. Failing that, third-party organizations like CPI must continue to devise robust and meaningful methodologies for identifying private adaptation finance using whatever data is available.

Recognizing the difficulties inherent to private sector adaptation finance tracking, we observed the following limitations in data collection due to a lack of standards and comparable data:

1. **Screening is based on limited project information:** The data sources from which adaptation finance could be extracted, such as the World Bank's PPI dataset or Green Bond post-issuance documentation, contain limited project-level descriptions. This makes it difficult to validate eligibility. Arguably, more substantive qualifying evidence should be used alongside these limited project descriptions for robust classification of adaptation finance. For example, it would be useful to validate whether each project is located in an area facing a particular climate risk and, in turn, whether that project is expected to alleviate that identified risk.
2. **Quantifying private adaptation finance is different from the approach taken by public actors:** Public actors often report the cost of a particular project component or sub-component as the adaptation finance embodied within their wider investment. This is known as the 'incremental' approach to quantifying adaptation finance. Other public actors will apply a set coefficient to the total investment cost, dependent upon whether adaptation was the primary or secondary objective of the project. This is known as the 'proportional' approach to quantifying adaptation finance.[4]

A primary goal of the data collection component in this assignment is to expand the limited pool of data sources and to develop a more sophisticated approach to capturing private adaptation finance. There is an opportunity to develop a distinct dataset and taxonomy for private adaptation finance which will allow CPI and others to provide a more nuanced assessment in subsequent climate finance tracking efforts and will facilitate stakeholders' advocacy efforts to improve incentives for labeling private adaptation finance.

4 For private data, the approach of CPI for the GLCF has been to take the full project investment cost of any project classified by CPI's Taxonomy as adaptation finance. This is because the exact project component or sub-component associated with adaptation is unknown from the limited project information. This likely leads to a moderate overestimation of private adaptation finance for the projects tracked. On the other hand, the large gap in the labeling of adaptation-relevant finance yields an underestimation of net private adaptation finance.

## 2.2 CURRENT TAXONOMIES AND REPORTING APPROACHES AND THEIR LIMITATIONS

At the moment, only public FIs have harmonized principles for mandated reporting on adaptation finance, jointly established by the International Development Finance Club (IDFC) and multilateral development banks (MDBs) in 2015 (MDBs & IDFC, 2023). Broadly, these principles stipulate that adaptation finance must be qualified by:

1. A context of climate risks, vulnerability, and impacts,
2. Clear intent to address such issues, and
3. Direct linkage between an investment's activities and the aforementioned context.

Where possible, self-reported public adaptation finance is further quantified based on a principle of "disaggregation"—that is, only financing that directly supports adaptation activities is included in reported amounts.

While all of these principles are incorporated into the adaptation tracking and reporting methodologies implemented by IDFC members, MDBs, and governmental bodies following OECD-DAC Rio Markers guidance,[5] the overall landscape of adaptation tracking remains fragmented. The IDFC principles lack sector-specific guidance and project-specific investment criteria. As a result, many FIs, especially private sector entities, do not directly follow these principles and instead rely on a fragmented landscape of adaptation investment frameworks[6] and taxonomies[7] to inform and qualify their investments.

A June 2024 study by Oxford University's Resilient Planet Finance Lab identified 36 unique adaptation investment frameworks, of which 26 were labeled as taxonomies (Spacey, et al., 2024). To some extent, these taxonomies build on the work of the IDFC and MDBs by offering sector-specific guidance and further adaptation evaluation criteria. For example, the EU Sustainable Investment Taxonomy helped mainstream the concepts of substantial contribution, do no significant harm, and minimum safeguards for adaptation taxonomies (EU Taxonomy, 2020).

However, these adaptation taxonomies and frameworks remain largely siloed, as illustrated in Table 2. Most do not include the same sectors, investment criteria, or evaluation standards and diverge in their classification of adaptation activities. Therefore, practices vary significantly at the institution level. In particular, the criteria used to assess the context of climate risks, vulnerability, and impacts of adaptation projects may vary across institutions and can differ even further due to differences in data accessibility and quality. A reason for this divergence among taxonomies and frameworks is differences in intended use cases which can include portfolio risk guidance, investment structuring, and financial flow tracking.

Similarly, how adaptation finance is disaggregated is also subject to institutional differences in access to project-level information linking finance to specific adaptation activities. Where

5 See OECD DAC Rio Markers for Climate for specific guidance.
6 Investment frameworks are sets of principles that help institutions direct and track their resources and achieve desired outcomes from their investments.
7 Taxonomies are classification systems used to organize a set of activities, objects, or other types of groupings. Adaptation taxonomies are usually normative and establish, either through a list or criteria, what should be considered as adaptation.

this information is lacking, institutions are instructed to use qualitative or experience-based assessments to implement conservative disaggregation.

The European Bank for Reconstruction and Development (EBRD), for example, categorizes adaptation projects as either "adapted" (i.e., direct management of climate risks) or "enabling" (i.e., indirect facilitation of climate risk management), and then assigns a percentage share of the project financing as adaptation finance based on a secondary qualitative assessment of how extensively project activities address climate risks (EBRD, 2023).

Efforts, such as Climate Bond Initiative's Resilience Taxonomy Advisory Group, intend to bring convergence to the adaptation taxonomy space (CBI, 2024). However, a lack of clear guidance from actors across the adaptation ecosystem prevents private sector actors from confidently understanding and reporting their adaptation activities, which inhibits most tracking efforts.

**Table 2:** Examples of Adaptation Taxonomies and Frameworks[8]

| Name | Type | Overview | Intended Purpose |
|---|---|---|---|
| EU Sustainable Investment Taxonomy | Taxonomy | Details economic activities that are aligned with a net zero trajectory and other environmental goals, including adaptation. | To guide high carbon-emitting sectors on issues such as adaptation (notably excludes agrifood systems). |
| Climate Resilience and Adaptation Financing Taxonomy (CRAFT) | Taxonomy | Offers a classification scheme to assess the adaptive nature of fiscal spending through a normative, three-point scale. | To track adaptation fiscal spending deployed in response to COVID-19. |
| The Tailwind Taxonomy | Taxonomy | Establishes a classification system for adaptation activities with sector-specific examples and key considerations for investments. | To guide philanthropic and early-stage capital providers on investing in adaptation projects. |
| Climate Bonds Initiative's Climate Resilience Principles | Investment Framework | Sets out guiding principles for resilience bond issuance and provides some sector-specific examples. | To guide the integration of adaptation criteria into the Climate Bonds Standard. |

## 2.3 DIFFERENTIATING THE CURRENT PUBLIC FI TRACKING APPROACH FROM PRIVATE TRACKING

Because private actors do not have a mandate to self-report adaptation investment,[9] private adaptation finance must be tracked by top-down methods through qualifying adaptation investments based on available information. While the principles followed by public FIs reporting on adaptation finance could be broadly applicable to tracking private adaptation finance, in practice, data available to an external organization (i.e., CPI) does not always contain the level of detail needed to replicate the internal assessments that public institutions carry out while self-reporting.

8 These four taxonomies and frameworks were selected based on their frequency of use and to demonstrate the breadth of the universe of adaptation taxonomies and frameworks.

9 Voluntary reporting guidelines (TCFD and ISSB S1,2) have suggested reporting green revenues or capex in climate positive investment, but this guideline is not widely adopted by the private sector. Moreover, these guidelines do not specify methods for reporting resilience-related investment.

At best, context, intent, and linkages between tracked investments and climate risks can be inferred from good quality data, but key qualifying information such as project description, and the intent of the investment to improve resilience is often subject to data gaps. For example, investing in air conditioning in regions with rising temperatures is a common practice, but there is often little information on whether the explicit intent of the investment is climate adaptation. Disaggregation is also challenging to implement by organizations not directly involved in the project(s), as data collection is not always possible at the activity-level.

External tracking of adaptation finance through top-down methods typically requires a taxonomy to execute. For instance, the EU Sustainable Finance Taxonomy lists economic activities alongside a set of criteria for climate adaptation relevancy, which can allow investment into a given activity to be tracked as adaptation finance where it meets stated criteria. Across existing taxonomies, tracked adaptation finance is at minimum linked to activities that substantially contribute to climate adaptation, and sometimes is qualified with additional factors that suggest relevant climate vulnerability context and intent to manage climate risks. Under this approach, while a top-down approach to tracking private adaptation finance may not completely replicate the comprehensiveness of public sector assessments for self-reported bottom-up adaptation investment data, when applied rigorously and with proper qualification, this approach can at least reasonably approximate the principles for tracking adaptation finance outlines by the IDFC and MDBs in 2015.

# 3. METHODOLOGY

## 3.1 TAXONOMICAL APPROACH

Informed by the context above regarding existing methodologies for tracking adaptation finance and their limitations for private tracking in practice, our approach tracks financing for an activity as adaptation finance if that activity meets all of the following criteria:

1. The activity's end users or beneficiaries (people, assets, etc.) are located in a setting with material physical climate risks/impacts.
2. The activity materially reduces physical climate risks to the project or investment in which the activity occurs, materially reduces physical climate risk in other economic activities, or addresses systemic barriers to adaptation.
3. The contribution to adaptation—i.e., adaptation-related outcomes—can be defined and qualitatively and/or quantitatively measured.
4. The activity adopts the best available knowledge to provide solutions that do not lead to maladaptation of the direct user or the system in which the user operates and that manage against significant harm to other social and environmental objectives.

In order to align with these principles and criteria, we have developed an adaptation taxonomy that can be used to track private adaptation finance. This classifies climate adaptation activities according to a set of seven themes, derived from the adaptation taxonomies developed by Tailwind and CBI and are modified for the purpose of tracking financial flows. The intention here is to develop a consistent approach to identifying adaptation finance flows for private actors. The seven themes reflect the recommendations in the Global Goal on Adaptation Framework (COP28: CMA5, art. 9) and are associated with broader objectives of the UN Sustainable Development Goals.

Within each theme, the taxonomy identifies a set of adaptation sectors, subsectors, and activities. The activities are intended to be: (a) collectively exhaustive of all the adaptation activities that would potentially receive trackable private financing and (b) mutually exclusive from each other activity to the greatest extent possible. At the same time, the taxonomy is a living document that is malleable and open to revisions in structure as well as the addition of missing sectors, subsectors, or activities.

**Table 3:** Adaptation Themes and Definitions

| Theme | Type of activities covered |
|---|---|
| Agrifood Systems | Activities that improve the resilience of our food systems. Activities can be along the entire food system value chain and include primary production, processing, waste treatment, logistics, storage, wholesaling, retail, and other support services. |
| Ecosystems | Activities that aim to protect or improve terrestrial, freshwater, coastal, or marine ecosystems. Activities include the protection of their biodiversity, natural capital, and ecosystem services. |
| Health | Activities that either improve the resilience of our existing health systems or better allow us to respond to emerging health challenges and climate-related emergencies. Activities can occur along the health value chain and include facilities, products, and the delivery of treatment and care. |
| Industry and Commerce | Activities that improve the resilience of manufacturing operations, commercial trade, service-based industries, and other industrial activities. The risk hardening of extractive industries like mining is included but considered maladaptive or likely to cause significant harm. |
| Infrastructure | Activities that improve the resilience of our buildings, urban space, transportation, information, waste, and energy systems. The risk hardening of fossil fuel-based systems is included but considered maladaptive or likely to cause significant harm. |
| Social Systems | Activities that aim to protect or improve the social well-being of people. Activities can cover the protection of cultures, climate education, public administration, and social protection. |
| Water and Sanitation | Activities that either expand access to and improve the resilience of WASH (water, sanitation, and hygiene) services or better allow us to adapt to flooding and drought conditions. |

The taxonomy then tags each activity with several additional elements:

1. Secondary Theme
2. Activity Type
3. Cities Relevance
4. Gender Relevance
5. Mitigation Co-Benefit
6. Adaptation Likelihood
7. Maladaptation or Significant Harm Risk
8. Climate Hazards
9. Private Actors

An example of this assessment applied to the "Improved Cultivars" activity (e.g., drought resilient or heat-resistant crops) is shown in Table 4, and details on each of the nine elements are provided in the subsections below.

**Table 4:** Taxonomy Application to Improved Cultivars

| Theme | Sector | Subsectors | Activity | Secondary Theme | Activity Type | Cities Relevance |
|---|---|---|---|---|---|---|
| Agrifood Systems | Agricultural Production | Crop Production | Improved Cultivars | No | Product or Services | No |
| **Gender Relevance** | **Mitigation Co-Benefit** | **Adaptation Likelihood** | **Maladaptation or Significant Harm Risk** | **Climate Hazards** | **Private Actors** | |
| No | No | High | No | Heat Stress, Cold Stress, Water Stress | PE/VC, SMEs, Large Multinationals, Domestic Corporations | |

### 3.1.1 SECONDARY THEME

Each activity is assigned to the theme in the taxonomy with the greatest amount of specificity, and according to where the activity's impacts most directly materialize. While each activity is assigned one theme, in instances where an activity could reasonably belong to another, a secondary theme is also assigned. For example, the "Efficient Irrigation" activity under the "Agrifood Systems" theme has a secondary theme tag of "Water and Sanitation" to account for its role in water conservation and provision.

### 3.1.2 ACTIVITY TYPE

CPI classifies each climate adaptation activity as (a) a product or service, (b) an enabling activity, or (c) intelligence.

a. Products and services respond to climate risk by directly reducing vulnerability or exposure to one or more climate hazard(s) and its impacts. These activities include pest management, forest protection, metal manufacturing risk hardening, and artificial water storage.

b. Enabling activities respond to climate risk indirectly by building the capacity of systems to better respond to a climate hazard(s) and its impacts. These activities are associated with efforts like public disaster response and recovery planning, public adaptation plans, and crop insurance.

c. Intelligence is a subsect of enabling activities that indirectly responds to climate risk by providing information that enables better climate adaptation. Examples of these activities are flood forecasting systems, disease monitoring and alert, and climate change news and public media.

This classification enables CPI to generate more granular data in a structured manner and to align with other taxonomical efforts. It allows for a comparison between activities that actively embed climate resilience and those that enable climate adaptation. This, in turn, can inform a more nuanced conversation on existing flows and finance gaps, and how these investment gaps can be most effectively closed.

CPI's classification of activity type is just one of the various approaches to classifying adaptation efforts. Examples of other breakdowns are shown in Table 5.

**Table 5:** Adaptation Activity Types (non-exhaustive)

| Name | Breakdown |
|---|---|
| Climate Bonds Initiative[10] | **Adapting Measure:** Measures that make the activity in which they are implemented more climate resilient.<br>**Enabling Measure:** Measures that are implemented within an activity to make other activities more resilient.<br>**Adapted Activity:** Activities that make just the activity itself more climate resilient.<br>**Enabling Activity:** Activities that make the activity itself more climate resilient, as well as other activities. |
| Boston Consulting Group (BCG)[11] | **Protect:** Activities that safeguard value by either financing activities that protect against future losses or aligning investments with resilient companies.<br>**Grow:** Activities that are direct investments in companies that are developing resilient solutions or product lines.<br>**Participate:** Activities that represent collaboration with the public sector through either directly allocating capital to public adaptation or investing in financial vehicles that direct capital to resilience initiatives. |
| Global Commission on Adaptation[12] | **Reduce and Prevent:** Activities that shrink the climate risk curve through climate-proofing infrastructure, land-use planning, and investments in R&D.<br>**Prepare and Respond:** Activities that help communities react quickly to climate risks through early warning systems and strengthen response measures.<br>**Restore and Recover:** Activities including other enabling measures that allow communities to endure climate risks such as insurance and build back better initiatives. |

### 3.1.3 ADAPTATION LIKELIHOOD

The concept of adaptation likelihood aims to capture how likely an activity listed in the taxonomy is to meet our definition of adaptation, without any knowledge of local climate hazards. This indicator describes our confidence that a specific project that matches an activity in the taxonomy can be considered as adaptation without any further context. We tag according to scale of low, medium, and high, as defined in Table 6. To support our assessment of adaptation likelihood, we have conducted a literature review for each activity to determine how that activity can help respond to climate hazards.

For example, the activity of "desalination" is tagged as "high" since it helps respond to the climate hazard of drought in almost all contexts by augmenting additional water resources, whereas "improved breeds" is tagged as "low" since it can help respond to climate hazards in some circumstances (e.g., heat-tolerant cows) but usually does not contribute to adaptation. Adaptation likelihood does not consider the intent behind an activity but only its effects.

10 Climate Bonds Resilience Taxonomy Methodology, CBI, 2024
11 BCG. (2023). From Risk to Reward. https://www.globalresiliencepartnership.org/wp-content/uploads/2023/12/from-risk-to-reward-report.pdf
12 GCA. (2019). Adapt Now: A Global Call for Leadership on Climate Resilience. https://gca.org/wp-content/uploads/2019/09/GlobalCommission_Report_FINAL.pdf

**Table 6:** Adaptive Likelihood Definitions

| Adaptive Likelihood | Definition |
|---|---|
| **High** | The activity helps respond to one or more climate hazards in almost all circumstances. If 10 randomly selected projects that match a certain activity were selected, 8 or more could be considered as adaptation activities. |
| **Medium** | The activity helps respond to one or more climate hazards in many circumstances. If 10 randomly selected projects that match a certain activity were selected, between 4 and 7 could be considered as adaptation activities. |
| **Low** | The activity helps respond to one or more climate hazards in some circumstances. If 10 randomly selected projects that match a certain activity were selected, 3 or fewer could be considered as adaptation activities. |

### 3.1.4 MALADAPTIVE OR SIGNIFICANT HARM RISK

The tagging of Maladaptation or Significant Harm Risk identifies if an activity has a high potential of either:

a. Being considered maladaptive, or

b. Causing significant harm to other social and environmental objectives

*even when minimum compliance and industry standards are followed.*

For each activity in the taxonomy, maladaptation is assessed with reference to IPCC AR6 definition[13] and significant harm risk with reference to the EU Taxonomy.[14]

Activities are defined as maladaptive[15] if they significantly increase vulnerability to climate change through:

1. Increasing social vulnerability or causing unintended harm to humans,
2. Increasing climate-related impacts on ecosystems or ecosystem services,
3. Worsening the present or future condition of marginalized groups like low-income households, ethnic minorities, and women, or
4. Inhibiting deep and systemic change necessary for addressing climate change.

Activities are defined as bearing significant harm risk, as defined in the EU Taxonomy,[16] if they significantly inhibit other social and environmental objectives, including:

1. Climate change mitigation,
2. Sustainable use and protection of water and marine resources,
3. The transition to a circular economy,
4. Pollution prevention and control, or

13 IPCC. (2021). Figure 17.10. https://www.ipcc.ch/report/ar6/wg2/figures/chapter-17/figure-17-010
14 European Union. (2020). Document 32020R0852. https://eur-lex.europa.eu/eli/reg/2020/852/oj
15 In The IPCC's AR6, maladaptation includes "caus[ing] additional GHG emissions", which is excluded from our definition since it is captured in our definition of significant harm under criteria "(5) climate change mitigation".
16 In the EU Taxonomy, significant harm includes activities that harm "climate change adaptation", which is excluded from our definition since it is captured in our broader definition of maladaptation.

5. The protection and restoration of biodiversity and ecosystems.

Maladaptation and Significant Harm Risk are not binaries but rather a continuum where universal thresholds are difficult to specify. Yet, we assess the potential for both as binaries in the taxonomy for simplicity. Future work could address this simplification and set more precise thresholds.

### 3.1.5 CITIES RELEVANCE

Several taxonomies, such as the Tailwind Taxonomy[17] and the Climate Bonds Resilience Taxonomy,[18] include a separate theme for cities and human settlements. The CPI taxonomy does not because it is designed for tracking purposes and cities and human settlements is considered cross-cutting across all themes. To address this difference, CPI tags each activity for its relevance to cities.

An activity is tagged as having cities relevance if it significantly enhances cities' adaptive capacity and resilience to climate-related risks. Activities are included if they are usually located within city boundaries or aimed to address a climate risk faced by a city. Purely industrial activities such as manufacturing are excluded. Cities refer to functional urban areas, not administrative divisions, and encompass urban centers, towns, and suburbs but exclude villages and dispersed rural areas, as defined by the degree of urbanization definition.[19]

### 3.1.6 GENDER RELEVANCE

One objective that has a growing prevalence within climate finance is gender equity which is tagged across the activities in the taxonomy. The tagging of gender relevance corresponds to any activity that significantly and disproportionately benefits women or other marginalized genders. Almost all activities can be implemented in a way that is gender-responsive, but the tagging of gender relevance is intended to identify activities that nearly always contribute to gender equity.

### 3.1.7 MITIGATION CO-BENEFIT

An objective that is central to climate finance is the mitigation of GHG emissions, which is tagged across the activities in the taxonomy. Any activity that directly and significantly reduces the potential release of GHG emissions (e.g., wildfire management) or directly captures existing GHG emissions (e.g., resilient soil management) is tagged as having a mitigation co-benefit. This is further categorized by the primary mitigation mechanism used; either (a) carbon sequestration or (b) avoided emissions.

### 3.1.8 ASSOCIATED CLIMATE HAZARDS

The labeling of climate-relevant hazards corresponds to the hazards that an activity either directly or indirectly addresses. The categories are based on the framing of climate-related

17 Tailwind. (2024). Tailwind Taxonomy for Adaptation and Resilience Investments. https://www.tailwindclimate.com/taxonomy/#:~:text=The%20Tailwind%20Taxonomy%20is%20a,effect%20in%20the%20Companion%20Deck

18 CBI. (2024). Climate Bonds Resilience Taxonomy.

19 GHLS. (2020). The Degree of Urbanisation, a new global definition of cities, urban and rural areas. https://human-settlement.emergency.copernicus.eu/degurba.php

hazards outlined in the EU Sustainable Finance Taxonomy and Climate Bond Resilience Taxonomy.[20,21] Each hazard example can be classified as either acute (high intensity over limited time periods) or chronic (slow-onset), since adaptation must account for both rapid and gradual changes in the climate.

Associating each activity with the climate hazard it is addressing will allow those using the taxonomy, including CPI, to comment upon the relative financial flows mitigating each risk, as well as providing important information for assessing adaptation relevance. For example, by cross-referencing the risks an activity addresses with the risks present in the geography to which the investment is directed.

**Table 7:** Climate Hazards

| Climate Hazard | Sub-Categories | Acute or Chronic |
|---|---|---|
| **Heat Stress** | Average surface temperature increase | Chronic |
| | Average ocean temperature increase | Chronic |
| | Extreme heat events | Acute |
| | Marine heatwaves | Acute |
| **Cold Stress** | Average surface temperature during winter | Chronic |
| | Cold spells | Acute |
| | Snowfall and ice storms | Acute |
| **Water Stress** | Meteorological drought | Chronic |
| | Hydrological drought | Chronic |
| | Groundwater salinization | Chronic |
| **Storm Conditions** | Wind speed during storms | Acute |
| | Tropical cyclones | Acute |
| | Sand and dust storms | Acute |
| **Flooding** | Riparian flooding | Acute |
| | Heavy precipitation events | Acute |
| | Coastal flooding | Acute |
| **Mass Movement** | Landslides | Acute |
| | Coastal erosion | Chronic |
| **Wildfire Conditions** | Wildfires | Acute |
| **Marine Conditions** | Coral reef bleaching | Chronic |
| | Sea water acidification | Chronic |

20 EU TEG. (2020). Taxonomy Report: Technical Annex. https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf
21 CBI. (2024). Climate Bonds Resilience Taxonomy.

### 3.1.9 LIKELY PRIVATE ACTORS

The taxonomy associates each activity with the private actors that are likely to significantly contribute to its investment. This assessment will facilitate more efficient data collection, as it will allow CPI to narrow the range of data sources investigated for each activity, as well as comment on the relative importance of each actor type in financing A&R. An exhaustive definition of each private actor type, as well as examples of the types of activities the private actor finances, can be found in Section 4 of this paper.

### 3.1.10 ADDITIONAL ELEMENTS FOR FUTURE WORK

Several descriptive elements were not included in this initial iteration of the private adaptation finance taxonomy due to scoping constraints but should be evaluated in future revisions. These include normative assessments of the adaptive value of each adaptation activity and tagging for other overlapping environmental and social objectives.

One element that should be prioritized for future work is the additionality of adaptation investments. The concept of additionality qualifies the incremental spending that would not have occurred if not for the presence of climate hazards. In other words, the assessment of additionality attempts to separate the amount of finance being spent in direct response to a climate hazard, whether intentionally or not, from what would have been invested in the absence of a warming climate.

For example, desalination activities help respond to the climate hazard of drought in almost all circumstances and are therefore labeled as having "high" adaptation likelihood. Yet, a significant amount of the total spending on desalination would still have occurred in a world without anthropogenic climate change, since most desalination plants are located in naturally water-scarce regions with growing populations. In this example, additionality qualifies the incremental amount of financing going towards desalination specifically to address climate hazards, as opposed to business-as-usual desalination needs.

On a macro scale, assessing the additionality of adaptation finance can help translate the identification of climate hazards into investments that address the corresponding risks. Namely, adaptation activities that are evaluated as highly additional would then be targeted for investment support, given that they are less likely to be funded under business-as-usual conditions.

However, the comparative analysis necessary for rigorously evaluating additionality on a project-by-project basis would require resources and data that are not within the scope of this project. Instead, a preliminary assessment of additionality likelihood can be used to assign a low, medium, or high value for each adaptation activity. The exact structure and criteria need to be further developed, but the inclusion of additionality in future taxonomical work will be important for identifying the amount of finance being spent in direct response to climate change.

### 3.1.11 TRACKING FINANCIAL FLOWS USING THE UPDATED TAXONOMY

Applying the structure provided by the taxonomy, we sourced data on adaptation projects and then categorized their financial flows. We then used a large language machine learning model, developed by CPI and Vibrant Data Labs (VDL), to classify financial flows based on the activities

in the taxonomy using project, company, and fund descriptions. We then conducted an analysis on the investment tracked to determine:

- The current state of global private adaptation investment,
- The investment going to each activity, subsector, sector, and theme,
- Investment and reporting gaps revealed by the data gathered, and
- Recommendations on improvements in data collection, as well as reporting standards for private actors.

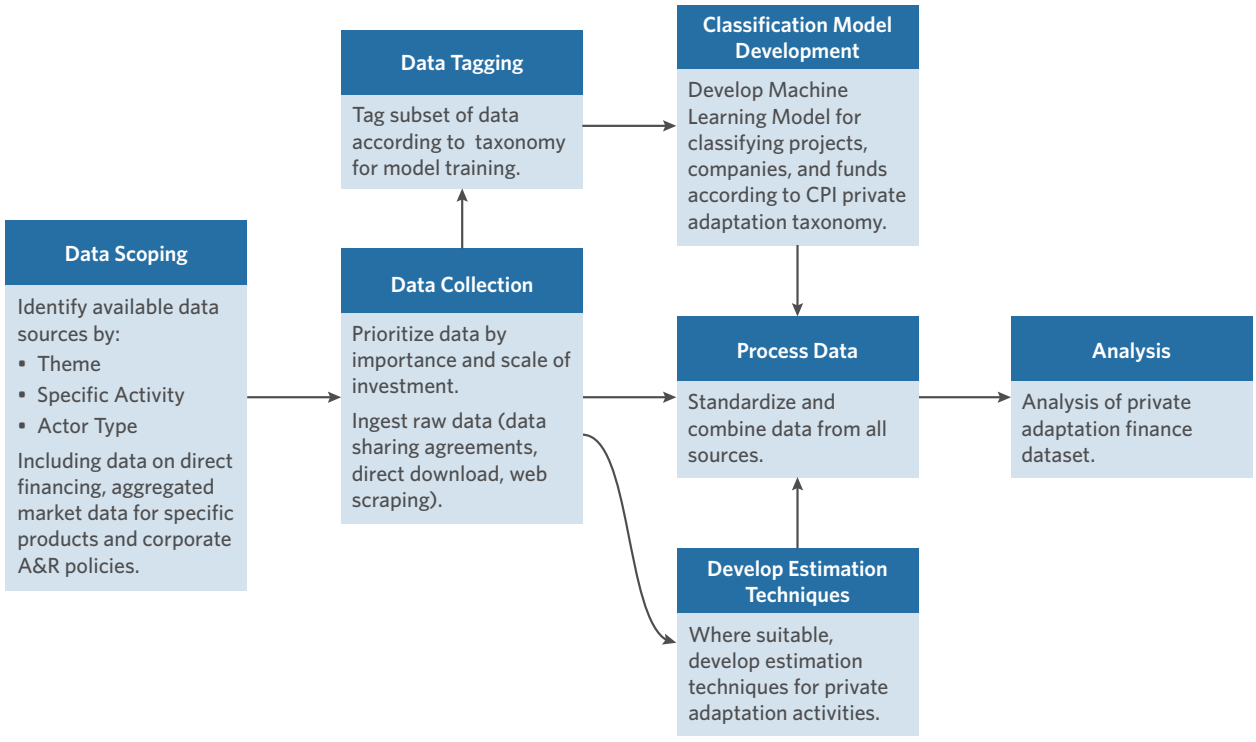
By engaging with a broad range of actors focused on assessing the state of adaptation finance, both in a public and private context, and by aligning our own taxonomy with Tailwind and CBI, CPI aims to continue to use this initial taxonomy development and data collection effort to help build consensus on how adaptation is tracked and reported. Improved clarity will leave investors with greater confidence and help unlock capital that is seeking A&R-based investment, but as yet lacks assurance to deploy.

Our data collection approach, as outlined below, is limited by the quality of data available. As such, the data presented in this report is necessarily a subset of total private adaptation flows. It does, however, represent a significant improvement upon existing efforts to track private adaptation finance, as well as providing a basis for further development.

## 3.2 DATA APPROACH

Due to the challenges with collecting adaptation-related financial flows from private organizations outlined in Section 2.1, various approaches were combined to arrive at a reasonable estimate of global adaptation investment. Figure 3 visualizes these approaches, which are further detailed below.

**Figure 3:** Data Approach Flow



The process for creating the private adaptation finance dataset begins with **Data Scoping**, where available data sources are identified based on various criteria such as theme, specific activity, and actor type. This stage focuses on collecting comprehensive data, including direct financing information, aggregated market data for specific products, and corporate A&R policies. Data Sources identified include World Bank Private Participation in Infrastructure data, focusing on large-scale infrastructure projects; Luxembourg Green Exchange green bond posy issuance data; CPI's GLCF; Crunchbase for early-stage VC investment; and CDP for assessment in corporate adaptation activities.

Once the relevant data sources have been scoped, the next step is **Data Collection**. In this phase, data is prioritized by its importance and the scale of investment it represents. The collection involves ingesting raw data, which can be obtained through data sharing agreements, direct downloads, or web scraping. Following collection, a subset of this data is tagged according to a taxonomy to facilitate model training, a process referred to as **Data Tagging**.

The tagged data then feeds into the **Classification Model Development** stage, where a machine learning model is developed to classify projects, companies, and funds according to the CPI private adaptation taxonomy. Simultaneously, Process Data involves standardizing and combining data from all sources to create a uniform dataset, including adaptation activity attribution. Upon completion of processing data sources into a cohesive dataset, the classification model is applied to project names and descriptions to classify projects according to the CPI adaptation taxonomy.

In some cases, there is also a need to **Develop Estimation Techniques**, which involves creating methods to estimate private adaptation activities where direct data may not be available. Finally, the processed and standardized data is analyzed in the **Data Analysis** stage, which is focused on examining the private adaptation finance dataset to extract insights, trends, or other valuable information.

## 3.3 FUTURE DATA COLLECTION BEYOND THIS WORK

Through this work, CPI has created a dataset of private adaptation as defined by the taxonomy outlined above. Because this is the first attempt at applying the taxonomy, and due to constraints on time, there will inevitably be gaps in data collection. Data collection in subsequent iterations of work to track private sector adaptation finance will be informed by the information gathered in this work. The lack of rich textual sources to assess the adaptation activity a project, company, or investment belongs to has been the primary limiting factor. Through development CPI and our partners at VDL have refined the approach of applying the model as well as carried out extensive manual labeling. The dataset created for this report will be an invaluable basis for further model development.

The expansion of CPI's collection of adaptation finance data is expected to come from multiple sources. Purchases of private datasets, as well as expanded use of AI to extract further relevant information from public sources are promising avenues to improve clarity to an opaque and nuanced area of climate finance.

Additionally, as we collaborate with partners to disseminate the CPI taxonomy, and the Tailwind Taxonomy on which it is based, we expect to facilitate a wider conversation and bring in additional expertise and data from these partners. This will allow CPI and others to further expand and refine the data collection process for private adaptation finance.

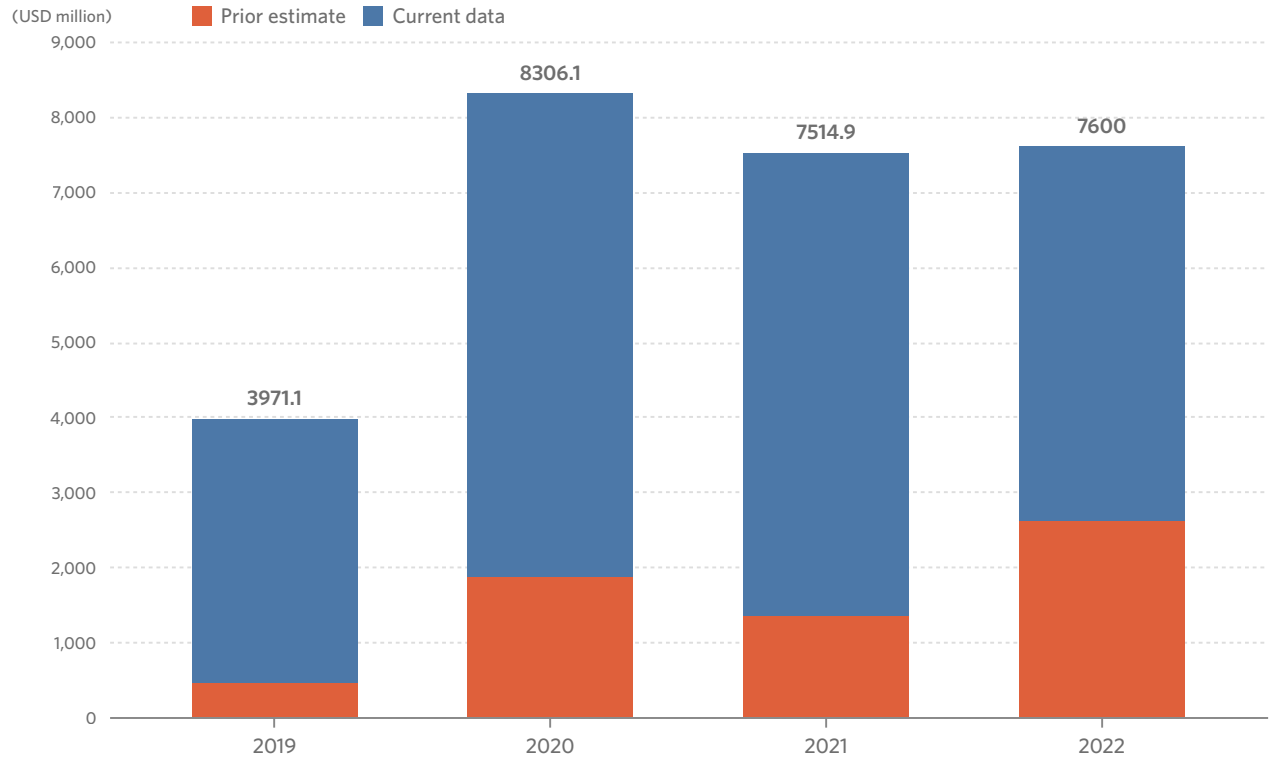
# 4. FINDINGS

## 4.1 SUMMARY OF FINDINGS

Due to the inherent difficulties of tracking climate adaptation investments in the private sector, this analysis combines multiple approaches to provide as comprehensive a view of these investments as is feasible. The analysis captured in this section involves widening the scope of assessed flows relative to prior adaptation tracking efforts, identifying not just investment at project level but also broader investment trends. For direct project-level investment, we have significantly advanced CPI's previous estimates of private adaptation finance. We have also advanced our ability to specify precisely the kind of adaptation activity the investments are supporting.

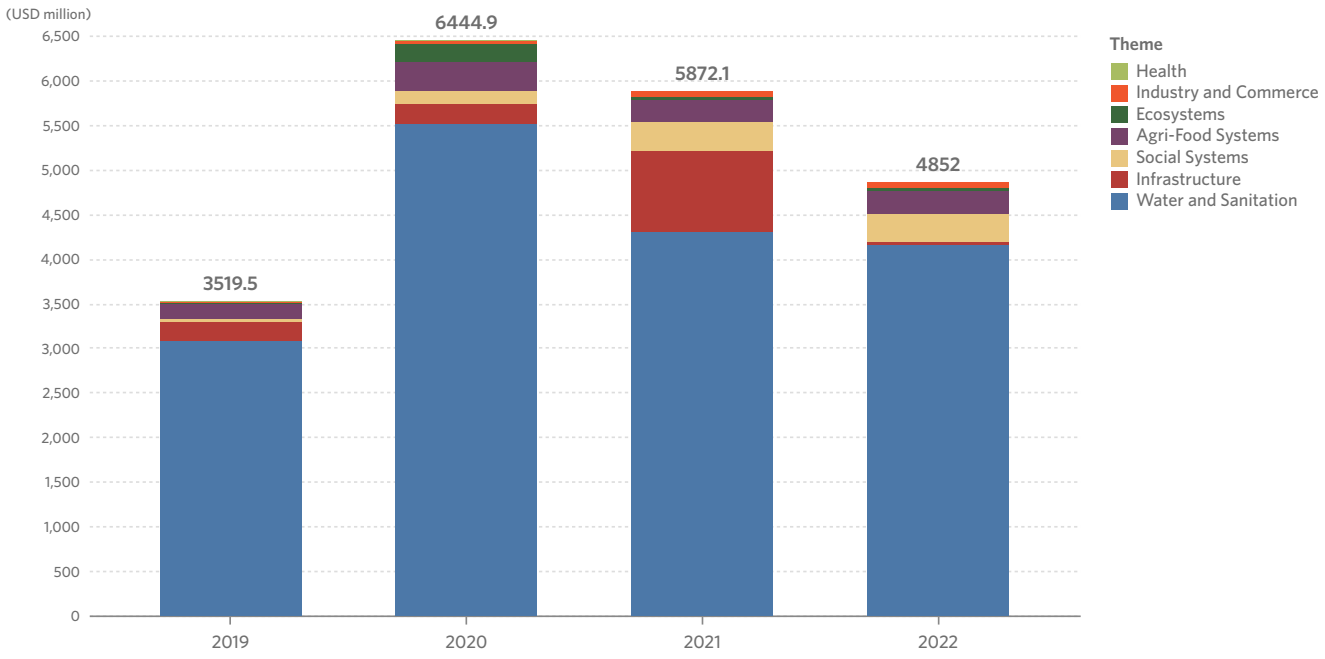
Through the methodological and data work represented in this analysis, we have increased total tracked adaptation finance from the private sector from **USD 1.0 billion annual average** from 2019 to 2022 in prior analysis to **USD 4.7 billion annual average** over the same period. The most substantial improvements in tracking have come from data on asset managers, commercial FIs, consumers and households, as well as corporations.

**Figure 4:** Adaptation Investment – Comparison of Prior and Current Tracking



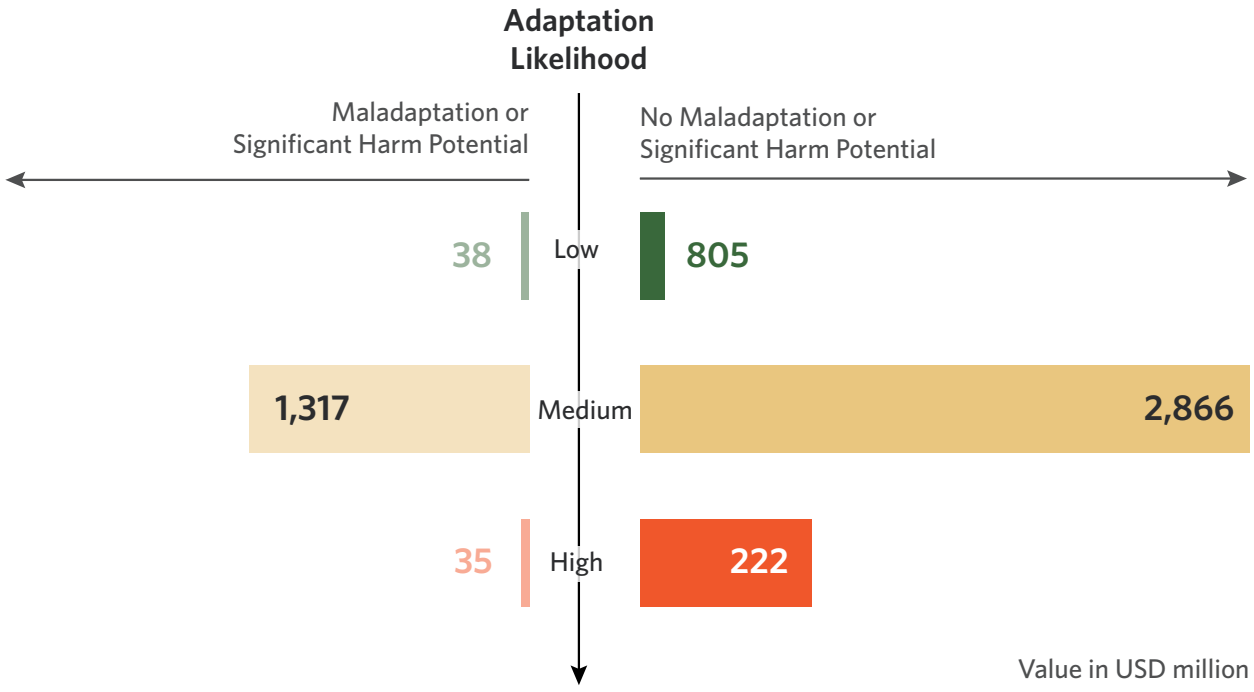

We find that the vast majority of project-level investment is directed toward the waste and wastewater sector, specifically WASH services, where efforts are directed at improving the efficiency and resilience of water management systems.

**Figure 5:** Adaptation Investment by Theme



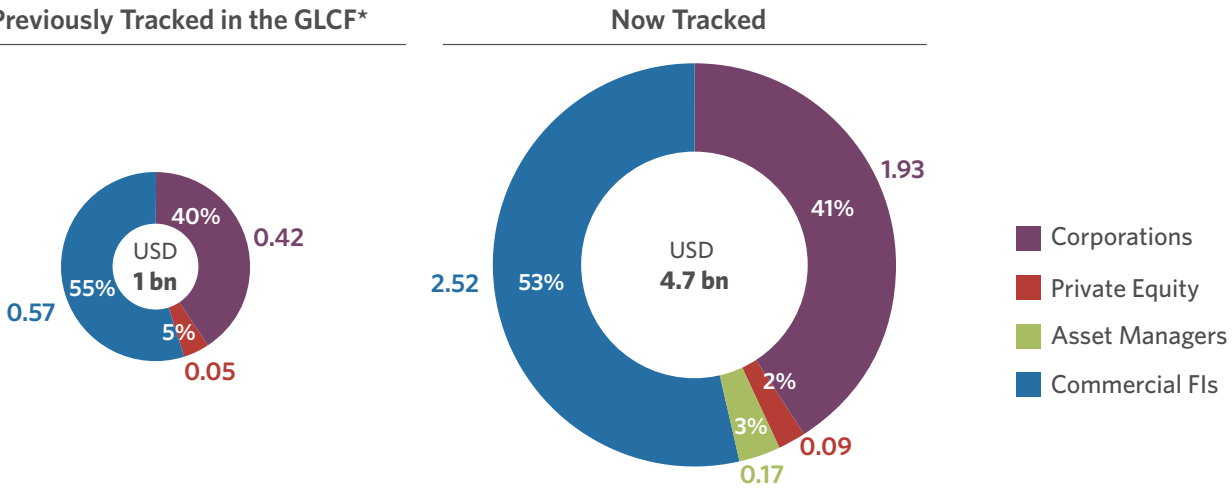

Tracked adaptation finance from the private sector under the approach captured in this report can be disaggregated by the likelihood of adaptation relevance. We find that 5% of finance tracked has a high likelihood of being adaptation (per the approach described in Section 3.1.3), 79% has a medium likelihood, and 16% has a low likelihood. We also find that a total of 27% of finance tracked holds potential for maladaptation or significant harm risk (described in Section 3.1.4), fairly proportionately distributed across likelihood of adaptation.

**Figure 6:** Private Adaptation Investment by Adaptation Likelihood



Even with the advancement made in this report, significant gaps remain in tracking private adaptation finance, and a handful of institutions—most notably insurers and pension funds—remain very difficult to track. Figure 7 summarizes finance tracked in the GLCF, newly tracked finance per this analysis, and an extrapolative sketch of untracked private finance from seven key institution types, each then described in detail in Section 4.2.

**Figure 7:** Private Adaptation Finance as Tracked in the GLCF and in this Report and Extrapolative Analysis of Untracked Finance




*excluding Philanthropy

***Consumers and Households:*** *Tracked (in Section 4.2.7) but not aggregated as not project level data.*
***Venture Capital:*** *Tracked (in Section 4.2.3) but not aggregated as not project level data.*

### Extrapolative Untracked Private Finance: Unknown Amount

**1. Asset Managers**

We now track USD 165 million annually at project level, likely a significant underestimate.

**2. Commercial FIs**

We now track USD 2.52 billion annually at project level, which is likely close to accurate order of magnitude at project-level but is missing enterprise-level and intermediated finance.

**3. Consumers and Households**

No finance tracked at the project level, USD 48-61 billion (high likelihood adaptation) at transaction-level. Likely close to accurate order of magnitude at transaction-level.

**4. Corporations**

We now track USD 1.93 billion annually at project level, likely a moderate underestimate missing especially indirect corporate investment in supply chains, infrastructure upgrades, and internal process innovation.

**5. Insurance**

None tracked – significant gap. Without detailed reporting on coverage or investment of institutional capital, it remains difficult to gauge the extent of insurers' current contribution.

**6. Pension Funds**

None tracked – significant gap. True scale of involvement is difficult to assess from the current data environment (in the context of USD 47.9 trillion in pension assets across the major 22 pension markets in 2023).

**7. Private Equity/Venture Capital**

Now tracked USD 92 million annually project level and USD 6.3 billion annually in venture-level investment. Likely significant underestimate of project-level PE investment and moderate underestimate of venture-level VC investment.

## 4.2 INSTITUTION GROUP/TYPE ANALYSIS

As mentioned in Section 4.1, the private sector actors involved in adaptation finance we consider for this work are listed below.[22]

1. Commercial banks
2. Asset managers
3. Private equity (PE) / venture capital (VE) firms
4. Pension funds
5. Insurers
6. Corporations
7. Households and consumers

These are the seven private institution types we evaluate as most likely to be currently and potentially financing adaptation given their ubiquity in financial markets, engagement with one another, and exposure to climate risk. Further details on cross-institution flows are provided in Annex 2. While these institutions do indeed engage with one another, and while capital flows between institution types, the analysis that follows has been conducted at the institution level in order to more coherently assess each institution's involvement in adaptation finance across three parameters:

a. Qualitative current and potential role in adaptation: Describing the institution's current and potential role in the adaptation finance ecosystem, the most common types of adaptation funded by that institution, and real economy examples of adaptation finance when available. This analysis supplements quantitative data findings, particularly in instances where quantitative data is limited or lacking.

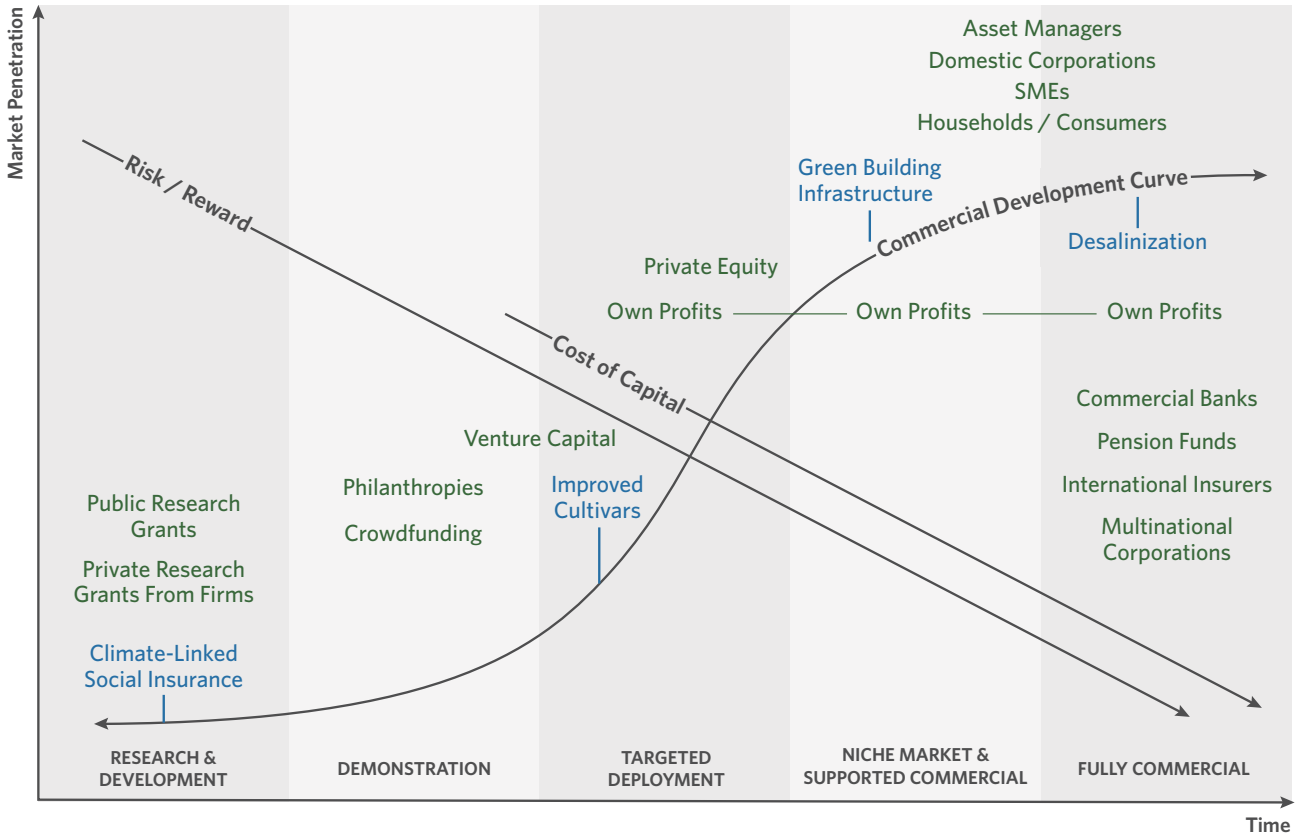
b. Quantitative data findings: Capturing relevant findings of private adaptation finance tracked under the methodology outlined in Section 3, end employing new data sources.

c. Gaps in analysis and what is needed to better understand how actors are financing adaptation: Highlighting what is still not known or trackable by institution type and pointing the way forward regarding next steps to improve understanding of institutional action.

The point at which these actors engage with investment opportunities is depicted in Figure 8. In general, private sector actors engage with adaptation investment opportunities once a given investment has reached the risk-return profile preferred by each respective actor type. Furthermore, the risk-return profile of the investment broadly corresponds to its level of commercial development—i.e., adaptation solutions and products that rely on newly developed technologies and/or have not been deployed at scale within their respective markets have a high potential to deliver returns to investors but often bear commensurately larger risks. While some actors may engage outside of the ostensible range of their risk-return preferences on an individual investment basis, the general orientation of their overall engagement with adaptation investments can be understood within that context.

22 Alongside institution-specific analysis, it is critical to assess how finance flows among different actors. An overview of the ways that finance flows between actors can be found in Annex 2.

**Figure 8:** Adaptation Investment by Theme[23]




## 4.2.1 COMMERCIAL BANKS

**1. Qualitative current and potential role of commercial banks in adaptation:**

The central role commercial banks can play in financing adaptation is likely to be via lending to businesses and consumers seeking to respond to climate hazards. From household loans for renovations addressing climate risks for homes to co-financing large-scale adaptation projects with public actors, these institutions can enable adaptation action using a number of different levers:

- **Climate-resilient mortgages:** The underlying climate risk associated with mortgage portfolios has been highlighted in bank stress testing exercises. Banks can address this by routinely assessing and disclosing location-specific risks to properties (and their value) to inform potential borrowers and aid the formation of adaptation strategies. They can also develop innovative mortgage products to guide consumers toward climate-resilient home ownership. Banks have a responsibility to work with insurers and policymakers to address high-risk areas such as flood zones. This coordination can help to ensure that risks are dealt with through adaptation whenever possible, minimizing the number of at-risk businesses and consumers being locked out of lending and insurance and opening up valuable discussions on the balance of responsibility between governments and the private sector in these situations.

23 Referencing CPI. (2018). Deep decarbonization by 2050: Rethinking the role of climate finance. https://www.climatepolicyinitiative.org/wp-content/uploads/2018/07/Deep-decarbonization-by-2050-rethinking-the-role-of-climate-finance.pdf

- **Borrower risk assessments:** Where loans are being approved on a business case basis, banks should develop adequate frameworks that allow them to properly consider adaptation benefits. These benefits can be difficult to quantify, especially for consumers or small businesses, and banks can build up and share best practices to increase capacity. Banks should also be actively scanning for adaptation opportunities in new lending, particularly for situations where adding adaptation activities to a project would increase the upfront cost but lead to lower costs and risk of nonpayment over the life of the loan. Conversely, banks should also screen borrowers and projects for climate risk and ensure that climate risks are priced into lending products. Banks should complement risk assessments—including exercises such as TCFD (Taskforce on Climate-Related Financial Disclosures) assessments—with their own strategies for managing this risk. An example of this is requiring customers or clients to take certain actions to remain bankable if they add significant climate risk to the bank's portfolio.
- **Co-financing adaptation projects:** Commercial banks, particularly in emerging markets and developing economies (EMDEs), can be a good co-financing partner for public adaptation finance. They can co-lend for publicly supported projects, for example by providing bridge loans for contractors. Commercial banks may have local contacts and knowledge that are particularly useful in an adaptation project setting.
- **Addressing internal climate risk:** Banks provide essential services including bank accounts, cash, deposits, and others. They must ensure that their exposure to hazards that may disrupt these services has been assessed across specific locations and that they have time-bound plans for addressing these through adaptation efforts.

While commercial banks have been dealing with climate risk for many years, they have often grouped this with broader physical risk and have lacked specific solutions and targeted action. Commercial banks must make better use of the data they have on climate risk to ensure consistent pricing of this risk across borrowers and to improve institutional understanding of how adaptation benefits can be priced into risk assessments for new lending. There are few examples of innovative products, such as climate-resilient mortgages being offered by commercial banks today, but this is an area of future growth that can draw lessons from wider green lending.

Banks must acknowledge their role in actively supporting and enabling adaptation. UNEP FI has set out detailed steps for how banks can move past physical risk management and towards driving adaptation action in the real economy with effective adaptation plans that cover both existing and future activity. Banks will need to work with other FIs, such as insurers and public banks, to ensure that businesses and households with high exposure to climate hazards are given adequate information and tools to pursue adaptation action, including relocation, and avoid being locked out of lending.

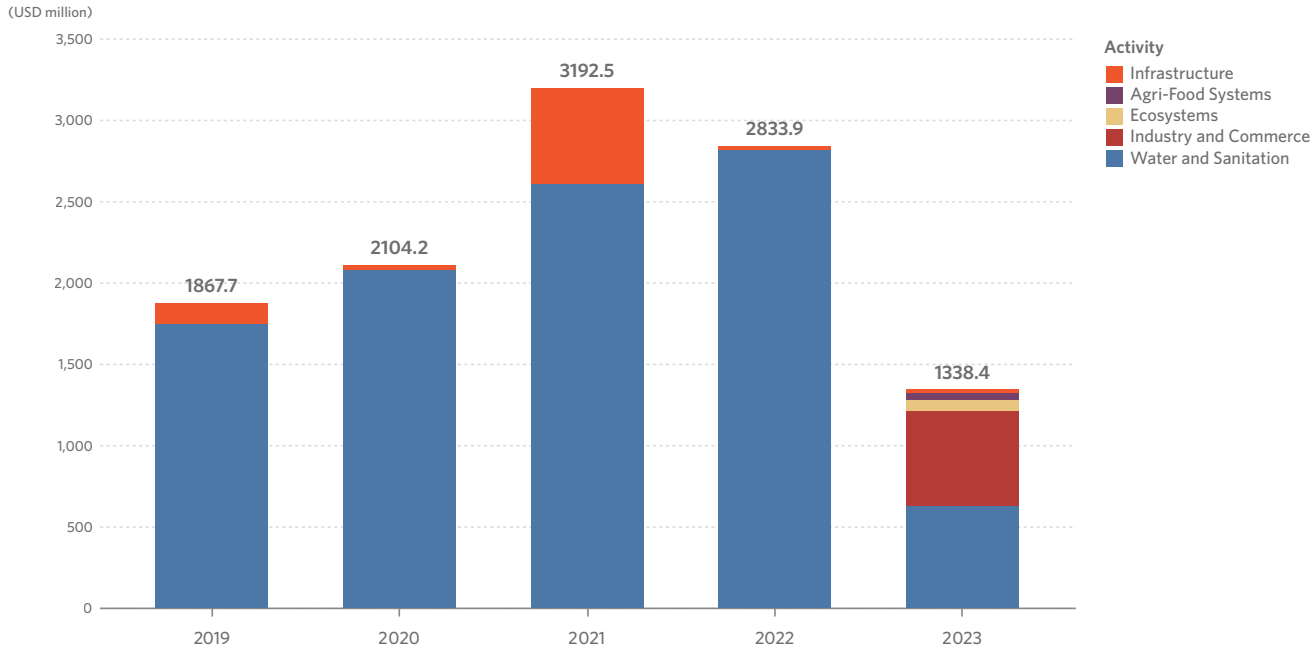
**Table 8:** Commercial Bank Action and Examples

| Type | Examples |
|---|---|
| Innovative products | The Responsible Commodities Facility is an initiative that aims to grow zero-deforestation supply chains for soy and incentivize farmers to redirect production to degraded lands, using low interest credit lines, crop financing and restoration loans. The facility raised funds with a USD 300 million bond issuance with underwriting support from HSBC. |
| Co-financing | Africa Rural Climate Adaptation Finance Mechanism: Equity Bank Kenya are co-financing a facility with the International Fund for Agricultural Development (IFAD) to provide loans to agri-MSMEs in rural communities in Kenya, Uganda, Tanzania, and Rwanda to adapt to a changing climate. IFAD and its funders are financing part of the first-loss and second-loss tranches of the facility. |

### 2. Quantitative data findings:

CPI's analysis reveals significant investment in adaptation-related projects involving commercial banks, **averaging USD 2.52 billion annually** in 2019-22, with the water and sanitation sector accounting for **around 95%** of this. Our data highlights the critical role these institutions play in financing climate adaptation and infrastructure projects, especially in emerging markets. However, it also reflects a bias in existing data sources towards large-scale infrastructure projects.

**Figure 9:** Value of Commercial Bank Projects by Year and Theme




**Sectoral analysis:** The water and sanitation sector represents the largest share of investments by commercial banks. These investments primarily focus on wastewater treatment, sanitation services, and industrial water reuse. The infrastructure under these projects aims to enhance resilience to climate change impacts, particularly in regions that are vulnerable to water scarcity and sanitation challenges. Commercial banks are also heavily invested in related WASH services, with notable projects such as sewage treatment plant expansions and wastewater reuse

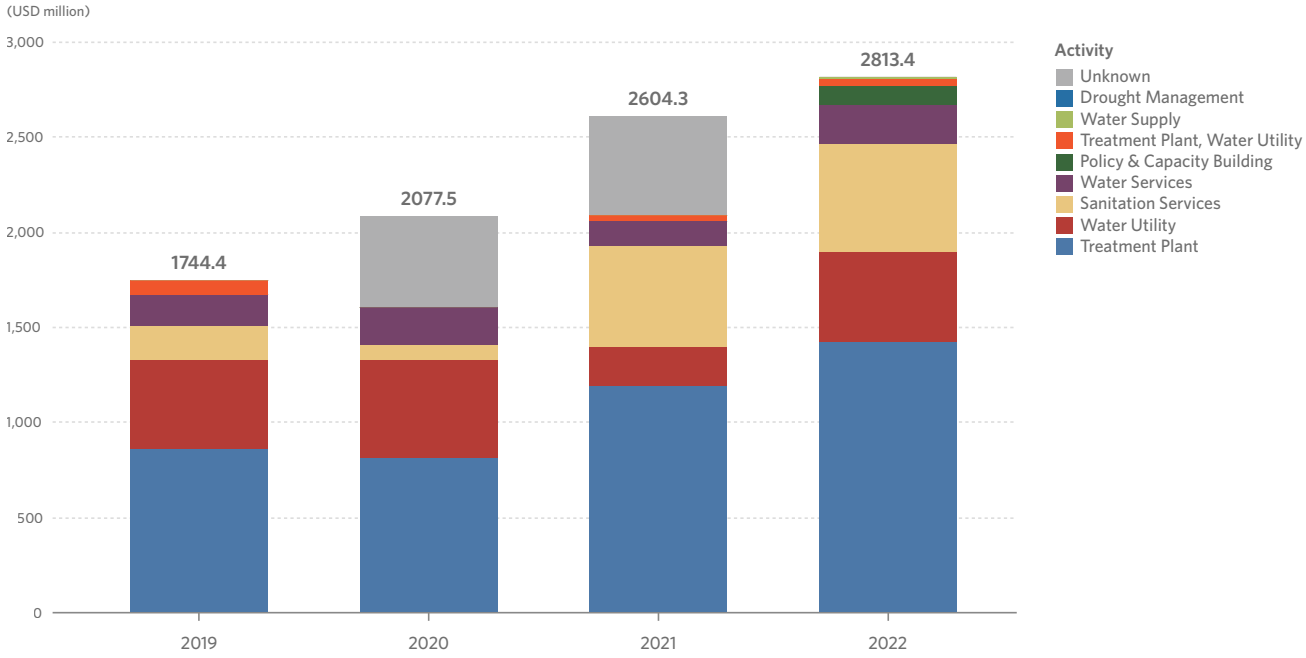
initiatives. These activities align with global climate adaptation goals, addressing critical needs for clean water access and improved sanitation in urban areas.

We find that commercial banks focus primarily on activities such as:

- **Wastewater treatment and reuse:** ensuring sustainable management of water resources and reducing the environmental impact of industrial processes.
- **Sanitation services:** developing infrastructure to improve public health outcomes and resilience to climate-related water challenges.

Commercial bank financing of water and sanitation is further captured in Figure 10.

**Figure 10:** Commercial Bank Investment in Water and Sanitation by Subsector and Year




**Financial contributions:** The financial value of investments by commercial banks is substantial, with multi-million-dollar projects contributing to climate resilience. These projects help bridge the gap between public sector initiatives and private sector capital flows, facilitating large-scale infrastructure developments. Our data shows that commercial banks have invested roughly USD 11.5 billion from 2019 to 2023, accounting for half of all project-level investment tracked.

**Regional focus:** Investments are concentrated in a few regions, most notably East Asia and the Pacific, where emerging economies require substantial funding to improve infrastructure and address climate adaptation needs. The involvement of commercial banks is essential to meet the financing requirements of these large-scale projects, particularly in non-OECD countries.

**3. Gaps in analysis and what is needed to better understand how commercial banks are operating in financing adaptation:**

In a survey of around 140 banks, the UN Principles for Responsible Banking found that while 45% of respondents said they were investing in or financing A&R (with credit products making up 69% of this figure), none of this finance is tracked, and the adaptation benefit is not defined. Only a few banks have published adaptation plans.

These findings are supported by analysis of commercial banks' annual reports by Climate X (2024), which suggests that most commercial banks are in the early stages of engaging with adaptation. The majority of banks' current adaptation activity is focused on physical risk assessment and management, with relatively little reported action on adaptation plan development, target setting for mitigating physical climate risks, or the creation of metrics to monitor the impact of their adaptation investments.

The progress seen in transition planning offers many useful lessons for the initial stages of creating adaptation plans. Wide uptake of adaptation plan development would significantly improve understanding of how banks consider both adaptation potential and climate risk across their current and future business.

### 4.2.2 ASSET MANAGERS

**1. Qualitative current and potential role of asset managers in adaptation:**

Asset managers are uniquely positioned to boost private financing of adaptation, given their role in allocating and overseeing large pools of capital and their influence in investee companies. There is limited evidence that asset management companies are prioritizing A&R in their activities. The following actions can help asset managers to realize their potential to expand financing for adaptation:

- **Assessing climate risk of portfolios:** Asset managers can utilize the highly developed physical risk assessment tools they already use to also assess climate risk across their portfolios. This can help them understand the effects of current and future climate impacts on valuations, allowing for investment strategies to respond appropriately. These assessments, along with transparent reporting through initiatives such as the TCFD, can also inform adaptation action in portfolio companies and improve risk awareness for asset owners.
- **Using voting power:** There is growing expectation that asset managers use their voting power (in their shareholder capacity) to encourage and influence action on areas including climate (Inside Track, 2023). The Net Zero Asset Managers Initiative, for example, requires its members to develop engagement and stewardship strategies for portfolio companies that include voting and escalation policies. Such policies could push portfolio companies to consider climate risk when making investment decisions and to take steps to adapt and protect the long-term value of their assets.
- **Investing in adaptation solutions:** Asset managers can invest in adaptation across public and PE and debt. The range of options is vast. Asset management companies can use their substantial research expertise to identify companies contributing to adaptation, using or developing adaptation metrics and wider frameworks and taxonomies in conjunction with wider investment criteria to identify opportunities. This can include innovative financing

options such as resilience bonds. Many asset managers are invested in large infrastructure projects and could ensure future projects include the adaptation to current and future climate impacts from the start.

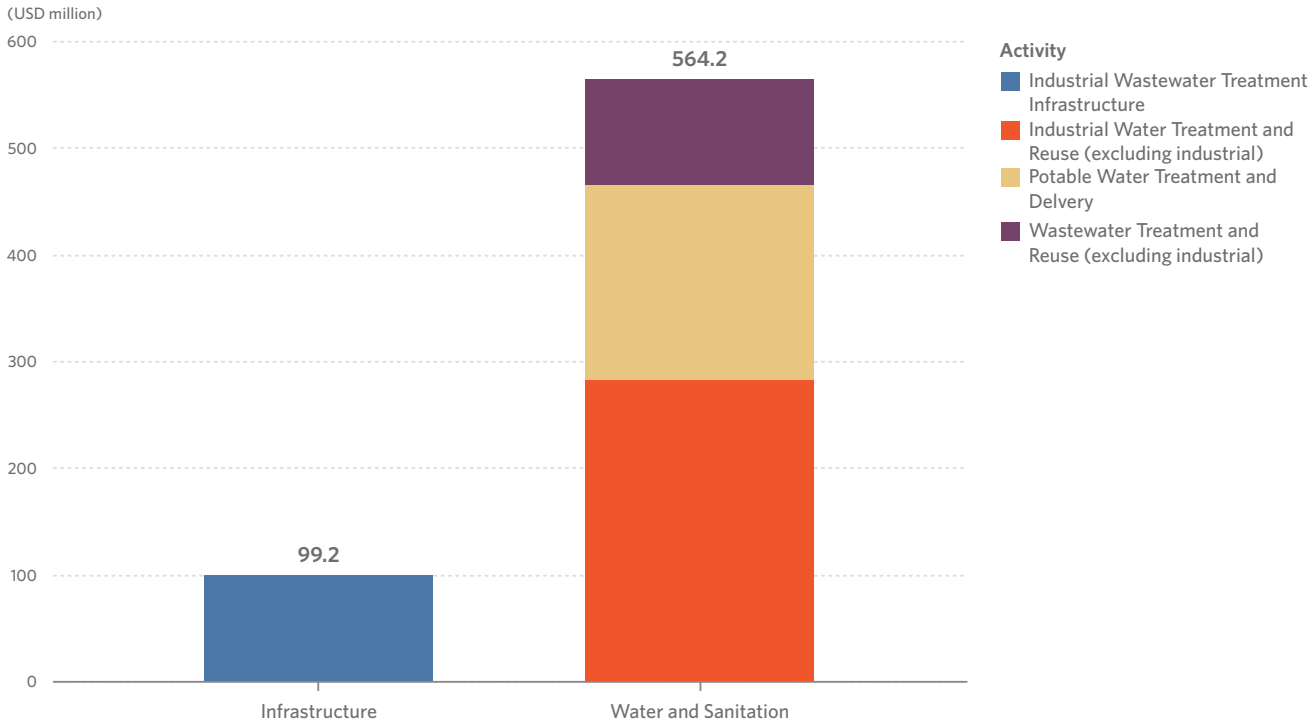
**Table 9:** Asset Managers Adaptation Example

| Example | Description |
|---|---|
| Macquarie Asset Management and UK Government adaptation of Bhadla Solar Park in India | Macquarie Asset Management's Green Investment Group and the UK Government have established a joint venture (UK Climate Investments) that has acquired a 40% stake in a 185 MW portfolio of solar parks in India. A smaller adaptation investment (~USD 900,000) has been made in robotic waterless cleaning technologies for one of the solar parks in Rajasthan, adapting to the increasing water scarcity in the area. |

### 2. Quantitative data findings:

Asset manager project-level investment is focused in the 1) infrastructure and 2) water and sanitation themes, amounting to USD 99 million and USD 564 million, respectively. Like other FI types analyzed, large-scale infrastructure projects draw the most investment from the private sector. This is in line with the typical model for asset managers, looking for lower-risk, long-duration assets to balance their portfolios.

**Figure 11:** Asset Manager Adaptation Investment by Activity



**3. Gaps in analysis and what is needed to better understand how asset managers are financing adaptation:**

The actual scale of asset manager investment in adaptation-related activities is likely to be significantly larger than what current tracking suggests. While direct project investment is the most visible form of adaptation finance, it represents only a fraction of the overall investment picture. The bulk of asset manager investments are directed toward companies rather than individual projects. To capture the full scope of adaptation-related investment, it would be essential to assess the entire portfolios of asset managers and determine the extent to which these companies' business activities contribute, either wholly or partially, to climate adaptation.

For the climate finance community, it is crucial to achieve a comprehensive understanding of these investment flows. By identifying how much capital is already directed toward adaptation through corporate channels, stakeholders can better understand the real scale of investment and determine where additional capital should be allocated to meet global adaptation needs. This effort would also allow asset managers to better align their investments with adaptation goals, which is critical for mobilizing private sector capital at the scale needed to address climate challenges.

Currently, asset managers do not report in detail on their adaptation-related investments, with the exception of specific funds targeting adaptation activities. This lack of transparency obscures the scale of private capital going to adaptation efforts. Encouraging asset managers to compile and share more granular information on how their investments align with adaptation objectives would clarify this issue. This would not only help to quantify existing adaptation finance but also highlight critical gaps where further investment is needed. CPI's Adaptation Tracking Taxonomy could serve as a useful tool for asset managers to develop a better sense of which investments might qualify as adaptation and other important considerations like maladaptation. However, it is important that CPI's taxonomy complements investment-specific guidance such as that provided in the Climate Bonds Resilience Taxonomy.[24]

### 4.2.3 PRIVATE EQUITY AND VENTURE CAPITAL

**1. Qualitative current and potential role of PE/VC in financing adaptation:**

VC funds are a pivotal source of adaptation finance, as they represent a critical segment of investors that focus on early-stage and high-risk investments in firms offering climate adaptation solutions. These investments are key for incubating companies that have the potential to scale and monetize the benefits of their adaptation solutions. They fill a unique niche by taking risks that other investors may not be taking, effectively acting as the bedrock for nurturing innovative adaptation solutions that can later attract broader financial support once they reach full commercial scale.

While VC investments do not limit themselves to a specific set of adaptation activities, there is a tendency to focus on sectors and markets such as food and agriculture, where rapid uptake of adaptation solutions is possible. The choice of sectors underscores a strategic approach to investment, selecting areas where the impact of adaptation solutions can be quickly realized and where the potential for scaling is high.

24 Climate Bonds Resilience Taxonomy Methodology, CBI, 2024

VC investors generally operate in market segments separate from other institutional investors. However, after VC investment successfully incubates adaptation firms, other institutions may provide co-financing at later stages. This transition from VC incubation to broader institutional investment is a vital pathway for scaling adaptation solutions to meet global needs.

VC investors primarily invest in small and medium-sized enterprises (SMEs), which exist across all sectors of the global economy and are thus well embedded throughout the adaptation finance ecosystem. Because SMEs operate in varied sectors, the range of adaptation activities that VCs can target through SME investment can be varied and tailored to the specific risks and opportunities of their respective contexts. This horizontal flexibility—combined with an ability to intermediate capital deployed by upstream sources—indicates a potential area for enhancing the adaptation finance ecosystem.

PE firms can also deliver or incentivize adaptation flows through tailoring their investment strategies and ensuring that portfolio companies are adapted to climate risk. The range of companies that PE firms hold stakes in can vary from public companies acquired in leveraged buyouts to smaller, early-stage businesses with high growth potential, and often include organizations facing liquidity issues that can use capital to restructure.

A common factor across these diverse business types is PE firms' ability to finance adaptation action in stake companies that can lead to resilient growth. As PE firms tend to look for growth or transformation in their equity holdings, they are often working with slightly longer time horizons which can lend themselves well to adaptation investments. High-potential companies with difficult-to-finance adaptation requirements could look to PE firms for investment.

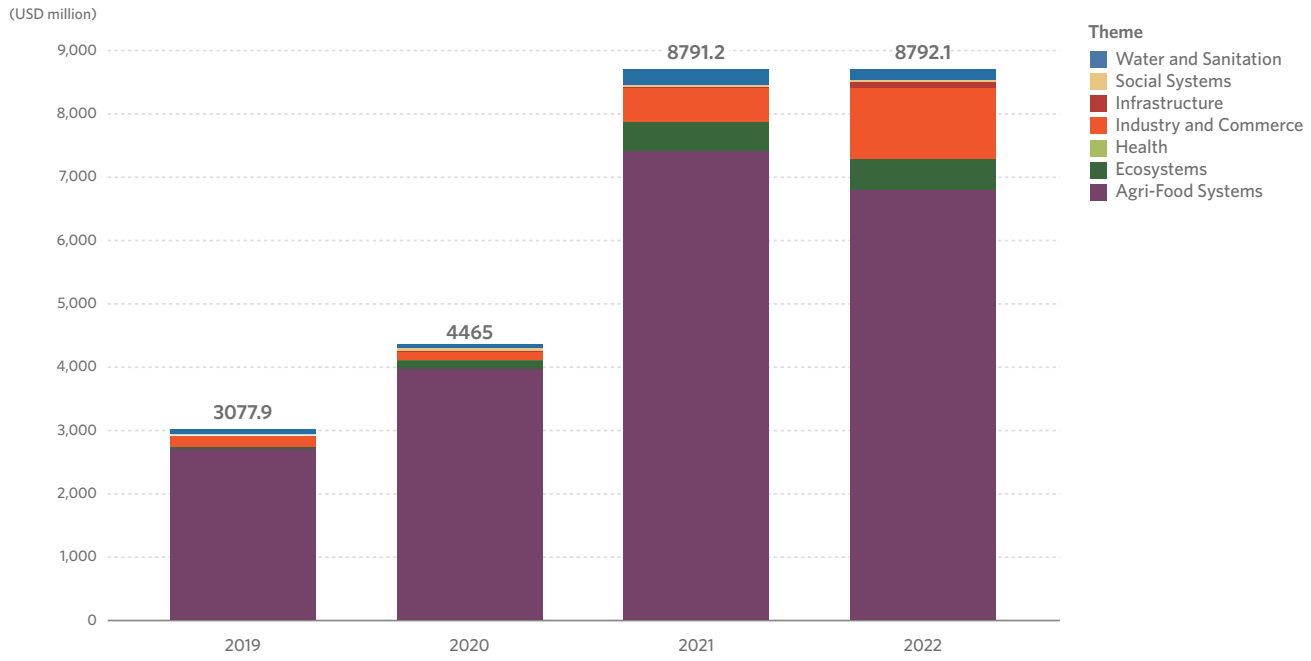
PE investors can also develop investment strategies that build in considerations of A&R. The relatively longer time horizon of PE investments means that investors' holdings are more likely to be affected by climate impacts as risks increase over time. Focused investment strategies combined with incorporation of climate risk considerations into due diligence and company selection processes can ensure that investments are made into companies that are well-adapted to their climate risks, or that have the potential to become so.

### 2. Quantitative data findings

Over the 2019-22 period, venture capital invested USD 6.28 billion on average annually in adaptation-related companies. Agrifood systems is the dominant theme for VC investment, amounting to 83% of all VC investment in this period. Investments in general agtech declined by 44% between 2021 and 2022, but adaptation-related agrifood investment remained strong.[25] 2023, however, saw a steep decline, also in line with the wider sector, influenced by economic challenges such as inflation, geopolitical tensions, and supply chain disruptions.

25 AgFunder. (2023). Global AgriFoodTech Investment Report 2023. https://research.agfunder.com/agfunder-global-agrifoodtech-investment-report-2023-fb5628814916427c849881af50d068f2.pdf

**Figure 12:** VC Adaptation Investment by Theme

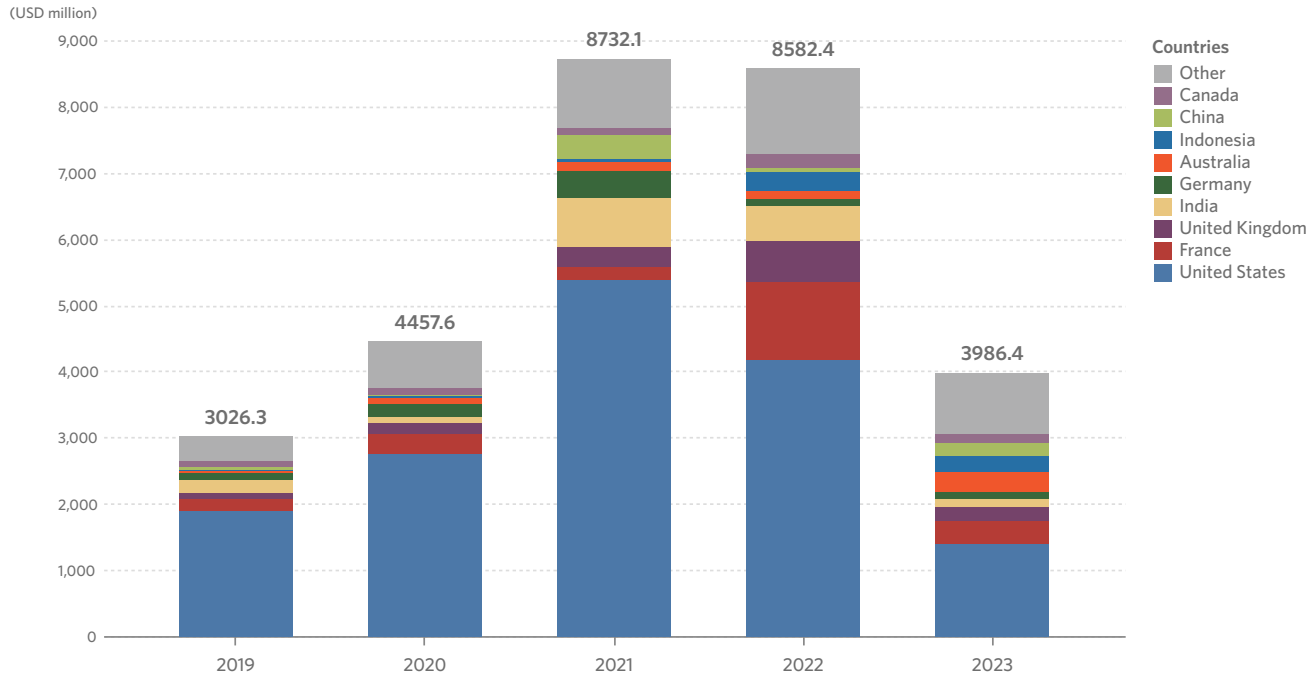



The agrifood systems sector accounts for the largest share of investment across all years, with significant contributions toward improving agricultural resilience, food security, and sustainable farming practices. The rise in agrifood systems investments from USD 2.7 billion in 2019 to over USD 7.3 billion in 2021 underscores the critical role this sector plays in mitigating climate risks to food production, especially in emerging markets.

Investments in ecosystems have seen notable increases, reflecting growing awareness of the need to protect natural resources and biodiversity as part of broader climate adaptation strategies. The sector saw consistent growth, peaking at over USD 570 million in 2023, with projects primarily focused on habitat restoration, biodiversity conservation, and sustainable land management practices.

While the preponderance of investment is directed towards companies headquartered in developed countries, notably the US, recent years saw a substantial increase in investment going to adaptation-relevant companies located in developing countries, where climate risks are more acute. India and Indonesia received large amounts of investments over the period (USD 1,795 million and USD 580 million, respectively), with agribusiness marketplace activities performing strongly in both locales. Agrifood cold-chain storage companies in India received USD 544 million over the period, while fishery production automation companies attracted USD 305 million in Indonesia.

**Figure 13:** VC Adaptation Investment by Country




### 3. Gaps in analysis and what is needed to better understand how PE and VC is financing adaptation:

Though this analysis substantially improves the tracking of PE and VC adaptation finance, a primary barrier to fully understanding their role is the lack of transparency and standardized reporting. Private firms and early-stage startups are not subject to the same reporting requirements as publicly traded companies, and as a result, their adaptation-related activities go untracked to an even greater extent. This creates a significant data gap, making it difficult to assess the true scale of PE and VC investment in climate adaptation.

To unlock the full potential of these financial actors, it is essential to push for greater disclosure on how their investments contribute to adaptation. This could involve encouraging firms to report more granular information on the climate risks their portfolio companies face, as well as the measures being taken to address them. In the VC space, establishing clear definitions and metrics for adaptation-related innovation could help ensure that early-stage funding is directed to solutions that build resilience to climate change.

In analyzing finance from PE/VC to SMEs specifically, it is necessary to understand SMEs' business activities in detail. Many SMEs adopt adaptation strategies to mitigate risks from climate change, such as investing in drought-resistant crops, flood-proof infrastructure, or water-efficient technologies. However, these activities are often classified as general business operations rather than climate adaptation, rendering an incomplete picture of their role in the broader landscape of adaptation finance.

Collecting reliable data on SME investment will be an ongoing challenge for the climate finance community. This is due to the relatively small scale of SMEs' commercial activity and financing flows of each individual enterprise. Additionally, many SMEs will be situated in EMDEs, where data collection can be difficult. A key question for SMEs' adaptation finance is to identify fit-for-purpose financing structures that can support A&R activities, considering they are likely to involve small ticket sizes and general SME challenges of accessing finance, particularly in EMDEs.

### 4.2.4 PENSION FUNDS

**1. Qualitative current and potential role of pension funds in financing adaptation:**

Pension funds have large pools of stable capital that are particularly well suited to long-term and big-ticket projects such as resilient infrastructure developments. Pension funds can also deliver on adaptation objectives, whether through regularly assessing and disclosing the climate risks that are associated with their portfolios, or by practicing responsible stewardship of investee companies, encouraging them to take adaptation action to address any identified physical climate risks.

Current pension fund adaptation action is mostly focused on climate risk assessments and disclosures. Trustees of large pension funds—particularly in Europe and North America—are increasingly required to report on their climate risk, and in some cases, to have effective policies in place to manage these risks.[26] It is too early to judge whether these disclosures and policies are leading to investment in adaptation activities. However, the regulatory changes represent an opportunity for trustees to develop strategies that help address the climate risk of existing investments and for funds' asset managers to develop frameworks for assessing the embodied climate risk of future investments. Potential strategies for managing climate risk can include exiting and engagement: that is, divesting from assets with high exposure to climate hazards, or engagement with investee companies to encourage in adaptation action that address the underlying causes of vulnerability and reduce climate risk.

Despite pockets of action on adaptation from pension funds, net finance flows from pension funds to adaptation appear limited. While large pension funds are beginning to designate climate investing allocations, those allocations to date have mainly focused on mitigation. Fund managers' fiduciary duties to pursue stable, long-term returns mean that not all adaptation investments will be immediately suitable. However, there are investment options such as large-scale climate-resilient infrastructure projects and emerging resilience bonds that could meet investment criteria as well as driving action on A&R.

**Table 10:** Pension Fund Adaptation Examples

| Example | Description |
|---|---|
| KPA Pension investment in green bond targeted at regional action on adaptation and mitigation | Swedish private pension firm KPA Pension has invested over USD 75 million in a green bond focused on investing in adaptation and mitigation in the Swedish region of Telleborg. Potential adaptation measures funded by the proceeds of this bond could include urban mini-forests and water conservation measures. |
| Kenyan pension fund investment into project bonds for financing resilient infrastructure | USAID provided funding to bring together a consortium of Kenyan pension funds to invest in resilient road infrastructure, upgrading road networks with paving to make them less vulnerable to extreme weather and improving usability. The USD 17 million project bond was oversubscribed by 157%, demonstrating a willingness of pension funds in that region to invest in resilient infrastructure project if sufficient technical assistance and derisking provisions are put in place. |
| Aviva Climate Transition Equity Fund | Aviva have launched an equity fund that will take investment from opt-in workplace pension scheme customers. The fund will invest in companies taking action on adaptation and mitigation, deriving at least 20% of revenue from activities in these areas. |

26 WTW. (2024). Navigating climate risks: A perspective on trustee fiduciary duty in UK pension schemes. https://www.wtwco.com/en-gb/insights/2024/06/navigating-climate-risks-a-perspective-on-trustee-fiduciary-duty-in-uk-pension-schemes

**2. Quantitative data findings:**

No new data findings are available for pension funds through the current methodology. The sub-section below outlines the significant gaps in understanding the current role of pension funds in adaptation finance.

**3. Gaps in analysis and what is needed to better understand how pension funds are financing adaptation:**

Pension funds have the potential to significantly contribute to climate adaptation, yet the scale of their involvement is difficult to assess from the current data environment. Institutional investors, including pension funds, control large pools of capital—approximately USD 44 trillion globally—that could be directed toward adaptation efforts. However, the majority of pension fund assets are not currently allocated to climate-related projects, with less than 1% invested in low-carbon assets.

Similar to asset managers, a comprehensive assessment of pension fund contributions to adaptation requires a deeper understanding of their investment portfolios. Much of the current climate finance reporting focuses on direct project investment, while substantial portions of pension fund assets are tied up in companies and sectors only indirectly related to adaptation. To capture the full scope of adaptation investment, it is crucial to analyze how pension fund investments align with corporate strategies that support climate resilience, such as water management, infrastructure upgrades, or ecosystem protection.

It is important to note that pension funds face increasing climate risk exposure, particularly in countries where assets are heavily concentrated domestically. Many pension funds hold a substantial portion of their assets in national markets, making them vulnerable to physical climate risks such as extreme weather events or rising sea levels. This geographic concentration further emphasizes the need for greater diversification of pension fund portfolios, particularly toward climate-resilient sectors and regions.

A key challenge is the lack of detailed disclosure on adaptation-related investments by pension funds. The regulatory landscape varies widely, with some countries, such as those in the EU, leading the charge by requiring pension funds to disclose climate-related activities, while others lag behind. Pushing for more robust reporting frameworks that require pension funds to detail their exposure to climate risks and their investments in adaptation could provide a clearer picture of how these institutions contribute to global adaptation efforts.

### 4.2.5 INSURERS

**1. Qualitative current and potential role of insurance in financing adaptation:**

The insurance and microinsurance industries can develop a pivotal role in the adaptation finance ecosystem, leveraging their deep-rooted expertise in risk and impact analysis to support investments in climate A&R. Uniquely positioned to operate both ex-ante (prior to a climate

hazard) and ex-post (rebuilding in the aftermath of a climate hazard), the insurance industry already possesses substantial capacity and know-how in risk and impact analysis.[27]

An increased focus on affordable, widely available insurance against climate risks is timely and important. In the aftermath of increasingly frequent and intense climate-related weather events, those in affected areas can experience financial shocks that range from manageable to extreme. Insurance payouts following disaster events can speed households' and businesses' recovery and avoid compounding risks such as water-borne diseases after flooding. However, this increased ability to absorb and respond to shocks only addresses one part of resilience. We must also consider what can be done to limit vulnerability to climate shocks, and, in some cases, what is needed to transform systems to reduce exposure. Insurance can also play a role in incentivizing action on these fronts, with key areas of opportunity detailed below:

- **Preventative adaptation measures:** Insurance policies can incentivize policyholders to take measures that mitigate climate risks. Examples of these measures include risk-adjusted premiums that offer improved pricing for better-adapted businesses and households, or standards or conditions on insurance policies that require customers to take certain measures to be eligible for payouts—similar to contents insurance requiring policyholders to have secured their belongings. A survey of US residential property insurance holders suggested that 77% would be willing to take adaptation measures to reduce their premiums.[28]
- **Resilient reconstruction:** Resilient reconstruction efforts or 'build back better' initiatives focus on encouraging policyholders to improve their resilience following disasters or damages from climate events, avoiding reconstruction that reinstates the previous level of climate risk. These efforts could take many forms, from information provision about potential resilience measures and their efficacy to additional payments for implementing these actions. As insurers are usually only required to pay out sums that are needed to restore assets to their previous condition or similar, it can be challenging for private actors to make the case to fund policyholders' A&R measures if more costly than the actions they would otherwise take. Though the insurer may see the benefit through reduced risk and lower probability of payouts/lower quantities of payouts, the 12-month insurance cycle means that the customer may not stay with them long enough for them to realize the financial benefit of the reduced risk.
- **Underwriting adaptation projects and projects with adaptation components:** As underwriters, insurers can facilitate risk transfer for potential investments in adaptation solutions and projects with adaptation elements. Where investors need adjustments to make risk-return profiles more attractive, insurers have a crucial role in crowding in private capital.[29]
- **Owners and providers of climate risk data:** Insurers can collect vast arrays of localized climate risk data through insurance processes. There is potential for a dynamic relationship between insurers and other actors, such as government planners and building developers, to anticipate and support climate risk management.[30]

27 WMO. (2020). The value of GBON: Exploring the Insurance Sector. https://library.wmo.int/records/item/57183-the-value-of-gbon-exploring-the-insurance-sector

28 Center for Insurance Policy and Research. (2021). Extreme Weather and Property Insurance: Consumer Views. https://content.naic.org/sites/default/files/CIPR%20Consumer%20property%20ins%20report%208-21_0.pdf

29 FSD Africa. (2022). Leveraging the African insurance industry to create resilient African economies. https://fsdafrica.org/press-release/leveraging-the-african-insurance-industry-to-create-resilient-african-economies/

30 Surminski, Barnes, and Vincent. (2019). Insurance as a catalyst for government climate planning? https://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2019/10/working-paper-327-Surminski-et-al.pdf

- **Institutional investment:** Insurers can channel funds towards A&R in their capacity as institutional investors, as they invest their received premium income to generate returns to meet future liabilities. Current global assets under management of insurers sat at USD 44 trillion in 2021.[31] Insurers tend to invest in fixed income instruments and equity and with their longer liabilities, can finance longer-term investments.

There are many routes into A&R investment for insurers. Yet, most of these institutions are focused on expanding coverage of insurance against climate risk. There is no doubt that risk transfer plays an important role in adjusting to a warming world—but insurers can go beyond this to encourage or provide financing that addresses and transforms root causes of exposure and vulnerability.

It is challenging to paint a picture of insurers' adaptation action beyond the risk transfer achieved through expansion of insurance coverage of climate damages. This is both because the alternative routes for insurers' A&R efforts identified above are relatively nascent and because initiatives are disparate and reported in an inconsistent manner. However, some notable examples are detailed below:

**Table 11:** Insurance Adaptation Action Types and Examples

| Type | Examples |
|---|---|
| Preventative adaptation measures | In September 2023, commercial property insurer FM Global announced its second consecutive resilience credit to support client investment in climate resilience solutions. The credit, collectively worth approximately USD 350 million, will be shared among FM Global's clients, providing them with additional resources to guard against extreme weather hazards such as wind, flood, and wildfire. |
| Resilient reconstruction | FloodRE Build Back Better offers households the chance to install property flood resilience measures up to the value of just over USD 13,000 when repairing their properties after a flood. |
| Innovative insurance products | Through a Climate Resilience for All/Self-Employed Women's Association program, 50,000 women across the states of Rajasthan, Maharashtra, and Gujarat each received USD 5 payments to cushion financial losses from lost wages as temperatures topped 40°C in May 2024. More than 46,000 women were given additional insurance payments of up to USD 19.80 each. Payments across the program amounted to over USD 340,000.[32] |
| Institutional investment | The Net Zero Asset Owner Alliance is galvanizing institutional investors (including insurers) to reallocate capital to the technologies, sectors, and projects that will accelerate the transition to a post-carbon economy. |

The insurance sector will require significant transformation to reach its full potential in encouraging, incentivizing, and financing adaptation action. Responsible insurers must collaborate to find solutions that ensure that areas being hit with increasingly frequent and intense weather events do not become uninsurable. They can also explore new business models, such as risk-adjusted premiums and resilient reconstruction requirements, making adjustments to the structuring of policies as necessary over time.

Parametric microinsurance that has low premiums and lower coverage limits can utilize innovative weather monitoring technology to improve the speed and efficiency of payouts,

31 IAIS. (2022). Global Insurance Market Report (GIMAR). https://www.iaisweb.org/uploads/2022/12/GIMAR-2022.pdf
32 Climate Resilience for All. (2024). Women's Climate Shock Insurance and Livelihoods Initiative. https://www.climateresilience.org/wcsprogram

ensuring resources reach those in need without the delays of a claims process. Transparent and accessible information that tells policyholders how likely they are to meet payout thresholds is needed, especially where there are limited numbers of providers. Over the next few years, insurers can also consider how they can design policies that provide protection for slow-onset events or events with compounding damages—such as droughts followed by floods—that require additional assistance.

Eventually, insurance could become part of a wraparound climate risk management service, covering assessment of climate risk, insurance, and financing for adaptation action for businesses and consumers.

**2. Quantitative data findings:**

Data on the insurance sector's investments in climate adaptation is nearly non-existent, presenting a significant gap in understanding the private finance mobilized for adaptation efforts. While insurers are heavily involved in managing and mitigating climate risk through underwriting policies and developing new products, their investment activities related to adaptation are largely unreported. This lack of data poses a challenge for the climate finance community in assessing the full potential of the insurance sector in contributing to global adaptation goals.

**3. Gaps in analysis and what is needed to better understand how insurers are financing adaptation:**

Insurers, as major institutional investors, manage vast portfolios that could be directed to climate-resilient infrastructure, water management, and other adaptation-related activities. However, without detailed reporting on how their capital is allocated to such projects, it remains difficult to gauge the extent of their contribution. This lack of transparency prevents a comprehensive understanding of where private capital from the insurance sector is being deployed and where it could be better leveraged to address adaptation needs.

This underscores the need for more robust disclosure frameworks and targeted reporting standards. With more data on how insurers are investing in adaptation, the finance community could unlock new opportunities for mobilizing private capital and ensure that investments are aligned with climate resilience objectives.

### 4.2.6 CORPORATIONS

**1. Qualitative current and potential role of corporations in financing adaptation:**

Corporations will have a significant role to play in financing adaptation. Large businesses operating across multiple countries will be exposed to various climate hazards that could negatively impact their own assets and operations, their supply chains, and their customer markets. Domestic corporations can use knowledge of local adaptation needs to provide tailored products and services to both businesses and consumers.

The main adaptation financing opportunities for these actors include:

- **Addressing their own climate risk:** Corporations can assess and address their assets and operations' exposure to climate risk and invest in adaptation solutions that address these.

Large multinationals should consider engaging in risk assessment and disclosure activities to inform corporate adaptation strategies.

- **Addressing supply chain risk:** Climate risks in the supply chain have potential to significantly disrupt operations for both multinational and domestic corporations that rely on upstream inputs or imports. Investing in adaptation can make these businesses more resilient and provide market advantage over competitors with similar exposure to climate hazards that have not made efforts to adapt.
- **Producing adaptation products and services:** Demand for adaptation products and services will rise as climate impacts become more frequent and severe. Corporations can invest to meet this demand and take up opportunities to gain an early advantage in some relatively nascent markets.

**Table 12:** Corporations Adaptation Examples

| Type | Examples |
|---|---|
| **Corporations addressing their own climate risk** | Chip manufacturing is highly water intensive and vulnerable to climate-induced drought. Intel has partnered with the local government in Arizona to build a reclaimed water facility to address the drought risks faced by its Ocadillo plant. The facility will supplement local groundwater and provide water resources to the Ocadillo plant for industrial cooling.[33] |
| **Adaptation products and services** | There is increasing global demand for buildings that keep cool in extreme heat. Kéré Architecture have built schools in Burkina Faso that use passive cooling techniques such as natural ventilation and high thermal capacity-building materials to ensure that students can remain comfortable without electric air conditioning.[34] |

### 2. Quantitative data findings:

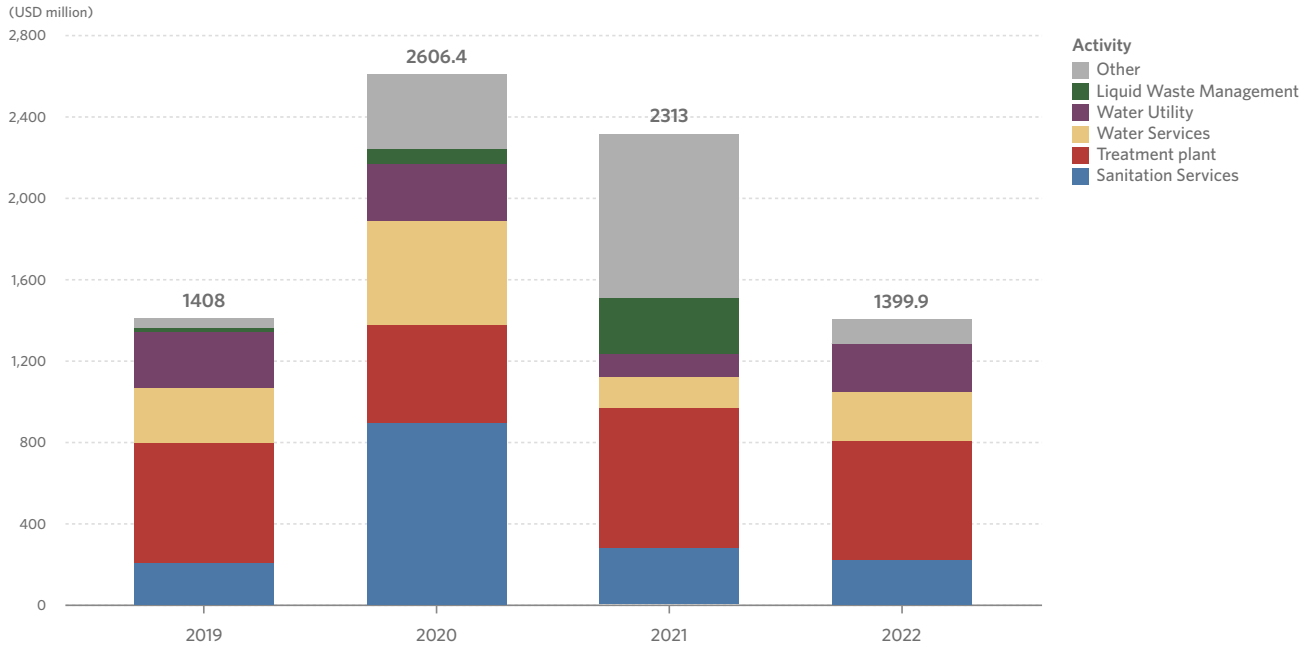
We track USD 1.93 billion annual average in 2019-22 in corporate project-level investments. Corporations are actively contributing to climate resilience by financing and executing large-scale infrastructure and capacity-building projects, which are pivotal to addressing the impacts of climate change. Investments tracked are predominantly in the water and sanitation and WASH services sectors. As with commercial banks, this also reflects the data that is available to assess, driven by large-scale infrastructure projects.

**Key themes and sectors:** Similar to commercial banks, corporations have concentrated much of their investment in water and sanitation infrastructure. These projects focus on building and expanding sewage treatment plants and implementing innovative industrial water treatment and reuse practices. These activities are essential in mitigating water scarcity, improving public health, and enhancing urban resilience. Corporations are also key players in WASH services, particularly through the construction and operation of treatment plants, as well as capacity-building initiatives in sanitation services. The projects aim to provide clean water access, ensure effective wastewater management, and foster resilient urban systems capable of adapting to climate stresses.

33 Gilbert Sun News. 2022. Unique water plant enabling Intel's massive expansion. https://www.gilbertsunnews.com/news/unique-water-plant-enabling-intel-s-massive-expansion/article_e0627520-296f-11ec-9073-8b20fb045903.html
34 Holcim Foundation. (2013). Secondary school with passive ventilation system in Burkina Faso. https://www.holcimfoundation.org/projects/secondary-school-with-passive-ventilation-system

In terms of specific sectors, corporations are involved in both industrial and municipal projects that emphasize the sustainable use and management of water resources. These activities align with adaptation strategies that reduce water demand and increase the efficiency of water systems. Corporate projects also focus on expanding access to sanitation in vulnerable regions. By developing infrastructure for sewage treatment and wastewater management, these projects directly contribute to improving public health outcomes and preparing urban areas for the challenges of climate change.

**Figure 14:** Corporate Investment in Water and Sanitation by Subsector and Year




**Financial contributions:** Corporations contribute significantly to the total investment in climate-related infrastructure, funding multi-million-dollar projects that advance adaptation goals. These investments fill essential gaps in the infrastructure of developing regions, especially where public funding alone is insufficient to address pressing climate needs. The decrease in funding for water and sanitation projects from corporate actors since 2020 may have resulted from the COVID-19 pandemic. Corporations' investment via equity requires significant upfront capital; companies facing tighter margins during the pandemic and its aftermath may have pulled back from such investments, even though public sector involvement (e.g., through concessional loans or grants) remained steady.

**Regional focus:** A substantial portion of corporate investments are directed toward regions like East Asia and the Pacific, particularly in non-OECD countries where infrastructure development is crucial for climate adaptation. Corporate investments often focus on emerging economies, where the private sector plays a critical role in boosting resilience through improved water and sanitation systems.

**3. Gaps in analysis and what is needed to better understand how corporations are financing adaptation:**

The true extent of corporate investment in adaptation-related activities is likely to be underreported in this data. While some corporations engage directly in adaptation projects, much of their contribution occurs indirectly through supply chains, infrastructure upgrades, and innovations that enhance resilience to climate risks.

Corporations invest in sectors that are highly vulnerable to climate change, such as agriculture, water management, and energy. For instance, companies with extensive global supply chains may invest in climate-resilient infrastructure to protect their operations from disruptions caused by extreme weather events or resource shortages. However, much of this investment is not explicitly categorized as climate adaptation, making it difficult to assess the full scope of their contributions. Additionally, internal investments are not routinely disclosed, meaning that this assessment cannot be conducted by third parties such as CPI.

To fully capture the extent of corporate investment in adaptation, a detailed analysis of companies' business operations is required. Many large companies are already integrating climate risk assessments into their financial strategies, driven by both regulatory pressure and the need to mitigate operational risks. For example, sectors like agriculture and food production are adopting drought-resistant technologies, while energy companies are investing in resilient infrastructure to withstand climate impacts. These activities, while often framed as risk management, are inherently adaptation-focused and contribute to broader climate resilience.

Encouraging corporations to disclose more granular data on their adaptation investments could significantly improve transparency and provide insights into where private capital flows. Additionally, greater collaboration between corporations and governments, particularly in developing countries, could help scale adaptation efforts by leveraging both public and private resources. Public-private partnerships, for example, are critical in sectors like water management, where the private sector can provide expertise and financing to complement public adaptation goals. As public investment is involved, this data is more likely to be available for analysis.

### 4.2.7 CONSUMERS AND HOUSEHOLDS

**1. Qualitative current and potential role of consumers and households in financing adaptation:**

Consumer and household adaptation finance assessed in this report is relatively clear cut—these expenditures are directly linked to equipping consumers and households with the means to undertake adaptation activities as specified in the taxonomy. In particular, consumer and household adaptation finance focuses on purchasing products (e.g., building improvements, specialized equipment, specialized financial products) that facilitate adaptation—for example, a household investing in flood-resistant building materials during home renovation. Accordingly, no proof of intent is required to qualify these purchases for tracking, and this approach integrates easily into broader efforts that utilize the taxonomy to identify and prioritize investments in A&R.

Private individuals may source capital used for adaptation products from commercial banks, government grants, and other financing schemes. However, this financing is already captured as

flows from these other institutions, so it is not double counted as household spending. Instead, a sizable portion of the capital that is considered consumer spending on adaptation comes directly from household income. In addition to household income, the interest paid on loans used to finance household and consumer adaptation projects is also included.

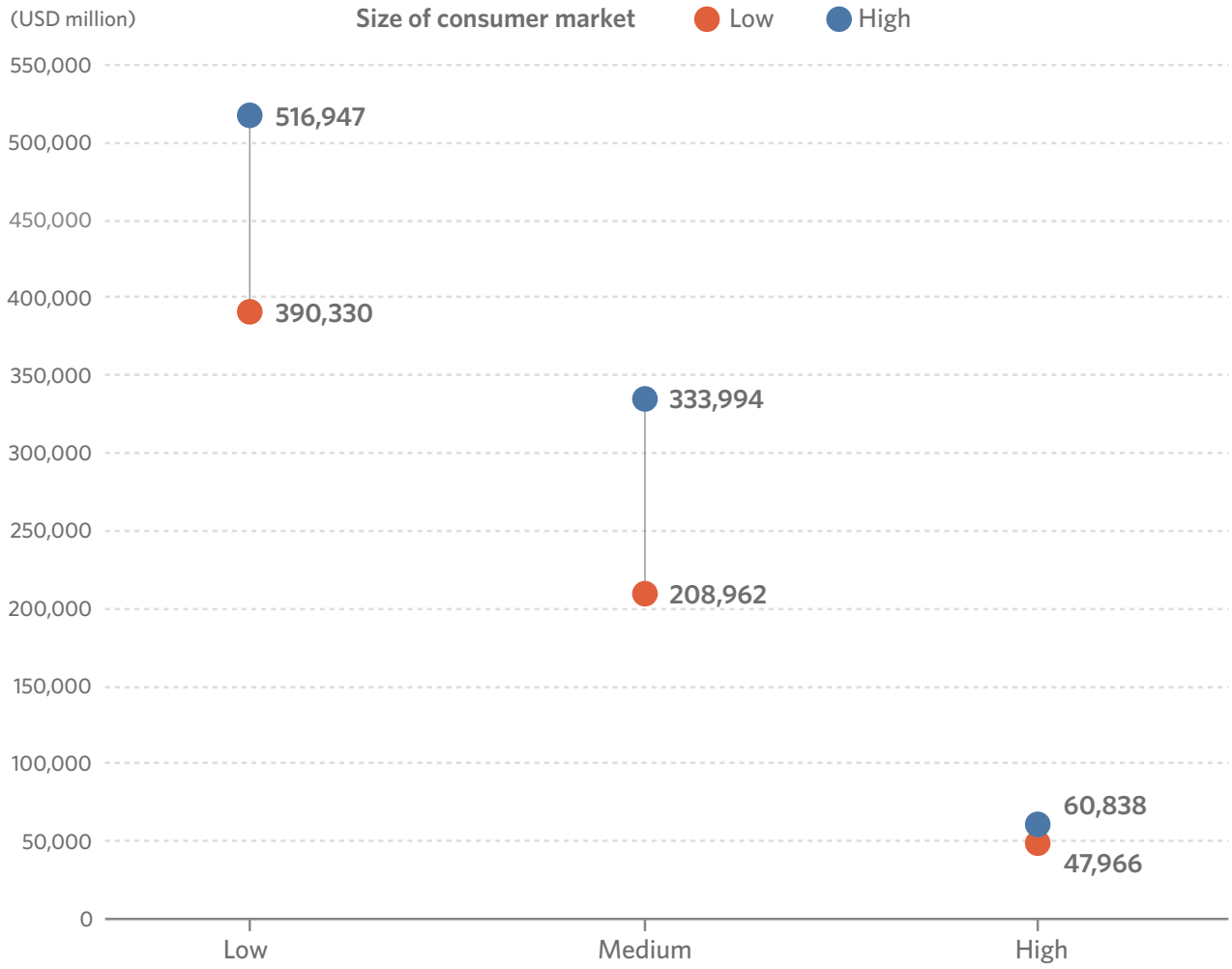
**2. Quantitative data findings:**

Tracking and analysis of consumer and household adaptation finance flows are based on aggregating global consumer and household expenditures on products used to undertake adaptation activities. In theory, transaction-level data collection of consumer and household adaptation investment would require monitoring of billions of small-value transactions around the world.

To analyze consumer and household adaptation finance flows on a more practical basis, product market sizes are used as an approximation of the total value of purchasing transactions for a given product linked to adaptation activities. Similar to the taxonomy activities, products are labeled with an adaptive likelihood to reflect the fact that consumer and household products used for adaptation activities can also be deployed in non-adaptive contexts.

Assessing 113 consumer and household products, annual financing towards high adaptive likelihood products is estimated to fall between USD 48 and 61 billion. The vast majority of this expenditure contributed towards flood management infrastructure, air conditioning systems, and other activities to protect against acute disasters. An additional USD 209 to USD 334 billion flows towards medium adaptive likelihood products, while USD 309 to USD 517 billion is spent on low-adaptive likelihood products. The increasingly large range of estimated financing flows going to medium and low-adaptive products reflects the fact that relatively few products qualify as having high adaptive likelihood.

**Figure 15:** Annual Consumer and Household Finance by Adaptation Likelihood




Although this analysis does not pinpoint a precise figure for consumer and household adaptation finance, it does demonstrate that the aggregate value of consumer and household purchases of adaptation-linked products is likely quite substantial. This finding further indicates potentially large addressable demand for A&R goods and services that are produced downstream of financing from institutional investors (i.e., PE/VC, banks, asset manager, etc.), which could be a motivation to accelerate commercial financing flows towards adaptation.

### 3. Gaps in analysis and what is needed to better understand how consumers and households finance adaptation:

Unlike the tracking of financial flows for the eight other types of private actors, the tracking of adaptation finance for consumers and households relied on non-project-based market size estimates as its central data source. This type of data is readily available but extremely difficult to validate and often prohibitively expensive to acquire. CPI was not able to delve into the methodologies of the market size estimates and validate their approaches. Nonetheless, our estimate of household and consumer spending on adaptation is intended to convey potential magnitude and not a precise spending value. An additional issue with using non-project-based data is that it is very difficult to ascertain consumer sentiment and determine if the adaptation products were purchased with the awareness of their benefits for resilience.

# 5. NEXT STEPS AND CONCLUSION

The methodology and resulting findings outlined in this report highlight several areas for continued action and collaboration to improve understanding of private sector investment in climate adaptation. Next steps are captured below for CPI, private sector actors, and public sector entities:

**Climate Policy Initiative**

1. **Continue to advance the fit-for-purpose private adaptation finance tracking taxonomy** and build on the learnings and data produced in this work to advance CPI's broader global climate finance tracking workstream. To do this:

    a. **Refine and further test the adaptation taxonomy** developed here to ensure consistent tracking and reporting. As resources allow, develop normative assessments of the adaptive value of each adaptation activity and implement tagging for other overlapping environmental and social objectives. Also pursue further analysis of the additionality of adaptation activities, where the concept of additionality qualifies the incremental spending that would not have occurred, if not for the presence of climate hazards. Iterative work could also focus on incorporating early user feedback to increase the usability of the taxonomy.

    b. **As data continuously improves across sources and providers, future releases of CPI's GLCF will use the methodology outlined in this report** to inform our broader adaptation taxonomy used to classify public and private adaptation-related investments, while ensuring alignment with taxonomies developed by our public partners such as the joint MDB group.

3. **Continue to work with relevant data and taxonomy partners**, including CBI, Vibrant Data Labs, and Tailwind, to refine and iterate on the taxonomy and to ensure the taxonomy is interoperable, when possible, with existing frameworks used by reporting institutions.

4. **As resources allow, pursue sector-level deep dives** on private sector project-level adaptation investment. As indicated in Section 4, the water and sanitation theme receives a plurality of tracked private adaptation finance and is thus a priority for future work. CPI has already begun preliminary analysis for a water and sanitation deep dive using more comprehensive data offered by Global Water Intelligence.

5. **As resources allow, continue to identify and pursue new data and collection methods** to improve the tracking of private adaptation finance. Specifically:

    a. **Commercial FIs:** Pursue one or a set of institution-specific deep dives and potential additional data collection of EMDE-based commercial FIs.

    b. **Asset managers and corporations:** Advance corporate action on adaptation and related ownership structures (and analyze the quality of private adaptation) and evaluate other data sources of corporate action.

    c. **PE and venture capital:** Pursue new data sources on venture capital in EMDEs.

d. **Pension funds and insurers:** Pursue further analysis of primary data sources (e.g., environment/sustainability reports), and ideally pursue one or a set of institution-specific deep dives.

e. **Consumers and households:** Trial analysis of sales data for a set of activities (i.e., cooling solutions) akin to electric vehicle purchases and (with sufficient funding and/or partnership) capture further market analysis.

**Private Institutions:**

- Raise awareness and build capacity within finance and operations teams on the benefits of reporting adaptation finance externally, including during engagements with investee companies. Sector-level experts should be trained in climate adaptation concepts and terminology to enable their reporting and tracking of A&R activities. When sector specialists within FIs have a better understanding of climate vulnerability, resilience building, and climate adaptation finance, it will improve documentation efforts.
- Apply the adaptation tracking taxonomy advanced through this work to develop a better sense of which investments might qualify as adaptation and other important considerations like maladaptation. Leveraging the taxonomy as a resource, in the VC space, establish clear definitions and metrics for adaptation-related innovation to help ensure that early-stage funding is directed to solutions that build resilience to climate change.
- Support public efforts to align on more robust reporting frameworks that require FIs to detail their exposure to climate risks and their investments in adaptation and report more granular information on the climate risks portfolio companies and/or projects face, as well as the measures being taken to address those risks.

**Public Institutions:**

- Public FIs that are relatively advanced in their tracking of adaptation finance can and should offer ambitious and transparent leadership on adaptation finance tracking. Most notably, public FIs should pursue increased openness regarding the criteria and methodology used (with examples) to identify and quantify adaptation finance and the data, models, and scenarios that are relevant in the context of tracking adaptation action.
- Donors and other concessional finance providers should increase finance for robust climate information on hazards, exposures, and vulnerabilities. This kind of climate data is severely limited globally, especially in EMDEs. This information is critical to a full accounting of the climate context in which activities are financed and can substantially improve analysis of the climate adaptation relevance of investment.
- Leverage concessional finance and technical assistance to build the capacity of domestic and regional private FIs—such as regional commercial banks, locally based pension funds, and regional insurers in EMDEs—to evaluate and act on climate risks. This could also include a concerted effort to increase their membership in international financial initiatives such as the UN Principles for Responsible Investment and Banking, and the IDFC—and to provide these institutions with the resources to participate actively. This action could substantially improve the reporting environment on climate adaptation.

- Regulators should strongly consider requiring private sector disclosure of climate risks—via national legislation and/or via development finance institution on-lending. Domestic financial regulators should consider requiring all financial sector actors to disclose climate-related risks in line with the TCFD recommendations.

While much more can be done, this report represents a significant advancement in methodology and execution of private adaptation finance tracking. As noted in the Introduction, limited data and reporting on private sector adaptation finance reinforces the common narrative that there are limited or no viable business models for adaptation. This is simply untrue, as this report indicates. Indeed, private finance will be critical to mobilize the levels of capital required to meet global adaptation investment needs. This analysis points the way forward in improving our collective understanding of private adaptation finance flowing today, in order to ultimately drive a material increase in future finance from private actors towards adaptation.

# ANNEXES

## 1. ALTERNATIVE INDICATORS OF INSTITUTIONAL PROGRESS BEYOND TRACKED FINANCE FLOWS

The analysis presented in this report tracks financial flows to the real economy because that is one of the central ways to measure progress and aligns with the approach of the GLCF. We nevertheless are exploring for future work other meaningful ways to measure progress on private sector adaptation despite the data challenges. These alternative methods may prove more viable where data on financial flows are lacking, while also being of greater relevance for assessing the level of engagement in A&R in the private sector.

A brief summary of alternative indicators that could be leveraged in future (but not pursued in this analysis) are as follows:

- Assets under management of FIs meeting a set standard of adaptation and resilience (A&R) governance (akin to broader climate standards like the Principles for Responsible Banking).
- Number of (or total revenue of) corporations aligned with Task Force on Climate-related Financial Disclosures (TCFD) standards for resilient activities (i.e., supply chains).
- Total number of (or volume of) financial transactions reported by the public sector for adaptation that identify at least one private sector co-financier.
- Total sales volume of selected climate-resilient products/services (e.g., total sales volume of storm roofs, home elevation technology, cold storage, etc.)
- Number of public listings of companies that explicitly report A&R solutions as at least one component of their business model.

## 2. EXAMPLES OF CROSS-INSTITUTION FLOWS

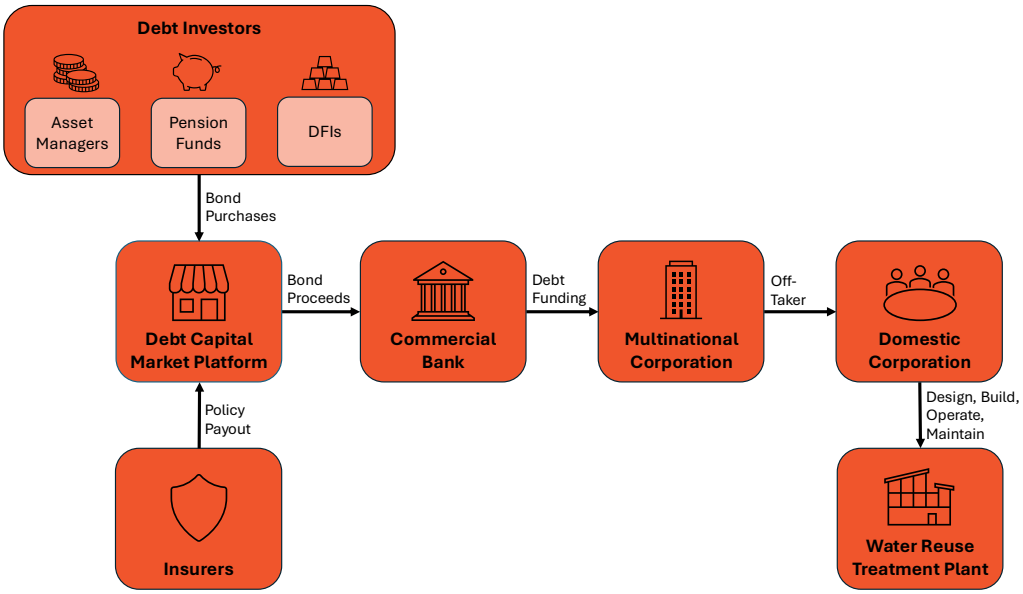
The below examples of the cross-institution flow of private adaptation finance are provided in order to demonstrate the potential complexity of adaptation project financing. Finance for a single adaptation activity might flow through multiple private institutions before reaching the intended project as shown through these illustrative examples.

### EXAMPLE 1: FINANCING A WATER REUSE TREATMENT PLANT

Water reuse treatment plants are an important form of adaptation intervention that directly reduce the physical climate risk of drought by providing additional water sources for agricultural and industrial users. Financing of these plants can take many forms and can include use of both public and private capital.

As shown in Figure A1, inspired by the Climate Adaptation Notes instrument supported by the Global Innovation Lab for Climate Finance[35], the financing of a water reuse treatment plant can be quite complex and may require the involvement of asset managers, pension funds, DFIs, insurers, multinational corporations, and domestic corporations. In addition to illustrating the intricacy of private adaptation finance, this example also shows the issue of double counting. It would be simplest to only count the financial flows that are being used by the domestic corporation to design, build, operate, and maintain the water reuse treatment plant. However, this would miss a deeper understanding of the role of different financial instruments that make financing a water reuse treatment plant possible. Several financial flows, including the interest paid on the bond and the premium paid for the parametric insurance, would not be properly accounted for under this approach.

**Figure A1:** Sample Financial Structure for Water Reuse Treatment Plant Investment




## EXAMPLE 2: FINANCING AN EARLY WARNING WEATHER SYSTEM

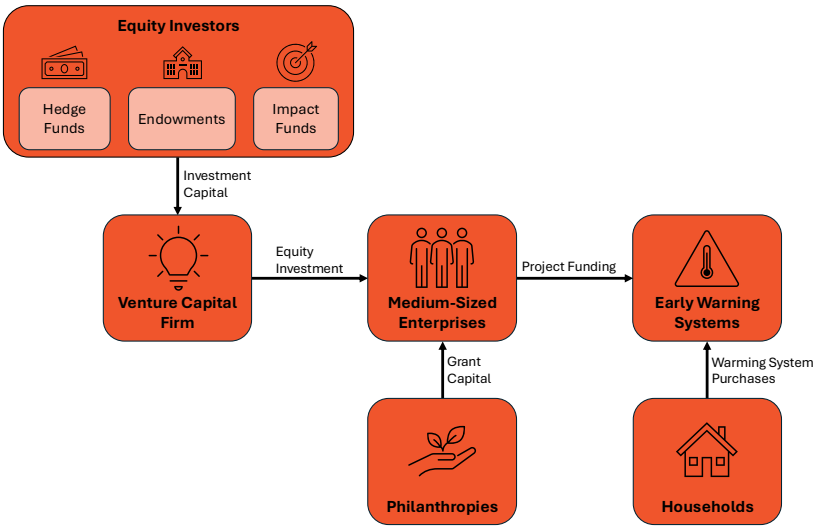
Early warning weather systems indirectly help communities respond to climate change by enabling them to more quickly respond to acute climate disasters. Finance for such systems can come from both the private and public sectors. The financial structure depicted in Figure A2 is inspired by the real-world example of the Green Climate Fund-supported program for Scaling up the use of Modernized Climate Information and Early Warning Systems in Malawi.[36]

Although early warning weather systems are often funded by public institutions, there is growing interest from the private sector in financing these solutions. As illustrated below, multiple private institutions, including asset managers (represented by hedge funds, endowments, and impact funds), venture capital firms, SMEs, philanthropies, and households, can be involved in financing an early warning weather system. The issue of double counting is also present in this example,

35 The Lab. (2020). Climate Adaptation Notes. https://www.climatefinancelab.org/ideas/climate-adaptation-notes/
36 GCF. (2024). FP002: Scaling up the use of Modernized Climate information and Early Warning Systems in Malawi. https://www.greenclimate.fund/project/fp002

where a reasonable argument can be made to count either project funding or system purchases but likely not both.

**Figure A2:** Sample Financial Structure for Early Warning System Investment




## EXAMPLE 3: FINANCING AN AGRICULTURAL MARKET ACCESS PROGRAM

Agricultural market access programs are an essential form of adaptation that indirectly enables farmers to better respond to climate change by improving their incomes and the diversity of their customer base. Most market access programs are financed by public institutions, but there are some instances in which private institutions also support these kinds of programs. The financial structure shown below is inspired by the real-world example of One Acre Fund's Smallholder Resilience Ventures Fund.[37]

It is rare for a private institution to exclusively fund a market access program. Instead, it is more common that financing is provided to a more general fund that includes a technical assistance facility that helps promote market access. In the example above, debt capital is provided to a farming development fund which in turn helps households access common markets through the establishment of farming cooperatives. Several private institutions are involved in the project, including commercial banks, insurers, philanthropies, small-sized enterprises, and households. This example demonstrates the difficulty of disentangling funding that goes to the market access program and funding that goes to small-sized enterprises to advance sustainable farming practices

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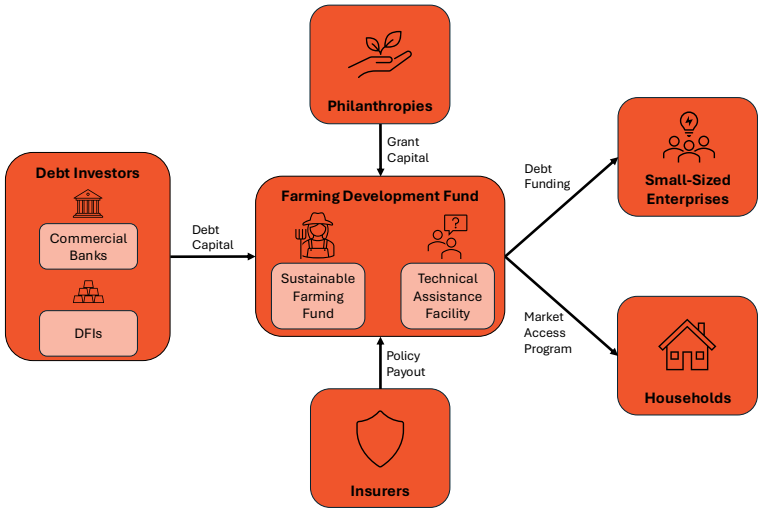
37 The Lab. (2021). Smallholder Resilience Ventures. https://www.climatefinancelab.org/ideas/smallholder-resilience-ventures/

**Figure A3:** Sample Financial Structure for Farming Development Fund Investment




# 3. TRACKING CONSUMER AND HOUSEHOLD ADAPTATION FINANCE

The approach described below is used to track consumer and household adaptation finance, based on the adaptation taxonomy framework. The approach aims to identify investment from consumers and households in products that facilitate adaptation activities.

### STEP 1: CATALOGUE HOUSEHOLD/CONSUMER PRODUCTS

First, a list of products is cataloged according to each of the activities listed under the adaptation finance taxonomy. For example, Cool Roofs are a product that corresponds to the "Measures to Reduce Urban Heat" activity and thus are listed for tracking of consumer and household products.

Overall, this cataloging exercise resulted in a list of 113 products. This is unlikely to be an exhaustive account of all household/consumer products but aims to capture the key products used in each activity.

### STEP 2: CLASSIFY ADAPTATION LIKELIHOOD OF HOUSEHOLD/CONSUMER PRODUCTS

Classifications essentially result from the question: "When this product is being used, and what is the likelihood that it is contributing towards adaptation or resilience?"

Categories of adaptation likelihood are low, medium, and high, defined as follows:

- **High:** The adaptation case is very clear regardless of context.
- **Medium:** The adaptation case is strong but there are non-rare instances where the activities would occur in the absence of climate risk.
- **Low:** The activity is highly context-specific and only relevant to adaptation in certain contexts of climate risk.

For example, storm doors are classified as high adaptation likelihood. While storm doors may not always be installed with an adaptation or resilience purpose in mind, they are highly likely to contribute towards adaptation or resilience regardless of intention.

In contrast, organic pesticides can be used in adaptive alternative farming practices, but in most cases are simply used for agricultural purposes without a discernible adaptation or resilience benefit. Accordingly, organic pesticides are classified as low adaptation likelihood.

### STEP 3: COLLECT PRODUCT MARKET SIZE DATA

Annual market size data, expressed in terms of total global sales value, are collected for each household/consumer product. The data are sourced from publicly available market intelligence reports. Given that multiple market intelligence reports often exist for a single product, market size data are selected from the sources that are the most recent and detailed.

### STEP 4: INFER HOUSEHOLD/CONSUMER SHARE OF THE MARKET

For each household/consumer product, a percentage share corresponding to the household/consumer portion of the total product market is inferred based on qualitative text descriptions found in market intelligence reports. When household/consumer market segments are described as the primary driver of demand for a given product, larger percentage values (50% and larger) are assigned to the household/consumer share of the market.

These percentage values are assigned conservatively—in instances where households or consumers are simply mentioned as a market segment without any further description, lower (5-20%) market shares are inferred. If households or consumers are not explicitly mentioned, it is assumed that they are not a market segment (i.e., 0% market share).

Given a lack of data needed to empirically determine the exact consumer share of the total product market, "low" and "high" values are inferred to construct a range that captures the possible size of consumer and household expenditures on adaptation-relevant products.

### STEP 5: ESTIMATE HOUSEHOLD/CONSUMER EXPENDITURE ON ADAPTATION-RELEVANT PRODUCTS

To estimate household/consumer expenditure on adaptation-relevant products, the total annual market size data is adjusted by low and high values for household/consumer share of the market. The resulting household and consumer expenditure figures are not a precise measure of product sales but rather provide a range indicative of the scale of current household and consumer expenditure on adaptation-relevant products.

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