Adaptation Investment Landscape

Deliverable 1.1

CLIMATEFIT

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DELIVERABLE INFORMATION

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EXECUTIVE SUMMARY

Urgent accelerated action is required to adapt to unavoidable and ongoing climate change. Climate adaptation investments must be substantially scaled up. Public budgets will not be able to address the adaptation financing challenge alone; financing from the private sector will also be necessary. CLIMATEFIT contributes to bridging the adaptation financing gap by providing critical insight and building the capacities of Public Authorities (PAs) to attract and orchestrate various public and private funding and financing sources, and of Financing and Investment Entities (FIEs) to discover and access resilient investment opportunities. The project will engage its experts, PAs, and FIEs to:

- Co-design 20 innovative investment strategies allowing to identify sources of financing and funding.
- Develop ten credible and scalable investment plans to help better negotiate and articulate financing streams and define investment concepts.
- Pilot four bankable, tailored investment cases.

This CLIMATEFIT deliverable (D1.1) is the main outcome of Work Package 1 (WP1) "Stocktake, Understand and Capitalise." **WP1 describes the current Adaptation Investment Landscape (AIL)**, analyse the barriers and drivers for funding and financing of climate resilience, from the financing and investment entities and from the 20 territories' perspective. The AIL is defined in CLIMATEFIT as "a descriptive assessment of the barriers, enablers, and good practices associated with the funding and financing of climate adaptation." The AIL is essentially a description of the current state of adaptation finance, described from three perspectives: territories and the leading PA of that territory (for example, a municipality and its local government), FIEs, and complemented with international best practices of innovative Adaptation funding and financing solutions (AFFS).

The target audience of this deliverable is the European Union (EU) and the European Commission (EC), and more specifically the signatories and partners of the EU Mission for Adaptation to Climate Change. In line with these target groups, this deliverable contains information that may be of interest to a broad range of practitioners, including government officials and administrations, the financial sector and FIEs, and consultancy firms or research institutes with an interest in adaptation finance.

This deliverable is the main outcome of WP1 that consisted of three sub-tasks. Each sub-task focuses on one of the three perspectives. The first perspective is that of the 20 territories across eight countries involved in CLIMATEFIT (Figure 1.1), including their public authorities. These countries are Romania, Slovenia, Czech Republic, Italy, Spain, Portugal, Belgium, and France. The second perspective is that of FIEs active in the 20 territories and/or other EU countries. The third perspective is informed from best practices of adaptation finance anywhere in the world that provide relevant inspirational stories for the 20 territories and the EU in general.

The main barrier for both PAs and FIEs is the lack of knowledge and expertise. **Another barrier that appeared among both PAs and FIEs is the challenge of quantifying economic or monetary benefits of adaptation**, particularly green-blue infrastructure with many non-monetisable co-benefits. **Among PAs**, there are regional differences in the level of climate risk awareness and knowledge about climate adaptation. **There is a large adaptation finance gap**, and territories struggle to allocate sufficient funds to climate adaptation because of other priorities, but at least climate is increasingly becoming a priority across the EU, also under the influence of EU policy and programme initiatives. PAs lack knowledge about alternative sources and financial instruments, specifically those that involve private capital, because of the historically strong reliance on public funding. The **most important barriers for PAs include a lack of capacity and staff constraints to apply for funding, as well as siloed governance**.

Results show that factors such as membership to climate networks, population size, gross domestic product (GDP) per capita, and adaptive capacity act as **drivers of adaptation planning capacities for PAs**. Other key drivers for PAs to participate in climate adaptation investments are incentives through research projects (like CLIMATEFIT), implementation of EU policies, and the growing frequency of extreme weather events. While lack of public knowledge about climate risks can be a barrier, increased knowledge is often identified as a key driver of financing adaptation.

For all the **FIEs** interviewed, **regulation poses the most significant barrier** to accessing finance for adaptation. Specifically, they highlighted the lack of an overarching stable policy framework covering all types of climate hazards. Criticisms from FIEs of (national and local) government were also frequently voiced for its failure to provide a comprehensive vision of adaptation. At the same time, (European) **regulation is perceived as a driver** of climate investment, and it is expected that it will keep evolving rapidly in the coming years. Some FIEs finance adaptation projects as a secondary driver; it is a project that they are financing anyway for other reasons, but it has adaptation elements.

The identified barriers experienced by PAs largely confirm what we already knew from the literature study. This deliverable complemented that existing knowledge with a deep dive into the challenges of specific territories, and PAs in those territories, including information about the flows and needs of adaptation finance in these territories. For the FIE perspective, the in-depth review of the literature (scholarly and practitioner),

validated with FIE interviews, showed there is a constellation of barriers, which is, to our knowledge, among the most detailed studies on FIE adaptation finance barriers to date. Additionally, previous works have identified barriers but research about the causes of barriers is scarce, a gap that was addressed in Chapter 5 of this deliverable. Furthermore, new methods were developed to measure the maturity of PAs (MASC) and FIEs (MAM) regarding accessing or unlocking climate adaptation finance. Finally, the 20 international best practices are among the first involving innovative AFFS that have been researched in such detail, and the database from which they were sourced is, to our knowledge, the largest at the time of publication that collects international examples of innovative AFFS.

When comparing the overall findings of Chapters 4 and 5, we see that there is a **mismatch between PAs and FIEs**. **PAs and FIEs may experience some similar and some different barriers, but they are two different worlds when considering the objectives that PAs and FIEs have regarding climate financing**. PAs in the EU must prepare policies, plans, and projects to align with the EU climate policy framework, including Green Deal targets to achieve climate neutrality by 2050, and the EU adaptation strategy. The adaptation strategy does not impose targets that member states must achieve, but the increasing severity of the impacts of climate change is incentivising an increasing number of PAs to accelerate climate adaptation policies. So, achieving climate resilience and climate neutrality are becoming priority objectives for many PAs. While many FIEs support the transition to climate neutrality and more resilience, their objectives largely remain to generate a return on investments and to focus on mitigation and net zero activities. This creates a **mismatch between PAs and FIEs, because the adaptation projects for which PAs require more financial resources are not the type of investments FIEs are looking for**. Because of this, there is a poor track record of collaboration and communication between PAs and FIEs regarding climate adaptation investments in the EU. A first important step to overcoming barriers to climate adaptation finance is to **bridge the chasm that currently disconnects PAs from FIEs regarding adaptation finance and bring both together in collaborative processes of capacity building, matchmaking exercises, and co-designing AFFS**. The core of CLIMATEFIT focuses on this challenge.

This deliverable is a first step in the right direction, by determining a baseline measurement of PAs and FIEs to understand their current challenges and needs. **Additionally, the 20 international best practices helped identify eleven general key success factors of innovative AFFS and six conditions to transfer the researched AFFS to other territories, including the EU**. The eleven key success factors are stakeholder involvement (collaborations between public and private partners, collaborations between public partners, community support), legal compliance, political support, public resources, private resources, de-risking mechanisms, a business case, accountability/transparency/reporting, financial incentives, combining multiple sources/instruments, having a long-term strategy or sustainable finance strategy, and flexibility. The transferability conditions are public resources, (re)payment capacity, objectives and governance structure, outreach and awareness, public or private champions, and using established or tested models or mechanisms.

The findings from this deliverable help us understand what we are (not) able to do within the scope of CLIMATEFIT. This falls into three activity tracks that align with the tasks in the other work packages, and for which the content of this deliverable can be used: **(1)** capacity building and awareness-raising; **(2)** co-creating AFFS in investment strategies, investment plans, and bankable investment cases; **(3)** and policy recommendations. The first two are related to barriers that CLIMATEFIT can directly address by engaging with PAs and FIEs. The third is related to a whole suite of barriers that are outside the control of CLIMATEFIT. These are barriers that must be overcome mainly through regulation changes, for which CLIMATEFIT can only offer advice in the form of policy recommendations. These three activity tracks will be the subject of subsequent work packages that build on this deliverable.

ABBREVIATIONS

Abbreviation	Description
AFFS	Adaptation funding and financing solution
AIL	Adaptation Investment Landscape
BID	Business improvement district
CBP3	Community-based public-private partnership
CEB	Council of Europe Development Bank
CMP	Cloudburst Management Plan
CWP	Clean Water Partnership
EAPP	Edwards Aquifer Protection Program
EC	European Commission
EIB	European Investment Bank
EU	European Union
ESG	Environmental, social, and governance
EUCRA	European Climate Risk Assessment
FEL	FIE Engagement Lead
FIE	Financing and investment entity
GA	Grant agreement
GARI	Global Adaptation & Resilience Working Group
GCA	Global Commission on Adaptation
GCF	Greenification certificate system
GCTWF	Greater Cape Town Water Fund
GDP	Gross domestic product
IC	Investment concept
ICAP	Investor Climate Action Plan
IPCC	Intergovernmental Panel on Climate Change
KTM	Key Type Measures
KPI	Key performance indicator
KRA	Key result area
LDV	Lower Don Valley
LRT	Local Resilience Taskforce
MAM	Maturity assessment model (MAM)
MASC	Maturity Assessment Scorecard (public authorities)
MSME	Micro, small, and medium enterprises
NbS	Nature-based Solutions
NGO	Non-governmental organisation
OSS	One-stop-shop
P2R	Pathways2Resilience
PA	Public authority
PCB	Paris Climate Bond
PES	Payment for ecosystem services
PFP	Project Finance for Permanence
PPP	Public-private partnership
RPPNM	Reserva Particular do Patrimônio Natural Municipal
SFDR	Sustainable Finance Disclosure Regulation
SRC	Stormwater retention credit
TCFD	Taskforce for Climate Related Risk Disclosure
TNC	The Nature Conservancy
TNFD	Taskforce for Nature-related Financial Disclosures

UA	University of Antwerp
UNFCCC	United Nations Framework Convention on Climate Change
WCF	World Climate Foundation
WBMP	Wetland Mitigation Banking Program
WEF	World Economic Forum
WP	Work Package

GLOSSARY

Definitions as formulated in the CLIMATEFIT glossary, including project-specific terms and terms from existing sources.

Adaptation finance gap: The difference between the estimated costs of meeting a given adaptation target and the amount of finance available. Term commonly referring to national, continental, or global finance gaps. It can be applied to the local level.

Adaptation funding gap: The difference between the available capital for a given adaptation initiative or project and what is required to fully cover the costs of the same. Term commonly referring to sub-national finance gaps and used interchangeably with adaptation finance gap.

Adaptation funding and financing Solution (AFFS): An umbrella term covering individual or combinations of financial instruments, mechanisms, products and vehicles suitable to finance adaptation initiatives and projects.

Adaptation investment landscape: A descriptive assessment of the barriers, enablers and good practices associated to practices of funding and financing of climate adaptation. Such assessment is produced by the CLIMATEFIT project.

Asset Manager: a financial professional who manages money and securities on behalf of a client, with the goal of growing the value of the assets. Asset managers are known by many names: investment advisors, financial advisors, wealth managers, institutional wealth managers, registered investment advisors (RIAs) and stockbrokers, to name just a few.

Business model: Describes in detail the services or products offered, the target markets, the cost structures and the resources required in a business or project. Often the business model goes hand in hand with a business model canvas, a visual representation of the business idea.

Adaptation options: The array of strategies and measures that are available and appropriate for addressing climate adaptation. They include a wide range of actions that can be categorised as structural, institutional, ecological or behavioural. Examples here.

Champion: Financing and investment entity (see below) with excellent knowledge of adaptation funding and financing solutions (see above), which participate in co-design and validation of investment cases in the selected territories. Champions include, but are not limited to, Arpinge, MPS Bank, CEB, EIB, EBRD, InvestEU Fund and Advisory Hub.

Climate adaptation: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.

Climate change: A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate finance: The term climate finance is generally applied to the financial resources devoted to addressing climate change by all public and private actors from global to local scales. Climate finance aims to reduce net greenhouse gas emissions and/or to enhance adaptation and increase resilience to the impacts of current and projected climate change. Finance can come from private and public sources, channelled by various intermediaries, and is delivered by a range of instruments, including grants, concessional and non-concessional debt, and budget reallocations.

Climate-related financial risks: Potential risks that may arise from climate change or from efforts to mitigate climate change, their related impacts and their economic and financial consequences. As defined in the TCFD recommendations, there are two types of climate-related risks: physical and transition risks.

Climate risk: The potential for consequences where something of value is at stake and where the outcome is uncertain, recognising the diversity of values. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability, exposure, and hazard.

Disclosures: in financial terms, basically refers to the action of making all relevant information about a business available to the public in a timely fashion. Relevant information about a business refers to any and every piece of information that can potentially influence an investor's decision.

EU Green Taxonomy: A classification system established by the European Union, where a business activity is considered environmentally sustainable if it makes a substantial contribution to at least one of six environmental objectives (climate mitigation, climate adaptation, water and marine resources, circular economy, pollution prevention and control, and biodiversity and ecosystems), while doing no significant harm to any of them.

Facilitator: One of eight (8) partners supporting the leader territories (see below) in their transformational journey to climate resilience. Mostly energy and climate agencies, ALEA, ENERGAP, ENVIROS, AMBIT, APEA, ADEPORTO, ACS, UA articulate with partners, public authorities and financing and investment entities to apply methods and solutions in practice.

Financing & investment entity (FIE): Organisation or stakeholder that enable or do the provision of any type of funding and financing solutions for climate adaptation. (CLIMATEFIT project definition).

Financing: Capital resources provided with expected return on investment, for example through loans, either public or private.

Funding (beneficiary perspective): Total amount of money needed to pay for the implementation of an adaptation initiative or project. For example, a public officer would say "How do we fund the insulation of this building?".

Funding (investors perspective): Capital resources provided without any expected return, for example through grants, either public or private.

Good practice: although defined in multiple ways, a thread common to most definitions implies strategies, plans, approaches and/or activities that have been shown through research and evaluation to be efficient, sustainable and/or transferable, and to reliably lead to desired results.

Investment landscape: A descriptive assessment of the barriers, enablers and good practices associated to practices of funding and financing of climate adaptation. Such assessment is produced by the CLIMATEFIT project.

Leader Territories: Four (4) territories, namely cities or regions located in France, Belgium, Italy and Romania, where tailored funding and financing solutions (see above) are experimented, applied in practice, resulting in the creation of four (4) case studies.

Public authority (PA). Local, regional, or national authorities that have the legal mandate to address climate change within their political jurisdictions (CLIMATEFIT project definition).

Technical Partner (TP): Partners leading research and innovation activities, including the development of methodologies and tools. These partners, WCF, UA, CMCC, SEI, SA, ITASIF, ACTERRA, RAMBOLL, are also responsible for the production of project deliverables.

Territory: City, region, or community, represented by one or several public authorities.

Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Chapter 1: Introduction

1.1. CLIMATEFIT: Boosting climate adaptation finance

Urgent accelerated action is required to adapt to unavoidable and ongoing climate change. Climate adaptation investments must be substantially scaled up. Public budgets will not be able to address the adaptation financing challenge alone; financing from the private sector will also be necessary. CLIMATEFIT contributes to bridging the adaptation financing gap by providing critical insight and building the capacities of Public Authorities (PAs) to attract and orchestrate various public and private funding and financing sources, and of Financing and Investment Entities (FIEs) to discover and access resilient investment opportunities. The project will engage its experts, Public Authorities, and Financing and Investment Entities to:

- Co-design 20 innovative investment strategies allowing to identify sources of funding.
- Develop ten credible and scalable investment plans to help better negotiate and articulate financing streams and define investment concepts.
- Pilot four bankable, tailored investment cases.

These innovative project outcomes will be showcased in 20 territories in eight EU countries, as shown in Figure 1.1. A territory is either a strategist (S), planner (P), or leader (L). For each strategist, an investment strategy will be co-designed. For each planner, an investment strategy will be co-designed, and an investment plan will be developed. For each leader, an investment strategy will be co-designed, an investment plan will be developed, and a bankable investment case will be piloted.

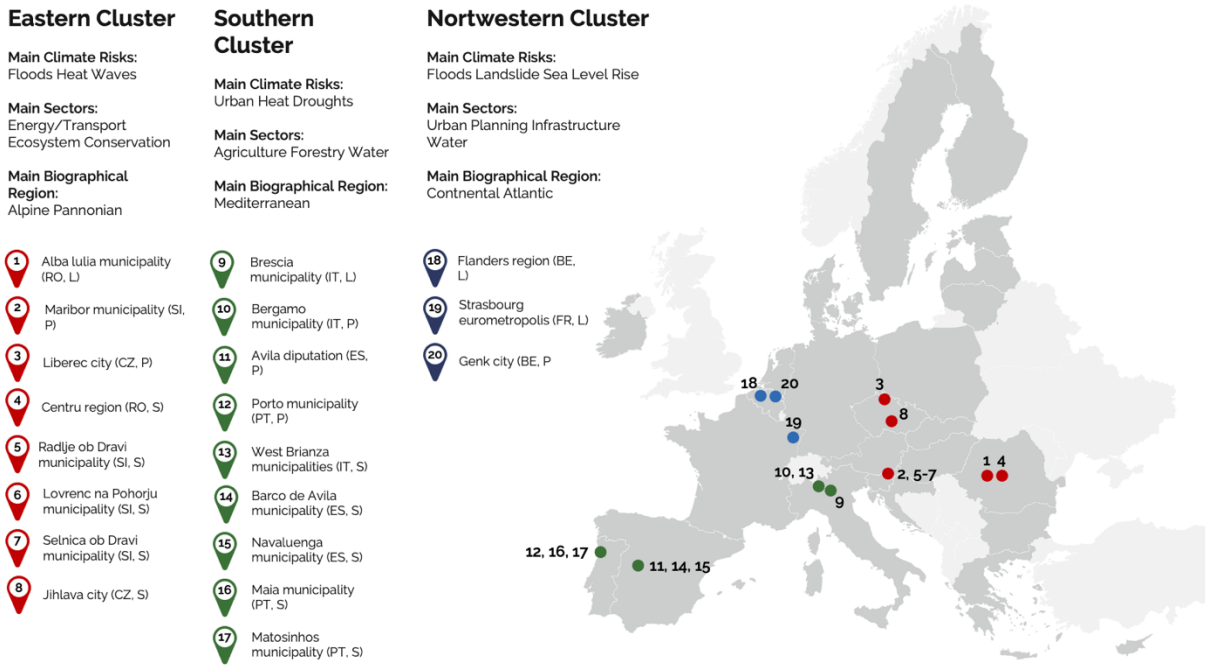


Figure 1.1. The 20 territories involved in CLIMATEFIT. The two-letter abbreviation refers to the country. L = leader, P = planner, S = strategist.

This deliverable (D1.1) is the main outcome of Work Package 1 (WP1) "Stocktake, Understand and Capitalise." **WP1 will describe the current Adaptation Investment Landscape (AIL)**, analyse the barriers and drivers for funding and financing of climate resilience, from the financing and investment entities and from the 20 territories' perspective. The AIL is defined in CLIMATEFIT as "a descriptive assessment of the barriers, enablers, and good practices associated with the funding and financing of climate adaptation." The AIL is essentially a description of the current state of adaptation finance, described from three perspectives: territories and their PAs, FIEs, and complemented with international best practices of innovative AFFS.

The **target audience** of this deliverable is the European Union (EU) and the European Commission (EC), and more specifically the signatories and partners of the EU Mission for Adaptation to Climate Change. CLIMATEFIT is funded as one of the Mission Projects. The Mission targets "regional and local authorities that share the ambitions of the Mission and that have manifested their interest to sign the Mission Charter and join the Mission. By doing so, they declare their willingness to cooperate, mobilise resources, and develop activities in their respective regions and communities to reach their adaptation goals. Other entities, such as research institutions or businesses, were invited to endorse the Charter and join the Mission's community of

organisations working together towards climate resilience as Friends of the Mission." In line with these target groups, this deliverable contains information that may be of interest to a broad range of practitioners, including government officials and administrations, the financial sector and FIEs, and consultancy firms or research institutes with an interest in adaptation finance.

The term **Climate finance** is generally applied to the financial resources devoted to **addressing climate change by all public and private actors from global to local scales**. Climate finance aims to reduce net greenhouse gas concentration in the atmosphere and/or to enhance adaptation and increase resilience to the impacts of current and projected climate change. **Climate adaptation finance** means finance for **adaptation options** that "range from actions that build adaptive capacity (e.g. knowledge creation and sharing of information, creating supportive institutional frameworks) or establish management systems and supportive mechanisms (e.g. better land management planning, insurance mechanisms) to adaptation actions implemented on the ground, e.g. physical or ecosystem-based measures" (Climate-ADAPT, n.d.). Climate-ADAPT adaptation options are categorised according to **Key Type Measures** (KTM), including governance and institutional, economic and finance, physical and technological, nature-based solutions (NbS) and ecosystem-based approaches, and knowledge and behavioural change (Leitner et al., 2021).

Because of the explicit focus of CLIMATEFIT on territories and their PAs, **this deliverable focuses more on climate adaptation finance for public initiatives rather than climate adaptation investments by private corporations**. Examples of private corporate adaptation investments include direct investments to climate-proof corporations (e.g., infrastructure), or investments in the development of climate adaptation technologies (e.g., water reuse technologies, genetically modified organisms to make crops ore climate resilient). The chapters of this deliverable furthermore touch either directly or indirectly on all the KTMs, but **there is a more attention for NbS and ecosystem-based approaches compared to physical (grey) and technological options**. This aligns with the EU's ambition to "position the EU as leader in innovating with nature to achieve more sustainable and resilient societies" (European Commission, n.d.-f). NbS are generally perceived to be more cost-efficient than grey solutions but face more climate adaptation finance barriers experienced by PAs and FIEs that are a key focus of this deliverable.

1.2. Climate change and adaptation finance in the EU

In 2024, the European Environment Agency (EEA) published the first-ever **European Climate Risk Assessment report (EUCRA)**, documenting and analysing climate risks on an EU-wide level. The EUCRA report offers the most recent climate-related information for the EU. Some of the key takeaways highlight the urgency of climate adaptation policies and finance. Globally, 2023 was the warmest year on record, and the average global surface temperature exceeded pre-industrial levels by 1.5°C between February 2023 and January 2024. Monthly global temperature records have continued to be broken since then. Europe is now the fastest-warming continent in the world. Extreme heat is becoming more frequent while precipitation patterns are changing. There is an overall decline in rainfall, causing severe drought risks, while precipitation extremes are increasing in severity, causing more flood risks. Figure 1.2 shows the observed and predicted trends in key climatic risk drivers in different European regions (EEA, 2024)

Land regions	Northern Europe			Western Europe			Central-eastern Europe			Southern Europe		
	Past	Future		Past	Future		Past	Future		Past	Future	
		Low	High		Low	High		Low	High		Low	High
Mean temperature	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
Heatwave days	□(*)	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
Total precipitation	↗	↗	↗	↗	⟋	↘	↗	↗	⟋	↘	↘	↘
Heavy precipitation	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
Drought	↗	↘	↘	↗	⟋	↗	↗	⟋	↗	↗	↗	↗

European regional seas	Past	Future
Sea surface temperature	↗	↗
Sea level	↗	↗

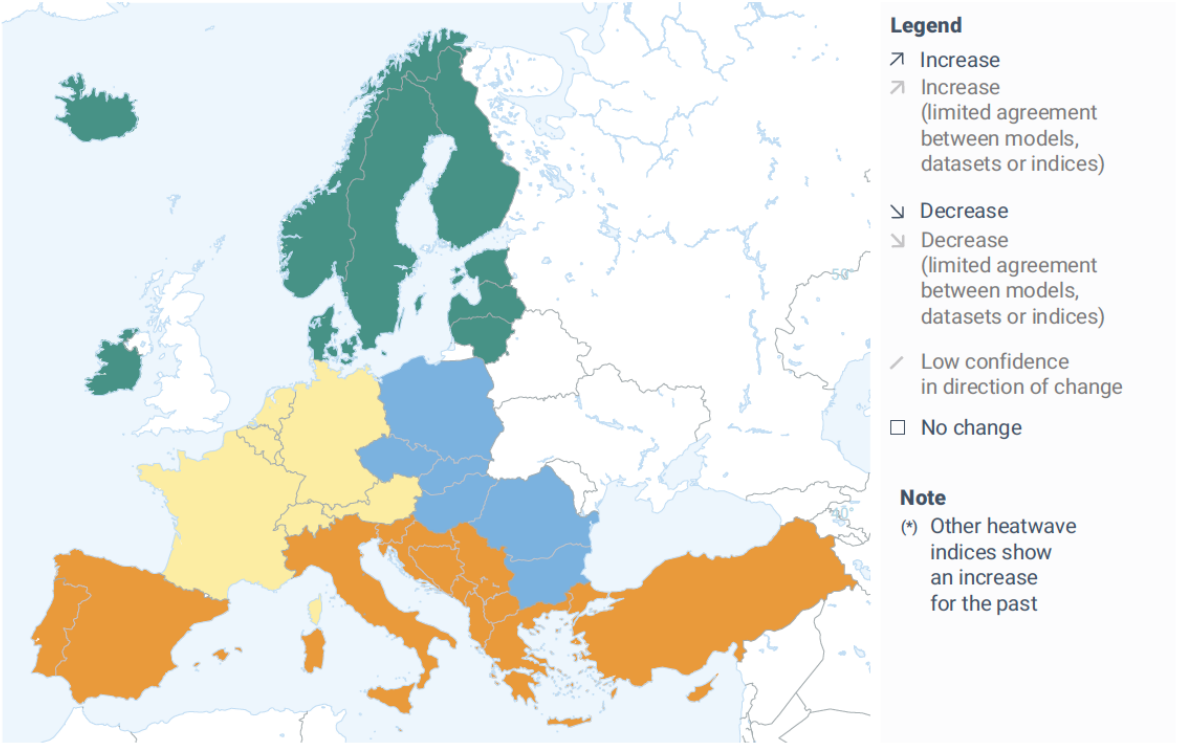
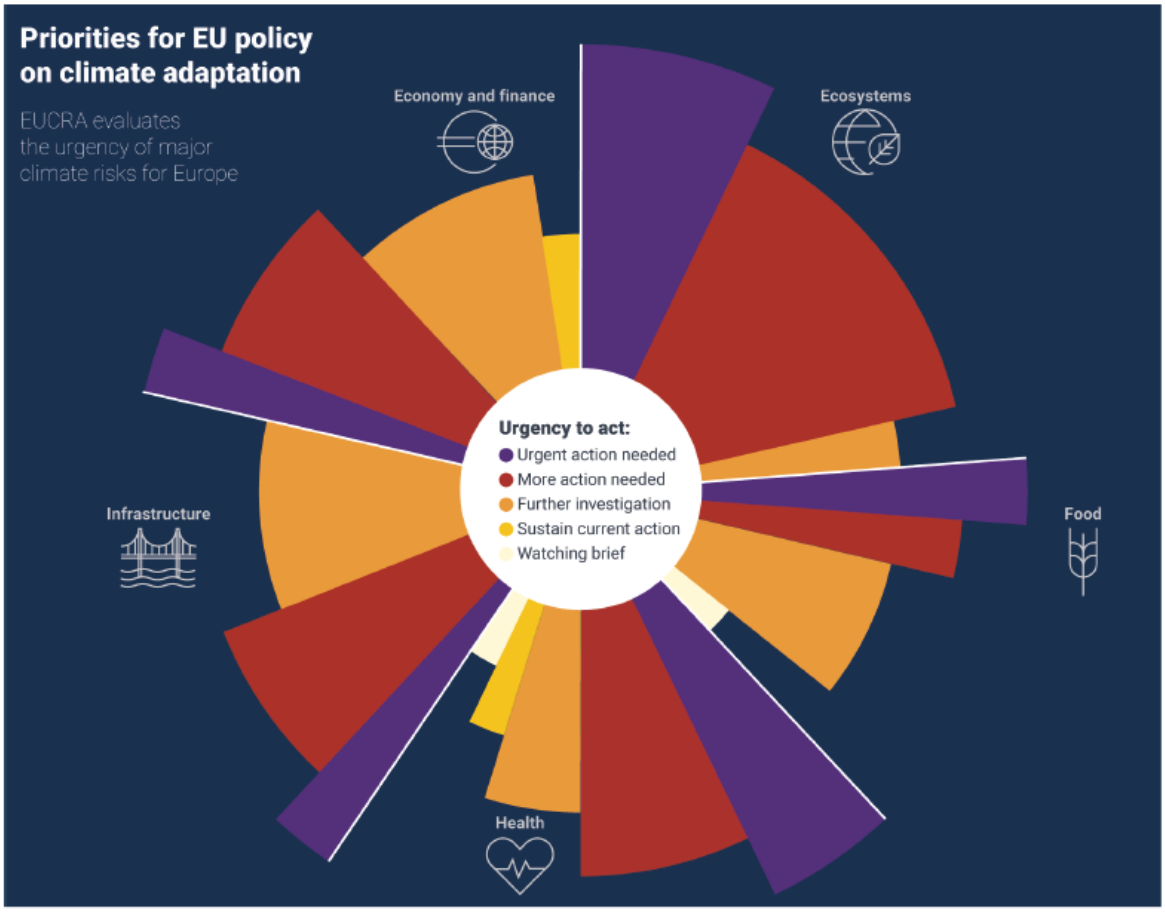


Figure 1.2. Observed and projected trends in key climatic risk drivers in different regions. Time periods and scenarios are past (1952-2021); future until the end of the century (2081-2100 relative to 1995-2014) Source: EEA (2024).

The EUCRA report and national climate risk assessments are examples of the EU and its member states' increased efforts to make progress in understanding climate risks and how to prepare for them. Reports like these are important to inform adaptation policy development, but societal preparedness is still low, and policy implementation is lagging behind quickly increasing risk levels. Globally, "current climate action is woefully inadequate to meet the temperature and adaptation goals of the Paris Agreement. While global average temperatures are already exceeding 1.1˚C above pre-industrial levels, current plans reflected in the nationally determined contributions (NDCs) are putting us on a path towards 2.4˚C–2.6˚C by the end of the century" (UNEP, 2023, p. XII). Figure 1.3 shows the major climate risks for Europe and the urgency to act on them. Coordinated and urgent action is required on local, regional, national, and EU levels, including an increase in climate adaptation policies and finance.

Figure 1.3 also shows that the European macro-fiscal and financial system are at substantial risk from the impacts of climate change. As described in the report, "serious sector- and regional-specific risks to Europe could catalyse a systemic financial shock" (EEA, 2024, p. 27). This affects public and private finances. For the public sector, "climate extremes can result in reduced tax revenues, increased government expenditure, lower credit ratings and increased cost of borrowing, among others" (EEA, 2024, p. 27). On the private sector site, "European societies, including businesses and services in essential sectors, are exposed to risks from climate-related disruptions to supply chains" (EEA, 2024, p. 28).



Climate risks by cluster

Ecosystems
- Coastal ecosystems
- Marine ecosystems
- Biodiversity/carbon sinks due to wildfires*
- Biodiversity/carbon sinks due to wildfires
- Species distribution shifts
- Ecosystems/society due to invasive species
- Soil health
- Aquatic and wetland ecosystems
- Biodiversity/carbon sinks due to droughts and pests
- Cascading impacts from forest disturbances

Food
- Crop production*
- Crop production
- Fisheries and aquaculture
- Food security due to higher food prices
- Food security due to climate impacts outside Europe
- Livestock production

Health
- Heat stress — general population
- Population/built environment due to wildfires*
- Population/built environment due to wildfires
- Well-being due to non-adapted buildings
- Heat stress — outdoor workers*
- Pathogens in coastal waters
- Health systems and infrastructure
- Infectious diseases
- Heat stress — outdoor workers

Infrastructure
- Pluvial and fluvial flooding
- Coastal flooding
- Damage to infrastructure and buildings
- Energy disruption due to heat and drought*
- Energy disruption due to heat and drought
- Energy disruption due to flooding
- Marine transport
- Land-based transport

Economy and finance
- European solidarity mechanisms
- Public finances
- Property and insurance markets
- Population/economy due to water scarcity*
- Population/economy due to water scarcity
- Pharmaceutical supply chains
- Supply chains for raw materials and components
- Financial markets
- Winter tourism

Note: *Hotspot region: southern Europe

Figure 1.3. Major climate risks for Europe and the urgency to act on them. Source: EEA (2024).

Climate adaptation and adaptation finance have become critical aspects of the EU's commitment to building resilience and fostering sustainability. A more detailed description of the EU Sustainable Finance Framework will be a part of CLIMATEFIT's Deliverable 6.1, "Draft White Paper for Policymakers and Practitioners." This deliverable provides recommendations to support the mainstreaming of climate resilience finance. The White Paper will be updated in a further draft (Deliverable 6.3) and a final White Paper (Deliverable 6.4). We limit ourselves here to key elements.

The **European Union has been actively working on various regulatory frameworks to address climate change**, including instruments and regulations to finance and fund climate adaptation. Early initiatives include

the EU's **Multiannual Financial Framework (MFF) 2014-2020** (Council of the EU & European Council, 2023), which pledged to allocate at least 20% of the European budget to climate-related expenses for adaptation and mitigation, and the 2016 **Mayors Adapt** (EEA, 2016), an initiative that is part of the Covenant of Mayors that provides a framework for local authorities to take climate adaptation action. The current MFF (2021-2027) pledges to spend at least 30% of its budget on climate-relevant objectives, including adaptation and mitigation (European Parliament, n.d.). In 2019-2020, the **EU Green Deal** set the target of climate neutrality (put into law the following year with the **EU Climate Law**) to be achieved by 2050 (Council of the EU & European Council, n.d.; European Commission, n.d.-d). One year later, in 2021, the **EU Adaptation Strategy** (put into action with the EU Mission on Adaptation to Climate Change) added the resilience goal for Europe to become the first resilient continent by 2050 as complementary and synergistic to climate neutrality, becoming a key priority under the same Green Deal umbrella.

The aspiration to make Europe resilient and climate neutral in the next few decades resulted in the development of important additional regulations, strategies, platforms, and initiatives. The **EU Sustainable Finance Framework** plays a crucial role in mainstreaming finance into climate change adaptation by integrating environmental, social, and governance (ESG) criteria into financial decision-making. Adopted as part of the EU Green Deal, the **EU Sustainable Finance Strategy Framework** aims to redirect financial flows towards sustainable and resilient activities, including those related to climate change adaptation (European Commission, n.d.-h).

- As an important component and a first pillar of the Sustainable Finance Framework, the **EU Taxonomy** Regulation establishes a classification system for environmentally sustainable economic activities (European Commission, n.d.-c). It aims to provide clarity on what can be considered environmentally sustainable. By setting criteria for sustainable economic activities, the taxonomy aims to guide investors and financial institutions toward financing projects that enhance climate resilience (Delegated Act adopted in April 2021). Related to the EU Taxonomy is the **EU Green Bond Standard (EU GBS)** (European Commission, n.d.-e). With the intention of promoting transparency, integrity, and credibility in the green bond market, the EU GBS provides a framework for issuing and verifying green bonds within the European Union. The Standard is voluntary for third-party companies carrying out pre- and post-issuance reviews at the European level and relies on the technical screening criteria of the EU Taxonomy to define green economic activities.
- A second pillar of the Sustainable Finance Strategy is the **Corporate Sustainability Reporting Directive (CSRD)** that mandates companies to disclose ESG-related information, enabling investors to evaluate companies' sustainability commitments (European Commission, n.d.-a).
- The **Sustainable Finance Disclosure Regulation (SFDR)**, a third pillar, requires pension funds, investment funds, asset managers, among others, to disclose information about their investment policies and products, ensuring clarity about environmental and social impacts (European Commission, n.d.-g). Both the CSRD and the SFDR relate to the EU Taxonomy in that organisations may use that classification system to assess the environmental sustainability of their business activities.

Although not an explicit element of the EU Sustainable Finance Framework, **Solvency II** is worth mentioning because it is the regulatory framework for the insurance industry in the EU (EIOPA, n.d.). Solvency II emphasises a robust approach to risk management, capital adequacy, and governance. It incorporates climate adaptation as a key component of its risk management protocols. By requiring insurers to integrate environmental, social, and governance (ESG) considerations into their risk assessments and capital requirements, Solvency II ensures that insurance companies are well-equipped to address the growing impacts of climate change. Through these and other relevant initiatives (such as the InvestEU programme), the European Union has been pushing for higher involvement of the private sector (including investors and insurers) in the development of climate adaptation projects.

The **EU Mission on Adaptation to Climate Change** is currently the main programme to accelerate climate adaptation across European regions and communities (European Commission, n.d.-b). This Mission was established in 2022 to translate the EU Adaptation Strategy into a shorter-term implementation plan—reaching climate resilience in 150 regions and communities across Europe by 2030. More details about CLIMATEFIT's relation to the Mission are provided in Section 1.5. Figure 1.4 gives a visual overview of CLIMATEFIT's position within the EU regulatory, policy, and project landscape concerning climate mitigation and adaptation.

Current EU initiatives are illustrative of the increasing importance of and attention to climate adaptation. At the same time, climate mitigation still receives more attention than climate adaptation, and there is, in general, still a large climate finance gap. Figure 1.5 shows the current global state of climate finance and the range of estimated needs, including mitigation and adaptation. Globally, climate finance in 2021 and 2022 has doubled compared to 2019 and 2020, with a total of $1,265 billion (Buchner et al., 2023). Of that total, only $63 billion was used to finance climate adaptation activities, and $51 billion was used to finance activities that contribute both to adaptation and mitigation, meaning 9% of all climate financing. Despite the global increase in climate

finance, growth in global adaptation finance has slowed down, representing only 5% of total climate finance in 2021-2022, compared to 7% in 2019–2020 (GCA & CPI, 2024).

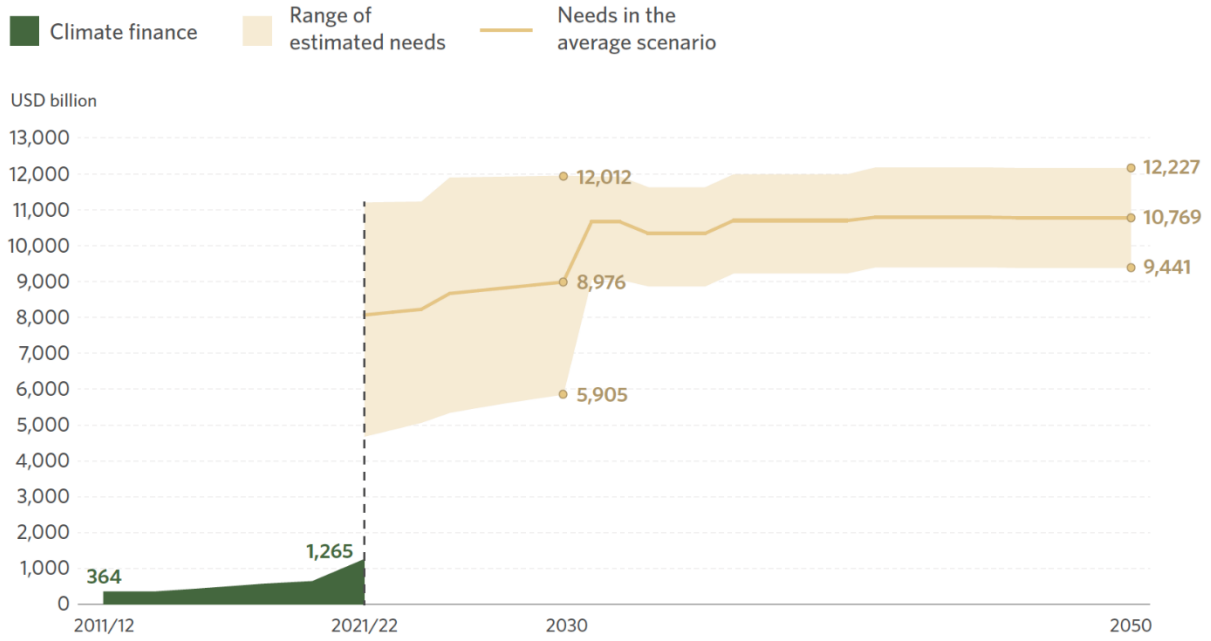


Figure 1.4. Global tracked climate finance and average estimated annual needs through 2050. Source: Buchner et al. (2023).

Climate Policy Initiative's "**Global Landscape of Climate Finance 2023**" report draws some important conclusions about adaptation finance:

- "While adaptation finance reached an all-time high of USD 63 billion, growing 28% from 2019/2020, this still falls far short of estimated needs of USD 212 billion per year by 2030 for developing countries alone" (Buchner et al., 2023, p. 6).
- "Tracked adaptation finance remains dominated by public actors (98%), with fragmented flows from the private sector. Adaptation finance tracking challenges continue to impede our understanding of progress of both public and private flows" (Buchner et al., 2023, p. 6).
- "Monitoring adaptation finance from the private sector and local governments remains fraught with tracking challenges. These include the context-specificity of what counts as adaptation, the complexity of linking climate risks with adaptation measures, the absence of clear impact metrics, and confidentiality concerns. In addition, unlike mitigation finance, adaptation finance is usually counted as incremental or proportional to total project costs, especially by international public climate finance providers" (Buchner et al., 2023, p. 29).
- "The private sector needs to step up adaptation efforts. Every dollar invested in adaptation could provide net economic benefits in the range of 2-10 dollars in the form of reduced risks, losses, increased productivity, and innovation (GCA, 2019)." (Buchner et al., 2023, p. 29)

UNEP's (UNEP, 2023, p. XII) adaptation gap report shows similar numbers for developing countries: "despite the clear signs of accelerating climate risks and impacts worldwide, the adaptation finance gap is widening and now stands at between US$194 billion and US$366 billion per year. Adaptation finance needs are 10–18 times as great as current international public adaptation finance flows – at least 50 per cent higher than previously estimated. (…) Narrowing the adaptation finance gap is of particular importance because of the high benefits that investments in adaptation can offer in terms of reducing climate risks and improving equity and climate justice. Left unchecked, however, increasing climate risks will inevitably lead to more climate-related losses and damages." These reports do not include detailed information about European countries. The flows and the needs for adaptation finance of European countries are not well understood, including the CLIMATEFIT territories' countries.

This context shows the importance of projects like CLIMATEFIT that aim to boost adaptation finance in the EU. It is important to first gain a baseline understanding of the territories involved in CLIMATEFIT, including an understanding of barriers, drivers, enablers, and opportunities among PAs and FIEs for adaptation finance, to propose the best solutions. Additionally, international best practices provide inspirational stories that may help shape investment strategies, investment plans, and bankable projects for EU regions and municipalities. The next section describes the work of WP1 performed for this deliverable in detail and its position within CLIMATEFIT.

1.3. CLIMATEFIT's relation to the EU Mission for adaptation to climate change

"The Mission on Adaptation to Climate Change focuses on supporting EU regions, cities and local authorities in their efforts to build resilience against the impacts of climate change. The Mission contributes to putting the EU's adaptation strategy in practice by helping the regions to better understand the climate risks they are and will be confronted with in the future; to develop their pathways to be better prepared and cope with the changing climate; and to test and deploy on the ground innovative solutions needed to build resilience. The Mission's objective is to accompany by 2030 at least 150 European regions and communities towards climate resilience" (European Commission, n.d.-b). Support is provided through the MIP4Adapt platform. The platform facilitates the alignment of relevant EU-funded projects with the work of MIP4Adapt, identifying synergies and complementarities that help to ensure the coherence of support to regional and local authorities regarding climate adaptation planning.

CLIMATEFIT is one of the Mission Projects, EU-funded projects that have completed or are undertaking research and developing innovative approaches and options for climate adaptation and associated guidance, tools, data, and case studies to help regional and local authorities deliver the EU Mission on Adaptation to Climate Change. CLIMATEFIT is currently the only Mission Project with a sole focus on adaptation finance. CLIMATEFIT has synergies with other Mission Projects that have finance-related components, namely Pathways2Resilience (P2R), PIISA, and TransformAr.

- **P2R** (Project: 101093942, HORIZON-MISS-2021-CLIMA-02) aims to advance a transformative and innovative approach to strengthen climate resilience in regional communities across Europe. CLIMATEFIT has a non-disclosure agreement with P2R. In WP1 of CLIMATEFIT, we use P2R's D5.2 "Catalogue of Sources, Instruments, and Best Practices" to ensure common finance terminology across our respective projects (P2R, nd).[1]
- **TransformAr** (Project: 101036683 HORIZON-MISS-2021-CLIMA-01) CM) aims to accelerating and upscaling the transformational adaptation in Europe, with a demonstration of water-related innovation packages. CLIMATEFIT has a non-disclosure agreement with TransformAr to share finance sector contacts and data during our respective research and training WPs.[2]
- **PIISA** (Project: 101112841 HORIZON-MISS-2022-CLIMA-01-03) aims to develop and deploy a range of insurance innovations that incite households and firms to adapt to climate change. We have excluded insurance from the literature review in WP1 and will draw upon the results of the literature review PIISA has undertaken when available in mid 2024. This will cover results on the efficacy and efficiency of various insurance products and services dealing with adaptation currently in the EU marketplace, such as parametric insurance. Their results will help guide the interactions of CLIMATEFIT with insurance providers.[3]

1.4. Description of D1.1

This deliverable is the main outcome of WP1 that consisted of three sub-tasks. Each sub-task focuses on one of the three perspectives. The first perspective is that of the 20 territories involved in CLIMATEFIT (Figure 1.1), including their public authorities. The second perspective is that of FIEs active in the 20 territories and/or other EU countries. The third perspective is informed from best practices of adaptation finance anywhere in the world that provide relevant inspirational stories for the 20 territories and the EU in general.

Task 1.1 (T1.1): Assess financing barriers and drivers for territories. This task aims to determine for each territory a baseline for climate resilience activities, new opportunities, and room for improvement. Concretely, T1.1 will describe the investment landscape of supply and demand approaches in the 20 territories, including a description of critical actors and existing Adaptation Funding and Financing Solutions (AFFS). This is done by reviewing and assessing financing barriers (legal, financial, economic, governance, regulatory, or organisational) impeding the territories from increasing their climate resilience investments through a desktop review of best practices and interviews with key stakeholders, including experts and PAs.

Task 1.2 (T1.2): Understand financial and investment entities' points of view and maturity. This task aims to understand financial and investment entities' (FIEs) points of view and maturity through a review of literature and FIE research (survey and interviews). In CLIMATEFIT, FIEs include banks (retail and commercial), institutional investors, asset managers, insurance companies, corporations, philanthropic organisations, foundations, development companies, multilateral development banks, NGOs, etc. T1.2 focuses on FIEs in the leader territories' countries (Belgium, France, Italy, Romania). As described in the grant agreement.

Task 1.3 (T1.3): Understand and capitalise on the good practices. This task will focus on benchmarking good practices in local climate financing in the EU and internationally selected based on their 1) transferability to the European context (if international), 2) transferability/relevance for local climate resilience projects, 3) an initial needs assessment among the cases, and 4) presentation of potential champions for a novel financing. In other

[1] https://www.pathways2resilience.eu/
[2] https://transformar.eu/
[3] https://piisa-project.eu/home

words, this task searches for international examples of climate financing relevant for the climate and financial context of the 20 territories.

1.4.1. Reading guide

The contents of the subsequent chapters allow readers to understand the current state of the adaptation investment landscape and provide a transparent and replicable methodology to develop adaptation investment landscapes in other territories or to research best practices.

Chapter 2 includes the results of a literature review of academic and grey literature about the barriers, drivers, challenges, and opportunities for adaptation finance from the perspective of territories and public authorities (Task 1.1), and from the perspective of FIEs (Task 1.2). This chapter also includes an overview of existing materials on financial sources and instruments for climate adaptation finance.

Chapter 3 describes the general methodology of WP1, and the detailed research methods adopted in the three sub-tasks. It describes the research steps undertaken to achieve the findings in Chapters 4-6. In combination with some of the annexes, Chapter 3 provides readers with insights on how to research and describe an adaptation investment landscape for a region or country, including interview scripts for PAs and FIEs, assessment frameworks to measure the climate policy and adaptation finance maturity of PAs and FIEs, and a detailed analysis framework for researching best practices.

Chapter 4 reports on the findings from T1.1 and the AIL from the perspective of territories and PAs. Chapter 4 offers a complete overview of the investment landscape in CLIMATEFIT's territories, including current practices, actors, currently used sources for adaptation finance, and challenges and opportunities of adaptation finance. Chapter 4 includes:

- A general description of the context of CLIMATEFIT's territories, including climate challenges and risks, geographical characteristics, and status of climate adaptation (e.g., existing plans).
- The AIL of supply and demand, including critical actors, main legislation for climate adaptation, and existing sources or adaptation funding and financing solutions. The AILs were produced on a country level, with a focus on the 20 territories in the eight countries: Belgium, France, Spain, Portugal, Italy, Romania, Slovenia, and the Czech Republic.
- An analysis and overview of barriers, drivers, challenges, and opportunities for adaptation finance in the territories, based on interviews with PAs and other critical actors (e.g., consultancy firms).
- A maturity assessment scorecard (MASC) to score the readiness of territories to access different sources of adaptation finance. The MASC has been tested in the four leader territories of CLIMATEFIT: Flanders region (Belgium), Strasbourg Eurometropolis (France), Brescia municipality (Italy), and Alba Iulia municipality (Romania).

Chapter 5 reports on the findings from T1.2 and the second AIL perspective (FIEs). Chapter 5 provides an overview of the FIE point of view regarding adaptation finance for in-country activities and EU-wide initiatives, based on data obtained through a scholarly and practitioner literature review, policy documents, and interviews and surveys with key financing and investment entities based in the CLIMATEFIT leader territory countries (Belgium, France, Italy, Romania), the UK, Denmark, and the Netherlands. Chapter 5 includes:

- The current state of climate finance in the EU from an FIE perspective, including existing adaptation funding and financing solutions (AFFS), regulatory frameworks for FIEs, current FIE investments in adaptation, and financing opportunities.
- Insights into the willingness, capacity, and maturity of FIEs to invest in adaptation based on interviews. This includes an overview of FIEs' opinions, experiences, barriers, drivers, challenges, and opportunities regarding climate adaptation finance.
- A maturity assessment framework to determine an FIE's organisational maturity. The framework has been tested among some of the participating FIEs.
- Guidelines on how to engage FIEs in adaptation finance, based on an analysis of and interviews with existing organisations like CCFLA (Cities Climate Finance Leadership Alliance). A draft of the FIE engagement strategy for CLIMATEFIT is provided in Annex 12.

Chapter 6 offers a deep dive into 20 international best practices. Through an in-depth analysis, each best practice's AFFS will be explained in detail, focusing on the technicalities of the financial mechanisms and lessons learned. The chapter includes an abstract and key information about each case. A full report of each best practice will be downloadable from the CLIMATEFIT website. After the presentation of the 20 cases, lessons learned across the 20 international best practices are described, with attention to successes and limitations, and conditions for transferability to EU territories.

Chapter 7 brings together and compares the main findings from Chapters 4-6 to draw general conclusions. Based on this concluding overview, we discuss how this deliverable feeds CLIMATEFIT's next steps, including how the content of this deliverable can be used and how barriers and challenges identified for PAs and FIEs will be addressed in subsequent WPs.

1.4.2. Synergies between D1.1 and other CLIMATEFIT activities

D1.1 reports on the key activities and outcomes of these sub-tasks, together describing the current AIL. This deliverable is a baseline measurement of adaptation finance from which to proceed with the co-creation and development of investment strategies, investment plans, and bankable projects in subsequent WPs. Below is an overview of the synergies between D1.1 and other WPs and deliverables. Some of these are described in the grant agreement, while others have been identified across the WPs by the technical partners.

WP2 - Build capacities, project pipeline and resilient investment strategies. WP2 will build the capacity of all relevant FIEs and PAs, key players in unlocking adaptation financing and investment opportunities. It will also develop, tailor, and apply a methodology to define investment strategies and pipelines of resilient bankable projects in 20 EU territories. D1.1 supports WP2 in the following ways:

- The AIL developed for the 20 territories' countries in T1.1 will support the capacity-building activities of T2.1 by determining the PAs' needs and expectations and will determine the baseline for co-designing the investment strategies for the 20 territories in T2.4.
- Similarly, T1.2 will measure the capacity and evaluate the maturity of FIEs, building a baseline for FIE engagement in T2.2.
- The good practices of T1.3 will feed capacity-building activities in T2.1 by offering inspirational stories and will propose AFFS examples that could help to co-design the investment strategies in T2.4.

WP3 - Build roadmaps for reaching investment plans. WP3 will develop an investment planning methodology to deliver 10 credible, scalable, and bankable investment plans. It will work with financing & investment entities (FIEs) to identify Incentive Mechanisms (IMs) for unlocking the finance required for the investment plans. Finally, WP3 will provide concrete Adaptation Funding and Financing Solutions (AFFS) on how territories and FIEs can better use innovative financial instruments to overcome identified gaps and barriers. D1.1 supports WP3 in the following ways:

- The state-of-the-art knowledge, best practices, and solutions derived from D1.1 offer an overview and AFFS examples helpful for developing a common process to translate investment strategies into budget planning and investment plans in T3.1, and to apply this common process to ten territories (planners and leaders) in T3.2.
- T3.4 will describe at least one selected IC and one AFFS per planner territory suited to investment plan development using the Investment Landscape in T1.1.

WP4 - Pilot solutions in 4 leader territories. WP4 will test the ICs, incentive mechanisms, and AFFS developed by the 4 PAs in 4 territories with at least one lead FIE for each solution identified. The aim is, to the extent possible, to test and experiment in the 4 leader territories a set of specific ICs and AFFSs identified in earlier tasks for detailed piloting. D1.1 supports WP4 in the following ways:

- The outcomes of T1.2 "Understand financial and investment entities' point of view and maturity" are relevant for understanding the bankability of solutions for T4.2 – "Mobilise and mainstream climate resilience in financing solutions and investment portfolios".
- The identification of the four champions in T1.2 grants expertise about adaptation finance approaches and a possible willingness to co-create new solutions in the leader territories. Additionally, the insights from T1.3 help understand how to mainstream best practices. These outcomes can facilitate the testing of ICs and AFFSs in the leader territories in T4.3.

Because of these synergies with WP2, WP3, and WP4, D1.1 also has synergies with the deliverables that document the activities and outcomes of the subsequent WPs, including:

- **D2.1** – Capacity building package for PA and for FIEs.
- **D2.3** – Report containing methodology to build investment strategy.
- **D3.1** – Report containing guidelines to build investment plan.
- **D3.2** – Guidance document on suitable Incentive Mechanisms.
- **D4.3** – Guidelines for PA on manual for leveraging finance.
- **D4.4** – Mapping of ICs and AFFS.

D1.1 also provides valuable input into WP6's **D6.1** - Draft White Paper for Policymakers and Practitioners, and its subsequent draft (**D6.3**) and final version (**D6.4**). These deliverables provide recommendations to support the mainstreaming of climate resilience finance.

Chapter 2. Literature study

A literature review of academic and grey literature was performed in all three tasks to understand the state of the art. The literature reviews either took the form of a narrative review or a scoping review (Xiao & Watson, 2019). Both are forms of descriptive reviews and "do not aim to expand upon the literature, but rather provide an account of the state of the literature at the time of the review" (Xiao & Watson, 2019, p. 95). A narrative review is "less concerned with assessing evidence quality and more focused on gathering relevant information that provides both context and substance to the authors' overall argument" (Kastner et al., 2012, p. 4). "A scoping review (Arksey & O'Malley, 2005) aims to extract as much relevant data from each piece of literature as possible — including methodology, finding, variables, etc.— since the aim of the review is to provide a snapshot of the field and a complete overview of what has been done" (Xiao & Watson, 2019, p. 99).

The review draws upon the literature identified in a longitudinal interdisciplinary systematic literature review (SLR) carried out in 2022 (n=283) (Whittaker 2023). Our research combines the literature in this SLR with additional peer reviewed research covering adaptation, climate finance and nature-based solution finance published in the period between 2022-2024. Our review focuses on the Global North and Europe in particular. The practitioner literature is rich in recent studies on finance for adaptation and nature and provides useful insights to fill some important gaps in the scholarly literature. The time segment selected for our review of literature is delimited to 2010 – 2024. We have excluded insurance from the literature review, although part of the remit of CLIMATEFIT, and will draw upon the results of the literature review PIISA have undertaken when available in mid-2024. Likewise, we have also drawn upon the review of literature undertaken in the early stages of PR2.

This chapter describes the results of the literature review performed in T1.1 and T1.2. In T1.3, a literature study was performed to shape the best practices analysis framework, which is described in Chapter 3.3.2. First, a general overview is presented about the scholarly literature (Chapter 2.1) and the practitioner literature (Chapter 2.2). Section 2.3 presents detailed overview of the barriers to climate adaptation finance found in the literature from the perspective of PAs and FIEs, followed by an overview of enablers and opportunities to private sector investment. Finally, section 2.4. provides a general introduction to business models and financial sources and instruments that may unlock finance towards climate adaptation. Table 2.1 outlines the most pressing barriers from an FIE perspective, and Figure 2.1 visualises barriers from an FIE and PA perspective (this has been extracted from both the scholarly and practitioner literature).

Table 2.1. Main barriers to adaptation finance faced by FIEs. Sources: Whittaker and Jespersen (2022a), Pauw et al. (2022), Frontier Economics (2022), EIB (2023)

Dominant barriers[4]	Actor descriptions of barriers (green are nature barriers (EIB 2023))
Regulation/Policy • Regulatory constraints • Lack of stable climate change adaptation policy • Legislative/regulatory incentives	• Regulations (financial & non-financial) not enabling of adaptation investment • Lack of a stable adaptation policy framework • Lack of long-term stability and credibility in climate change policies & regulation • Lack of governance processes for adaptation investment • Lack of incentive alignment to encourage investors participation • Lack of demand side economic policies to incentivise investment in adaptation (e.g., taxes, rebates, quotas) • Lack of transparency on the adaptation need finance available & the potential adaptation finance gap • Contradictory State regulations (planning, water, environment, etc.) • Lack of State vision & process for adaptation investment and sense of urgency • Distrust amongst Governments (State, municipal & utility- tariffs, charging, borrowing etc.) • Lack of institutional/regulatory arrangements
Finance/Markets • Unacceptable risk/return • Lack of income generation • Short termism • Lack of de-risking investments • Shortage of leveraged finance (supply) • Lack of track record • Absence of co-investment & blended finance • Lack of financial vehicles/instruments	**1. Acceptable risk/return** • Limited projects with acceptable return profiles • No or limited identified income/revenue/cash flow streams for adaptation • Adaptation projects do not present an acceptable risk-return profile for investors • Governments failing to leverage with high-risk capital to create incentives for private capital • Lack of investment-ready bankable adaption projects & project pipeline • Adaptation projects perceived as less financially attractive than mitigation projects/investments **2. Income generation**

[4] Market externalities/inefficiencies are not listed in these barriers

• Absence size transformation & capital aggregation • Projects not large enough • Complexity of capital aggregation • Low investor confidence • Failure to address market externalities • Other	• Scale and aggregation issues • System disincentivising of investment in adaptation (administration process, especially insurance) • Lack of investment-ready bankable adaption projects & project pipeline • Cash flow rates mismatched to impact & benefit (impact versus revenue) • Business case for adaptation investment lacking • Absence of investment models for adaptation projects **3. Short termism** • Short-term investment horizons of investors (timeframes of adaptation projects are long) **4. Leveraged finance (supply)** • Lack of proactive financing despite long-term economic case for investment • Lack State Government financing assistance • Few examples co-investment and blended financing for adaptation **5. Track record** • Lack of track record investing in adaptation • Lack data, no transaction history & limited disclosure record **6. Co-investment** • Lack of co-investment and use of private/public partnerships • Monopolisation of investment by public sector ('crowding out' the private sector) • Lack of collaboration between private and public actors • Bias to public sector **7. Financial vehicles/instruments** • Limited financial vehicles and instruments • Lack of competition in financing products • Lack of risk assessment methods for adaptation investment projects • Lack of research and credit/risk rating for adaptation investments • Lack of insurance products/mechanisms • Lack of liquidity in the sector **8. Size transformation & capital aggregation** • Lack of scaled investment-ready, bankable adaptation projects & project pipeline • Few examples of capital aggregation for adaptation projects • Ticket size. • Adaptation projects alone not large enough for investor requirement • Lack proof of concept on large projects attracting capital **9. Complexity of capital aggregation** • Complex capital aggregation processes with multistakeholder processes leading to high transaction costs **10. Investor confidence** • Lack of investor confidence **11. Market externalities** • Failure to address market externalities

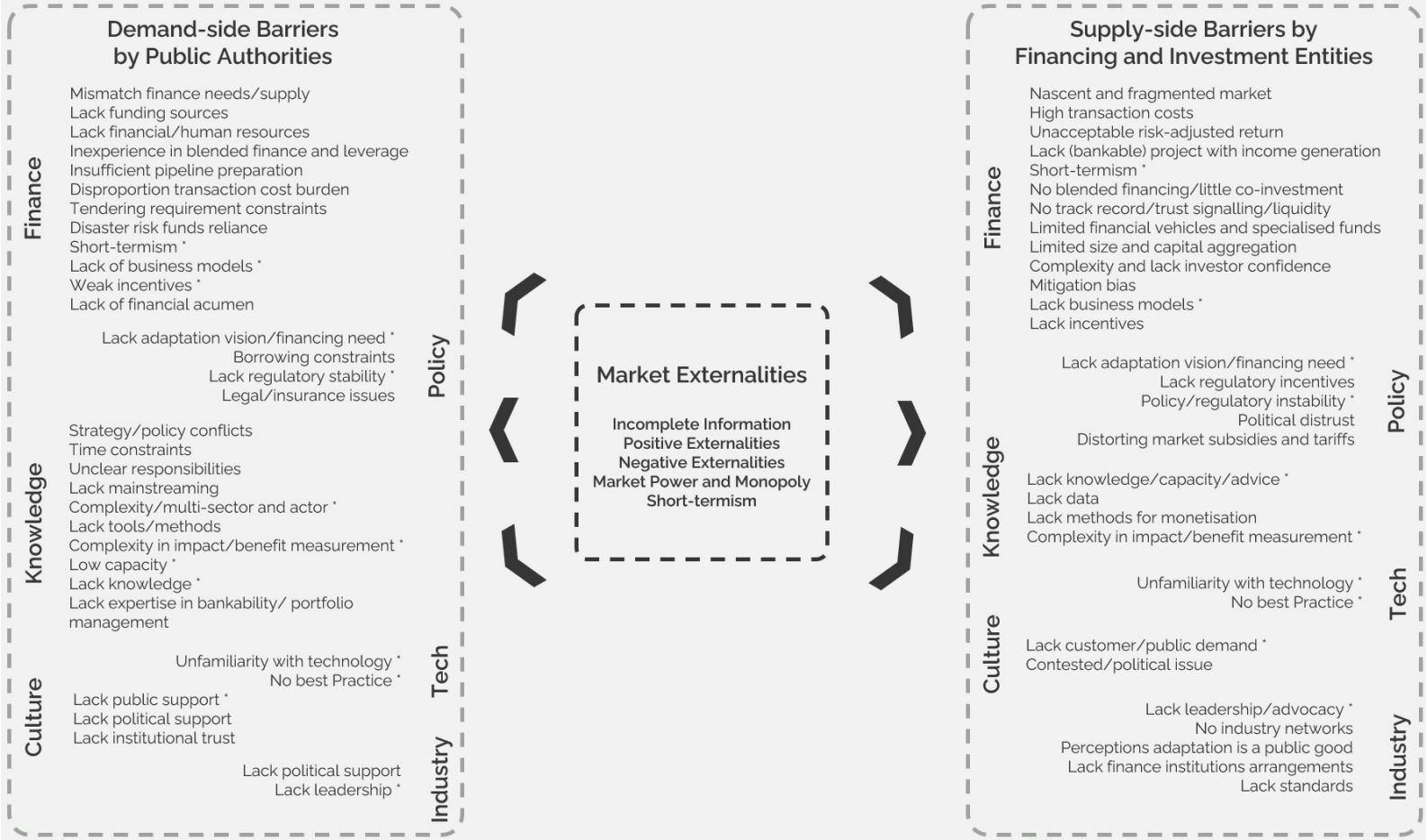


Figure 2.1. Barriers to adaptation finance (FIEs and public authorities). Source: Whittaker (2024)

2.1. Scholarly literature

Over the past decade, there has been a notable surge in academic studies dedicated to local adaptation efforts (R. Biesbroek & Delaney, 2020). Primarily, this scholarship has focused on assessing the effectiveness of contemporary policy processes related to local adaptation efforts (M. Olazabal et al., 2019). The scholarly literature on municipal level adaptation predominantly covers single-city case studies and comparative city analyses. The complex challenge of building long-term resilience to climate change is stressed in most of the literature (Aakre et al., 2010; Sainz de Murieta et al., 2021). Empirical studies abound regarding governments' adoption of diverse climate adaptation policies and plans (Araos et al., 2016; C40 Cities, 2016; Marta Olazabal & Ruiz De Gopegui, 2021). City case studies of climate action adaptation literature consistently highlight the disparity in attention given to adaptation compared to mitigation, emphasizing the need for greater focus on addressing this imbalance (M. Olazabal et al., 2019; Marta Olazabal & Ruiz De Gopegui, 2021). This literature highlights financial and resource constraints as the primary challenges faced by municipalities in progressing adaptation (Moser et al., 2019). The literature also acknowledges that adaptation finance remains a relatively underexplored area. The realm of adaptation finance research is in a very nascent state (Whittaker, 2023; Whittaker & Jespersen, 2022b). A bias towards mitigation over adaptation is present in the scholarly work on climate finance. Nearly all the climate finance articles examined cover mitigation and not adaptation. The climate finance field is under-theorised, with limited interest from the finance sector in climate change research (Diaz-Rainey et al., 2017). Addressing this imbalance requires greater attention to all areas of climate-related research, including adaptation, in finance journals (Hong et al., 2020).

Despite extensive research in various disciplines such as urban planning, economic geography, environmental business management, and climate finance, limited attention has been paid to the financial aspects of adaptation. Identified research gaps in this domain include the institutional and governance implications of adaptation finance, potential financial products, instruments and mechanisms, and obstacles to and opportunities for private sector engagement (Keenan et al., 2019). Some exceptions include studies on flood management, such as a comprehensive literature review by Bisaro and Hinkel (2018) on public and private finance for coastal adaptation. Research by various authors has explored adaptation finance mechanisms in the US context, including regional resilience trust funds and credit banking schemes (Cousins & Hill, 2021; Keenan, 2018a, 2018b; Keenan et al., 2019), offering valuable insights into the governance and institutional challenges associated with developing innovative financial mechanisms. A recent study by Keenan et al. (2021) delves into the relationships between different types of resilience and sustainability goals, emphasising the importance of understanding these dynamics when pursuing financing options in the context of municipal environmental governance. Other studies have highlighted the implications of new financial instruments, such as green bonds, for urban sustainability and socio-economic justice (Bigger & Millington, 2020; Cousins & Hill, 2021)

These gaps encompass various underexplored and under-theorized areas crucial to the focus of CLIMATEFIT. These include governance and institutional challenges in developing novel financial mechanisms, the risks, barriers, and opportunities for private investment in adaptation, financial instrument design, insurance approaches, and issues related to who pays for and who benefits from adaptation (Adhikari et al., 2021; Bhandary et al., 2021; Jarzabkowski et al., 2019; Keenan et al., 2019; Root et al., 2016; Tompkins & Eakin, 2012)

Within a core recent literature (Annex 2) composed by Whittaker (2023), scholars are studying adaptation finance with a deepness in relation to coastal hazards, retreat, and coastal flooding (Bisaro, de Bel, Hinkel, Kok, Stojanovic, et al., 2020). This group of scholars could represent the beginnings of a scholarly grouping focusing on the topic. This literature covers a narrow range of cities where innovative approaches are being progressed, so called 'bellwethers' of adaptation that are already massively exposed to the effects of sea level rise or inland flooding, such as Copenhagen, Greater Miami, Helsinki, New Orleans, New York, Randstad, and Rotterdam (Collier & Cox, 2021; Dąbrowski, 2018; Eckersley et al., 2018; Klein & Juhola, 2018; Taylor & Harman, 2016). These cities are grappling with the huge challenge of identifying funding and financing to address these hazards, they need to look beyond public provisioning to private sources and innovative mechanisms and hence the scholarly activity is picking up this shift in focus. These cities are also attending to issues such as the governance and economic complexities of responsibility, trade-offs, equity, and accrual of benefit at the local level, which will be crucial to mobilising new private partnerships and finance.

There is a need to climate proof localities which creates a significant public funding challenge and these challenges are most acute in coastal areas, such investment are typified by high upfront costs, high risk and uncertainty, multi levels of government, regulatory complexity and long-term investment horizons (Bisaro, de Bel, Hinkel, Kok, & Bouwer, 2020; Bisaro, de Bel, Hinkel, Kok, Stojanovic, et al., 2020; Bisaro et al., 2018). Public face the constraints of municipal budgets so adaptation solutions often fall short of what is needed; they are often incomplete or under-scaled (Keenan et al., 2019).

The challenge of measuring investment in adaptation, often referred to as the 'Holy Grail' of adaptation, is hindered by the ambiguity of adaptation as a policy area and the limited data and analysis of finance flows at various scales, including direct spending by the corporate sector on climate-proofing their businesses, and critically evaluating adaptation finance flows methodologically is a complex (ADB, 2021; CPI, 2017; Fatica &

Panzica, 2021; Marta Olazabal & Ruiz De Gopegui, 2021). Accurately measuring local climate finance flows is crucial to understanding the local adaptation finance gap (Rosenzweig & Solecki, 2014; UNEP, 2016).

Adaptation finance and the scholarly study of the phenomenon is still in its infancy. It faces many potential barriers; investors face significant barriers such as project bankability and project pipeline. However, potential investors often exhibit risk aversion when it comes to adaptation, reflecting their belief that: (1) many adaptations embody a public good component that is difficult to monetise (Holtedahl et al., 2022), and (2) the responsibility for adaptation is the subject of contentious debate, such as determining who bears the financial burden for such effects as household flooding (G. R. Biesbroek et al., 2014; de Koning et al., 2017; D. Reckien & Petkova, 2019). These barriers suggest bleak prospects for scaling up finance without systemic change (Christophers, 2019). Capturing these dynamics is of paramount importance, as the investment response will fundamentally shape the pace and character of the adaptation response at the local level.

2.2. Practitioner literature

The practitioner literature is the richest in recent studies on adaptation or nature finance and provides useful insights to fill some important gaps in the scholarly literature. This is illustrated by 20 recently released guidelines (2022 and 2023) produced by prominent finance sector entities.

Recent literature makes the investment case for adaptation and provides guidance on key features of adaptation finance. There are also specific initiatives and organisations such as Taskforce on Nature-related Financial Risk Disclosure (TNFD) plus the Global Adaptation & Resilience Working Group (GARI), Global Commission on Adaptation (GCA) (GCA & CPI, 2024) and the Climate Policy Initiative (CPI) (GCA & CPI, 2024) that are regularly providing specific guidance on climate and nature risk disclosure, risk assessment and climate finance tracking respectively. Detailed advisory literature for FIEs is also being produced on subjects such as climate stress testing for central banks (ECB, 2022). Some of the guides are produced specifically for certain financial entities e.g., central banks, asset managers, government ministries, pension etc.

In the following sections we examine several key publications produced in recent years by prominent finance sector organisations such as the European Investment Bank (EIB), the OECD, UNEPFI, the UK Green Finance Institute, USAID, KPMG and National Bank of the Netherlands. Collectively these organisations are setting out the agenda for adaptation finance for the finance sector and investors for years to come. A normative agenda is also being formed by the lead agencies responsible for adaptation such as the Global Centre on Adaptation GCA and CPI (2024) and the successive (Intergovernmental Panel on Climate Change) IPCC and Conference of Parties (COP) (SUP 2023).

European Investment Bank

A comprehensive review of databases and online sources was conducted by the **European Investment Bank** to assess the status and diversity of finance for nature-based solutions (NBS) in the European Union (EU) (Hudson et al., 2023). The review encompassed 1,364 projects; key findings include:

- Dominance of public funding (only 3% of identified projects report private sector financing covering more than 50% of total costs).
- Bulk of NBS projects are relatively small in scale (81% having investment costs below €10 million) (44% reported costs below €1 million).
- Implementation rate of NBS projects is sluggish, and significantly lower than their potential (despite a unique funding potential for agriculture).

In summary, while NBS hold promise for addressing environmental challenges in the EU, their full potential remains untapped due to reliance on public funding, small-scale implementation, slow adoption rates, and uncertainties regarding funding efficiency, particularly in the agricultural sector.

UNEP FI

(Mullan & Ranger, 2022) writing for the **OECD** introduced a practical framework designed for financial institutions to elucidate upon climate-adapted and resilient-aligned financial activities and investments. Building upon this, UNEP (2022) expanded the framework and suggested possible indicators for monitoring and reporting adaptation-aligned investment (refer to Fig 2.1). It is important to note that these metrics do not substitute current methods for tracking international adaptation finance, instead, they offer crucial insights into the alignment of broader (and significantly larger) non-climate financial flows with the objectives of adaptation and resilience.

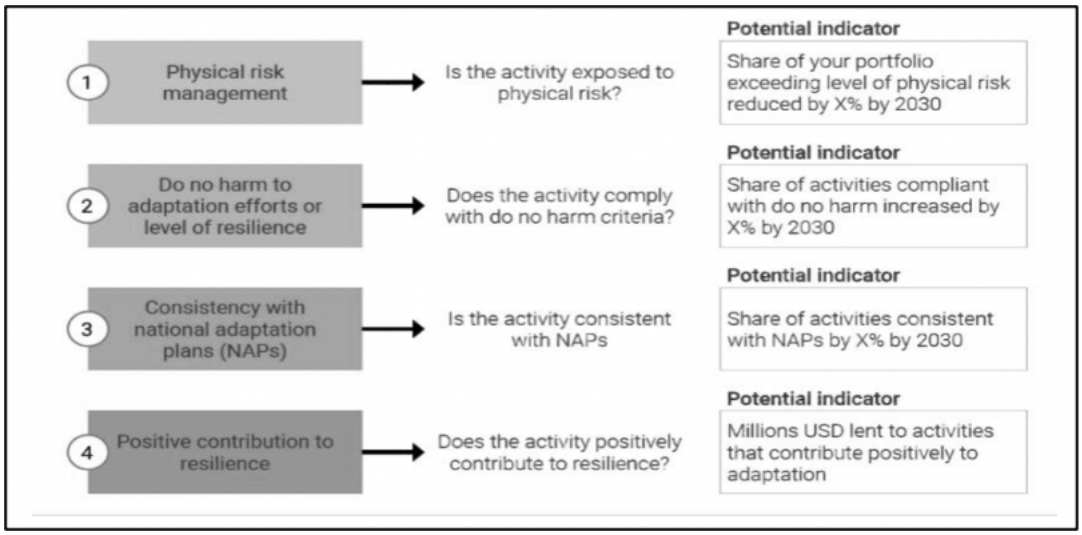


Figure 2.2. Approach to achieving positive adaptation investment alignment. Source: Mullan and Ranger (2022), building upon UNEP (2022)

Green Finance Institute

To bolster the UK National Adaptation Programme NAP3 (2023-2028) and extend the framework established in the UK's 2023 Green Finance Strategy (UK Government, n.d.), the UK's *Mission Climate Ready: Unleashing finance and investment for a prosperous climate ready economy* report produced for the Green Finance Institute outlines a roadmap of six actionable steps for the government to enhance investment in the UK's climate resilience by 2025 (see Figure 2.2) (Ranger et al., 2023). The six steps include vision/strategy, targets, enabling environment, government policy, public finance, and leadership. The report provides key areas of focus and 20-five targeted recommendations for governmental action within the specified timeframe (Ranger et al. (2022)). The report places significant emphasis on mobilising finance for adaptation and the necessity for timely policy interventions to rectify market externalities and establish an enabling environment conducive to the flow of finance, mirroring the efforts already underway for achieving climate mitigation and net zero targets.

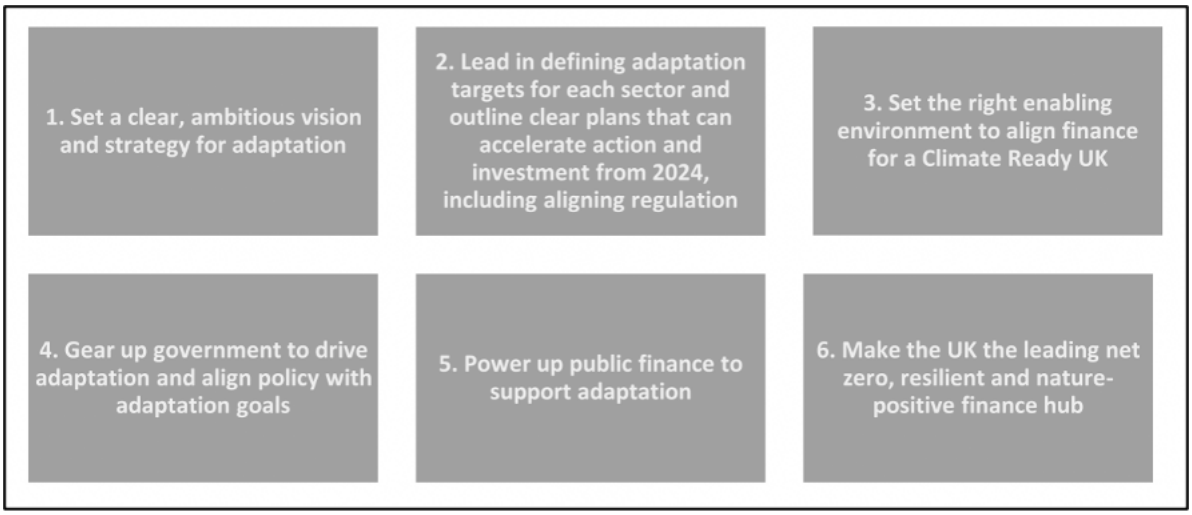


Figure 2.3. Six pillars of a climate ready economy. Source: (Ranger et al., 2023)

USAID and KPMG

Chau et al. (2023) in a report for **USAID** also set out the business imperative to finance adaptation, whilst **KPMG (2024)** set the investment case for nature. The former stresses three main opportunities: (I) protect (FIE's assets, supply chains, and operations), (ii) grow (the market of adaptation solutions) and (III) participate (role for the private sector).

'Most business leaders and investors have long viewed proactive investment in adaptation and resilience as important but not urgent. The business case was elusive because assessments of the negative financial impacts were based on uncertain climate scenarios, and the solutions seemed unclear and often fell into the domain of public sector investment. But all of this has changed dramatically. The

negative effects of the climate crisis on the global economy are no longer theoretical—they are happening now'. (Chau et al., 2023)

Both reports stress the insufficient amount of both public and private expenditure allocated to adaptation and nature and that closing the gap is both a public and a private responsibility. The market and business case are starting to rapidly change with discussions centring around accurately and consistently pricing the value of adaptation and nature in economic decision-making and turning to a debate on incentivising adaptation and nature to help mobilise financing. KPMG's report stresses the need for regulatory and incentive structure change (including clear policy, regulation and standards to create a level playing field for business, the financial sector and investors, the need for a biodiversity data taxonomy and building capacity to break down barriers).

State Investment Banks (SIBs)

The perspective of State Investment Banks (SIBs) is provided in the recent report of the Platform on Sustainable Financing and its Climate Adaptation Working Group, an initiative of the **National Bank of the Netherlands** (de Nederlandsche Bank, 2023). The report argues that it is valuable for the financial sector to engage in adaptation efforts, such as raising awareness among customers about climate adaptation and devising financial solutions to fund adaptation measures and making climate risks insurable. They make recommendations for the Dutch finance sector on raising awareness, developing products and services, goal setting, improved assessment of climate risks and public private compensations.

'Climate change can have a major impact on the financial sector. About a quarter of the balance sheets of Dutch financial institutions are related to real estate, which means that institutions are exposed to physical climate risks: insurers of buildings are seeing their claims burden increase, and a decline in the value of real estate in vulnerable areas affects banks that have granted mortgage loans and institutional investors with real estate investments'. (de Nederlandsche Bank, 2023)

'It is crucial to take joint action. This requires commitment from citizens, companies, governments and financial institutions. As financiers, insurers and investors, we have to take into account the climate impact and the associated adaptation strategies and their consequences for the most relevant economic sectors that we finance, insure and in which we invest. We want to include these consequences in our policy, and we want to encourage climate resilience through our conditions, our products and our services. In this way we facilitate the transition to a climate-proof society. […] *We (financial sector, government and businesses) advocate that all those involved tackle these in conjunction with each other, because there are dependencies and because initiatives can reinforce each other.'* (de Nederlandsche Bank, 2023).

Global Centre on Adaptation

The GCA and CPI (2024) publication is focused on the opportunities to overcome investment barriers for NbS. The lack of a conducive policy environment, both in terms of regulation and incentives, is stressed along with the usual financial barriers which are seen to be skewing investment for those that deliver traditional commercial revenues or carbon-related returns. They call for standardisation to assist, as well as blended finance and specialised actors, such as dedicated investment fund managers and funds.

World Business Council for Sustainable Development

A business leader's guide to adaptation was released by the **World Business Council for Sustainable Development** (Gerard et al., 2024), calling for action across three themes: a coordinated company strategy, acting now, and collaboration and partnership at all levels. Whilst the Summary of the **IPCC** 6th Assessment Working Group 1 Report for policymakers stress that current planning and budgeting practices have given insufficient consideration to climate impacts and now place ever more assets and people at risk (Bernardini et al., 2021). The guide states that large scale transformational adaptation will require improved governance and coordination across sectors and jurisdictions.

Several publications have called for the transformation of the financial system and its architecture. **COP27** stressed the need to transform the finance system to pay for climate change - its structures and processes - and to engage governments, central banks, commercial banks, institutional investors, and other financial actors in the transformation (IPCC, 2022). Other ambitious views see the need for local governments to take a 'state-market-civil society synergistic' or 'entrepreneurial state' role in their climate efforts (Mazzucato & Penna, 2016).

2.3. Barriers to climate adaptation finance

2.3.1. Barriers to adaptation planning from a PA perspective

Academic literature has studied barriers to adaptation from the perspective of public authorities, and ways to overcome them. Several literature reviews exist about the main barriers (Aguiar et al., 2018; Oberlack, 2017;

Oberlack & Eisenack, 2014; M. Olazabal et al., 2019). For these overarching challenges, a strong consensus seems to emerge about main barriers (Moser et al., 2019), notably thanks to research using the archetype method, characterizing recurrent patterns in variables and processes that shape adaptation (Oberlack et al., 2019). Distinct from limitations that tend to be absolute, barriers are challenges that can be overcome with concerted effort, prioritization and shifts in resources and management (Moser & Ekstrom, 2010).

On the abstract, theoretical level, Moser and Ekstrom (2010) identify four categories in the local urban context: institutional, attitudinal, financial and political. R. Biesbroek et al. (2011) determine seven main categories, ranging from conflicting timescales to the lack of resources. Other barriers, reviewed by M. Olazabal et al. (2019) include the **lack of knowledge, uncertainty about impacts, lack of leadership and limited stakeholder engagement**. The complex interactions between scales of governance are also seen as challenges with sometimes local governments lacking a clear policy mandate for adaptation (Juhola & Westerhoff, 2011), creating a situation with an unclear assignment of responsibilities. Furthermore, raising awareness about climate adaptation is an issue because the benefits are not always immediately visible, which can create the perception among citizens that climate adaptation is an unnecessary burden, or perhaps not even a priority.

Taking a case study approach on adaptation barriers and drivers for PAs, Diana Reckien et al. (2015) analyse 200 large and medium-sized cities across 11 European countries. Results show that factors such as membership to climate networks, population size, gross domestic product (GDP) per capita, and adaptive capacity act as drivers of adaptation planning capacities. Out of the 200 studied cities, only 56 had a dedicated adaptation plan. Building on this study, Aguiar et al. (2018) examined 147 Local Adaptation Strategies in 20 countries in Europe. Key drivers were incentives through research projects, implementation of EU policies, and the growing frequency of extreme weather events. On the contrary, the **main barriers were insufficient resources, capacity, political commitment and uncertainty**. Furthemore, the EEA (2023) finds that many Member States report difficulties to assess costs and track financing of the implementation of adaptation strategies, notably due to immature monitoring, reporting and evaluation systems.

This analysis of barriers and drivers of adaptation from the point of view of PAs reveals overarching challenges that reappear in multiple studies, in addition to numerous context specific challenges and enablers. This review offers a foundation to the research strategy for T1.1 within the CLIMATEFIT project. This literature analysis allowed us to identify several research gaps that require further investigation. Herein we selected 3 gaps identified in the literature that we will address Chapter 4, as they fitted the best the goals and perimeter of our work with PAs:

- **Research on adaptation planning for local governments appears geographically restricted**, with a vast majority focusing on western countries, and with very limited data notably of South or Eastern European contexts (R. Biesbroek & Delaney, 2020).
- **There is limited research on the financing of adaptation**. Although there is a growing recognition of the importance of funding and financing arrangements to enable climate change adaptation in cities and territories, there has been little analysis of the governance mechanisms necessary to support broader scaled application (Keenan et al., 2019).
- **There is limited research on the barriers to climate adaptation finance from the point of view of local governments**, although it is often identified as the most visible one (Moser et al., 2019).

2.3.2. Barriers to adaptation finance from a PA perspective

As the literature review reveals, adequate resources for adaptation appears as one of the most pressing and overarching challenges for PAs. The importance of financing in achieving a successful adaptation strategy has been raised for several years. The UNEP Adaptation Gap Report 2023 finds particularly high annual per capita adaptation needs in upper-middle and high-income countries (averaging USD 81)[5].

Financial and resource constraints are some of the most frequently highlighted challenges (Moser et al., 2019), indicating an undertheorized subject (Whittaker & Jespersen, 2022b). Throughout our literature review, we have found that Moser et al. (2019) offer the only in-depth research focusing on the precise nature of local finance challenges, approaching the finance related barriers at the local government level. Building on an archetype analysis, Moser et al. (2019) identify seven types of barriers to climate finance:

- Establishing climate change risks and adaptation as a matter of concern.
- Establishing the funding need, which involves assessing and justifying adaptation expenditures.
- Proving the financial standing (capacity) of the funding seeker (demander).
- Identifying and accessing funding providers.
- Accessing different types of funding or financing.
- Navigating specific funding mechanisms.

[5] The adaptation needs per capita in lower-middle and low-income countries are of USD 51 and USD 22. However, as a percentage of Gross Domestic Product the adaptation finance needs in low-income countries is the highest of any income group.

- Having or creating the ability to use and administer funds.

Moser et al. (2019) offer a comprehensible framework to the analyses of barriers to financing for PAs. However, their research focuses on the state of California, which economically, culturally, and legally differs significantly from the EU context. Furthermore, there is a consensus in the literature on the highly context specific nature of adaptation challenges and drivers (Moser & Ekstrom, 2010). Regardless of the differing research contexts, Moser et al. (2019)'s work is highly relevant as a theoretical basis for researching finance barriers in the context of the CLIMATEFIT project. Yet, field research appears necessary to comprehend the specificities of EU territories, their very own challenges and drivers in accessing financing and funding for climate adaptation.

If in depth research on barriers for accessing financing for the point of view of PAs has not been conducted at the EU level, Ducastel et al. (2023) have suggested that the EU is characterized by an investment paradox: **while there are increasing public resources for investment – especially for the green transition – there are fewer and fewer human resources to disburse it**. They argue that austerity measures and new public management policies are weakening territorial administrations, limiting capacities of local PAs to contribute to the implementation of projects. The authors claim that the European Union project-based policy funding does not take charge of the structural implementation costs of weakened territorial administrations, which has an effect on the efficiency of project implementations. This tends to favour the same large communities who have the resources to capture the fundings. Seen as a "bureaucratic weakness", the structural funding gap in territorial administrations makes long-term adaptation planning difficult.

2.3.3. Barriers to adaptation finance from an FIE perspective

Mapping the relevant literature gives a rich picture of the machinery of adaptation finance. Overall, it is obvious from the literature that there is a disconnect between adaptation planning and finance, both in practice and consequently in its study. The analysis of barriers to adaptation finance, considering both scholarly and grey literature, reveals challenges applying equally to investors and governments. Figure 2.1 compares barriers from the perspectives of local governments and investors, offering insights into the differences in experiencing barriers across actors and the importance of interactions in the system. This provides a foundation for CLIMATEFIT's research strategies in this emerging area. Common barriers include regulatory uncertainty, lack of knowledge, and short-termism. (Toxopeus & Polzin, 2021) identify the coordination between private and public financiers as one of two overarching barriers of NBS finance and the UK Climate Change Committee (2023) stress the need for brokerage or mediating bodies between the two parties.

The barriers cited in the literature in Table 2.1 are dissected by five (5) enabling conditions ((1) industry structure, (2) policy, (3) markets, (4) knowledge, (5) technology plus culture). We used the theoretical framework - strategic niche management of Smith and Raven (2012) that we also used in the MAM (Chapter 2.3). Table 2.1 also compares the barriers for nature finance (Hudson et al., 2023). Whilst there are many common barriers adaptation finance faces additional obstacles such as government de-risking of finance (4) (5) (8) (9), dedicated financial instruments (7), investor confidence (10) and market externalities.

For a full description of adaptation finance barriers extracted from the scholarly and practitioner literature, see Annex 3. Market externalities/inefficiencies are considered generators or causes of barriers (Pauw et al., 2022). Frontier Economics (2022) found both market failures and financial barriers, and in particular the bankability of projects, lack of regulation, lack of information, and lack of coordination to be of high if not very high priority.

When comparing barriers to mitigation and adaptation finance, commonalities emerge, suggesting that financing challenges go beyond those affecting climate finance in the broader market. The academic literature highlights challenges such as policy immaturity, low returns, technology risks, and lack of suitable projects (Dorst et al., 2022; Knight et al., 2022; Lazurko & Venema, 2017; Pauw et al., 2022; Sánchez-Arcilla et al., 2022). Practitioner studies identify additional barriers to adaptation, such as market externalities, market uncertainties, project bankability, social affordability, revenue shortfalls, and additional costs of mitigation (ADB, 2021; C40 Cities, 2016; Frontier Economics, 2022; Stenek & Amado, 2013). Furthermore, as adaptation is relatively new, there are uncertainties, real and perceived risks, lack of investment history, and technology lock-in issues. Adaptation investments also face high levels of risk and uncertainty due to regulatory issues, market fragmentation, and inadequate data (Steinbach et al., 2014). In addition, barriers related to unfamiliarity and competition with mitigation technologies also hinder the adoption of adaptation (Glover & Granberg, 2020).

The literature suggests addressing these challenges through regulatory changes, increased awareness and understanding of market dynamics (UNEP, 2023). To accelerate the diffusion of adaptation finance, the literature calls for diverse investment actors beyond governments, creating a space for private investors in adaptation (GCA, 2019; UNEP, 2016). In conclusion, the identified barriers, investor perspectives, and thematic analyses and guidance in the literature review provide valuable insights for future research and interventions.

Market failures

This section further explores the literature on barriers to adaptation solutions created by market failures (Bisaro & Hinkel, 2018; Frontier Economics, 2022; Pauw et al., 2022; UNEP, 2016; UNFCCC, 2022) (Table 2.2). Understanding how to address barriers requires an examination of the reasons for their manifestation.

Economic activities often have negative impacts on the environment and impose indirect costs on society. Market failure occurs when a market fails to function efficiently, resulting in socio-economic consequences typically not accounted for in markets and financial transactions. In addition, adaptation is generally considered a public good, which further complicates market dynamics. Table 2.2 lists five market failures found in adaptation commonly cited in the literature and by our interviewees.

Table 2.2. Market failures affecting adaptation finance.

Market failures	Description of adaptation failure	References	Expression in the market	Possible remedial approaches
Incomplete information	A lack of accurate and regarding the impacts of climate change, public goods and common pool resources issues	(Bisaro, de Bel, Hinkel, Kok, & Bouwer, 2020; Buck, 2021)	Projects encounter substantial difficulties in gathering and synthesising pertinent information regarding the performance, impacts and benefits of adaptation	Data, information, methodologies and standards for assessing climate adaptation impacts
Positive externalities	These are created when the benefit of an investment extends beyond the investor to the broader community	(Frankhauser & Soare, 2013; Ware & Banhalmi-zakar, 2020)	The public good nature of adaptation, means many benefits do not deliver direct private returns on investment	Incentives
Negative externalities	Negative externalities occur due to a significant costs imposed on others beyond the investor or increased societal costs	(Frankhauser & Soare, 2013)	Coordinating multiple agencies and stakeholders for project development poses a significant challenge, particularly for large-scale projects involving public and private entities with divergent responsibilities.	Compensation
Market power and monopolies	Market power and monopolies that limit competition and hinder efficient pricing	(Anderson et al., 2018; Corrado, 2017; Ware & Banhalmi-zakar, 2020)	A small number of key players with power.	Diversification the investment arena
Time inconsistency and short-termism	Short-term gains are prioritised over long-term benefits and long-term benefits are not fully considered in short-term decision-making	(Mullin et al., 2019)	Financiers seeking to invest in adaptation solutions often involves long timeframes sometimes required for financial returns	Changes to fiduciary duties regulation and project, de-risking etc.

Financial barriers

Investors face financial barriers related to acceptable risk/return, income generation, co-investment, de-risking of investments, leveraged finance (supply), track record, financial vehicles/instruments, scaling up, capital aggregation and investor confidence are all examples of financial barriers. WRI & WCF's Nature-Based Solutions Accelerator identified all these barriers to scaling up nature finance. The Robeco Global Climate Survey 2023 also confirmed these barriers (ROBECO, 2023). They are described in detail in Table 2.1 and Annex 3. However, the challenge identified in the literature was that adaptation and nature, while having immense value, do not have a price and are difficult to price (Hudson et al., 2023). They do not easily generate income and input or transaction costs are high, making them commercially unattractive to investors. Measures to make them more commercially acceptable, such as co-investment, scale transformation and capital aggregation, are possible but can add complexity and cost. In addition, there are approaches and instruments that can be used, but overall, they are not.

> *"There is a lack of willing investors to finance nature-based projects. Commercial finance predominantly looks to invest in projects at a later stage, with a significant track record and more scalable business models, which can offer lower risks for the money invested. The perceived riskiness of investing in nature has therefore proved to be a hindrance to investment" (Hudson et al., 2023, p. 72).*

Monetization, valuing, and assessing adaptation is a key financial barrier**.** Several guidelines address the issues of evaluating projects for funding, including pricing and risk assessment (Hudson et al., 2023). Finding ways to address this information deficit that hinders the monetisation and valuation of adaptation is critical to mobilising finance (Frankhauser & Soare, 2013; Ranger et al., 2023). Monetisation is defined here as an economic term for the process of transforming something, such as nature or adaptation, into revenue-generating assets (Long, 2021). This could include, for example, the (potential) monetisation of avoided costs or increases in property

value caused by an adaptation solution (den Heijer & Coppens, 2023). These valuations vary by market: the closer project proponents are to their respective markets, the better they can assess, price, and manage risk in those markets. Aspects of established concepts and methodologies for project analysis and description do not fit well with adaptation projects, and appropriate eligibility criteria may ultimately require a more adapted conceptual and economic valuation framework. For sufficient deal flow and impactful projects, the financial offer must match the risk/return characteristics and facilitate the desired outcomes on the ground. In the case of concessional/grant finance, close coordination between grants and repayable finance can enable more efficient deal flow. If not coordinated at the instrument level, the repayable finance instrument will experience an inefficient origination and development process. Opportunities to integrate adaptation into more mainstream investments will also be missed. This includes soft support, such as technical assistance, for all stages from scoping to implementation. The nature of adaptation solutions is often such that multiple benefit streams need to be included in the overall economic assessment of the financial structure for the solution to be considered viable. This requires appropriate flexibility in the eligibility criteria; it is helpful if this can be achieved through the relevant EU policies, such as the EU Taxonomy.

2.3.4. Enablers of adaptation finance

Climate change brings many potential risks for finance institutions of all types and to the public sector and the real economy (IPCC, 2022). There is a strong economic case for early investment in adaptation (Whittaker & Jespersen, 2022b). Climate change is also a systemic risk and a source of potential structural change in the economy, as such it is increasingly within the mandate of central banks, and their supervisors, and some are beginning to respond (NGFS, 2021). The recent European Climate Risk Assessment (EUCRA) highlights significant risks to the financial sector including (i) public finance, (ii) property and insurance markets, (iii) financial markets and (iv) the European Solidarity Mechanism (EEA, 2024). EUCRA also plots risks from climate change to public finance through the real economy and then to financial markets. The impacts to the financial markets can be through impacts to capital stock damages, productivity, exports and economic growth (EEA, 2024). There are many good reasons therefore to look at the enablers and opportunities to private sector investment. We have extracted six key enablers from the literature.

Regulatory reform (industry, fiscal, financial, market and monetary)

Overcoming barriers like unfamiliarity with adaptation, lack of knowledge, and competition with mitigation, lock in traditional technologies over newer adaptation approaches requires regulatory, structural, and awareness changes.[6] Of these changes, a reform of public and market-drive regulations to address these barriers is a top priority. Regulatory certainty is a highly cited enabler for adaptation. Regulation should address market fragmentation and contribute to reducing the perceptions of a high level of risk and uncertainty in adaptation investment. The uncertainties in the climatic system can also exacerbate underinvestment. The investment arena, marked by path-dependency and lock-in, shows that mitigation technologies hinder adaptation due to historical biases (GCA, 2019; KPMG, 2024; UNFCCC, 2023). In the low carbon and renewables market, green bonds predominantly fund mitigation (>95%). To avoid technological lock-in for adaptation, understanding investment dynamics, as well as interrelationships among institutions, user practices, and infrastructures, is crucial (Geddes & Schmidt, 2020; Ranger et al., 2023).

Expanding the actor space

The barriers relating to lack of knowledge and uncertainty, lack of suitable climate finance mechanisms, and lack of bankability of projects, means that there are many hurdles to the take-up and diffusion of innovations in adaptation. To accelerate the diffusion of finance, there needs to be an opening up the investment actor space, thinking beyond current incumbents and creating diversity in adaptation innovation. This means moving beyond municipal actors to involve a range of different investors and partners. Unravelling private capital and actors can potentially guide public finance towards more transformative uses (GCA, 2020; Mazzucato & Semieniuk, 2018). Instead, as shown in this literature review, the public sector dominance in adaptation finance runs the risk of crowding out private investors (Ranger et al., 2023; Whittaker & Jespersen, 2022b). Geddes and Schmidt (2020) found enablers of financing for the low carbon transition relating to knowledge, risk/return, transaction size, industry networks and interactions. 'Courageous and bold' finance is required to instigate innovation and transitions (Geddes & Schmidt, 2020, p. 13). These conditions currently do not prevail for adaptation finance as evidenced in the literature.

Private public partnership, blended finance, and de-risking of capital

Public-private partnerships (PPPs) are long-term agreements between a contracting public authority and one or more private entities to implement projects against payments by the contracting authority or users. They encompass different models and contracts, from projects that transfer the demand risk to the private partner

[6] Technological lock-in refers to a situation where a particular technology or system becomes dominant and entrenched, making it difficult for alternative technologies and approaches to compete or for users to switch to different options. This can occur due to various factors such as high switching costs, network effects, economies of scale, and established standards.

(concession PPPs) to projects where such risk is borne by the public partner (government-pay PPPs). To assist governments with developing and implementing such PPPs, To establish the legal framework for "PPPs for SDGs" and provide support, UNECE (2023) published the Standard on Public-Private Partnerships/Concession Legal Framework in support of the Sustainable Development Goals and its Accompanying Guide. It is structured as a ready-to-use document containing contractual principles, institutional arrangements, rules and procedures that could be easily transposed and adapted to national legislations, assisting countries in delivering fit-for-purpose PPPs. Focusing on integrating climate resilience, adaptation and mitigation into infrastructure investments and PPP agreements, the Global Center on Adaptation (2021) identifies within its Knowledge Module on Public-Private Partnerships for Climate-Resilient Infrastructure (2021) a series of crucial tools and capacities that actors need to develop, such as stakeholder engagement, climate risk assessment, decision-making under uncertainty and prioritisation analysis. On the same note, the World Bank Group (n.d.) developed in 2022 Climate toolkits for infrastructure PPPs, which outline the framework and describe practical actions to incorporate climate aspects in all the steps of the PPPs cycle.

The Cities Climate Finance Leadership Alliance (2022) identifies revenue enhancement, land value capture, and leveraging instruments as promising areas for unlocking resources for adaptation. Mazzucato and Semieniuk (2018) note that public actors are more likely to provide capital-intensive, high-risk finance for climate innovation. These approaches contribute to the de-risking of capital. However, the review indicates a lack of awareness and expertise in designing financial solutions for adaptation, emphasising the trust deficit among investors, policymakers, and technology developers (Frankhauser & Soare, 2013; Ranger et al., 2023).

Risks associated with adaptation projects hold financial institutions back (OECD, 2017). To address that, among others, the OECD proposes blended finance: "the strategic use of [public or private] development finance for the mobilisation of additional [commercial] finance towards the SDGs in developing countries" (OECD, 2017). Its rationale is to use funding to mitigate or distribute risks to which commercial stakeholders are averse . Risk mitigation is achieved via the provision of concessional and/or non-concessional finance by using: (a) financial instruments, such as loans, guarantees, and grants (mostly adopted); (b) mechanisms, such as syndication and public-private partnerships; (c) collective investment vehicles (facilities and funds). The latter to crowd in sources of finance, majorly (68%) run by fund managers (Oecd, 2018). Blended finance has been adopted across sectors, mostly on renewable energy, but also on climate adaptation (Calliari et al., 2022; Lazurko & Pintér, 2022), agriculture (Havemann et al., 2020), forestry (Gnych et al., 2020), landscape conservation and marine conservation.

Levelling up adaptation

The nascent adaptation finance market resembles the state of the low carbon and renewables market decades ago. Financing climate responses requires equal drive for both mitigation and adaptation. Adaptation needs to be uniformly progressed by scholars, policymakers, and practitioners alike.

Bankable project pipelines

Overcoming the many hurdles to investment requires a comprehensive understanding of risks within the broader vision of building resilient communities. Aligning with a collective vision can encourage the financial sector to view adaptation as an area for active risk management and opportunities rather than an unattractive investment (Ranger et al., 2023; Whittaker & Jespersen, 2022b). Increasing the knowledge, skills, and capacity of both investors and governments in adaptation finance would be highly beneficial. Improvements in individual project and project pipelines bankability for investors and governments alike are needed to increase activity and confidence in the adaptation market (Gorelick & Walmsley, 2020).

> *'Project preparation facilities are portrayed as particularly important […] where connecting investors with bankable projects, administering those projects, and implementing those projects, requires skills and expertise that are not immediately available within municipal administrations' (Gorelick & Walmsley, 2020, p. 120).*

2.4. Business models and finance sources and instruments

In practical terms, EU and sub-national policies seek to advance climate adaptation action by mobilising the necessary financial resources from both public and private sectors. As such, this section is an introduction to innovative business models, revenue streams, sources, and instruments that may unlock finance towards climate adaptation.[7]

2.4.1. Business Models and Revenue Streams in Nature-based Solutions

[7] Innovative business models leverage novel approaches to create, deliver, and capture value in ways that seek financial viability of climate adaptation projects.

Based on the above, it is evident that there is a need to develop and adopt innovative business models in climate adaptation projects, particularly in those integrating nature-based solutions, so that benefits from such projects are converted into revenue streams allowing for increased financing and investment by both the public and private sectors, as well as leveraging on public funding to attract private financing.

Before introducing some business models, examples of revenues and cost reductions when implementing nature-based solutions across sectors are presented in Table 2.3. The list is exemplary of how broad and diverse revenue streams may be across economic sectors. It is worth noting that investments in several of the sectors below are associated with businesses which tend to have proven revenue streams, such as sale of commodities (e.g. timber) or services (e.g. recreational activities). On the other hand, conservation projects focused on protecting, maintaining, or restoring nature often lack revenue streams. While carbon credits and payment for ecosystem services are on the rise, such revenue streams are yet to become mainstream among private investors (Miltenberger et al., 2021).

Table 2.3. Examples of revenue and cost reductions by sectors implementing nature-based solutions. Adapted from Hudson et al. (2023)

Sector	Examples of Nature-based Solutions	Examples of Revenue and Costs Reductions
Infrastructure	**Green buildings**. For example, green roofs and wall systems that use vegetation as the surface of the roof/wall covering instead of artificial materials.	**Revenue**: Reduced costs with heating/cooling by improving the thermal properties of roofs, increased lifespan of the waterproof, increased insulation, decreased damage of exterior from weather.
	Green water management. For example, ecosystem-based rainwater collection and water re-use systems using plants and other components of ecosystem as natural filters.	**Revenue**: Sale of water or water rights. **Cost reduction**: less water purchases, reduced impacts of rain/storm run-off and flooding and reduced need for chemical inputs into water treatment systems.
	Natural hazard protection. For example, restoring, modifying, or using natural landscapes to reduce or mitigate the impacts of flooding.	**Revenue**: Payments for ecosystem services. **Cost reduction**: lower need for artificial flood defences, reduced impact of natural hazards and removal costs of sediment.
	Erosion control. For example, creating or modifying infrastructure to reduce the effects of erosion, including from anthropogenic activities.	**Revenue**: Payments for ecosystem services. **Cost reduction**: reduced artificial erosion control techniques, reduced sediment flows and associated sediment removal costs (drainage infrastructure, etc.
Tourism	Providing tourism services in natural areas that conserve the environment and improve the well-being of local people. For example, limiting disturbance, conservation fees, waste management, nature educational activities and employing local guides.	**Revenue**: Tourism (bed nights, use of equipment, etc.), secondary activities (e.g., sale of secondary products and services), sale of carbon/ biodiversity credits. Potential revenue benefits from premium prices. **Cost reduction**: less staff on protection of nature.
Conservation	Protecting and enhancing nature. For example, protecting, enhancing or establishing new forest, and maintaining and enhancing native biodiversity (incl. terrestrial, freshwater and marine).	**Revenue**: Sale of carbon/biodiversity credits, Payments for ecosystem services, subsidies, biodiversity offset mechanisms. Potential revenue benefits from increased functioning of ecosystem services (e.g., pollination supporting agriculture).
	Pollution reduction. For example, reduction of artificial materials and chemicals introduced into the environment.	**Revenue**: Payments for ecosystem services. Potential revenue benefits to core operations from premium prices and increased yields. **Cost reduction**: Substitution of artificial materials for less costly ones.
Agriculture	Practices that increase biodiversity, enrich soils, improve watersheds, enhance ecosystem services, as well as build resilience. For example, using crop rotation, buffer areas and no tillage practices.	**Revenue**: Sale of crops or other products, sale of carbon/biodiversity credits. Potential revenue benefits from premium prices increased yields and market access. **Cost reduction**: less use of artificial fertiliser and other inputs.
Aquaculture and fisheries	Implementation of aquacultural practices that support or enhance biodiversity or climate adaptation. For example, integrated multi-trophic aquaculture, managing invasive species and limiting catch limits.	**Revenue**: Sale of fish and other products. Potential revenue benefits from premium prices and increased yields. **Cost reduction**: less use of artificial materials or inputs (fuel, fertilisers, etc.).
Forestry	Combining commercial production with the safeguarding of environmental value and the services forests provide. For example, managing invasive species, adopting	**Revenue**: Sale of timber or other forest products, sale carbon/biodiversity credits and payments for ecosystem services. Potential revenue benefits

	silvicultural practices, and protecting riverine areas.	from premium prices, increased yields and market access. **Cost reduction**: use of artificial inputs (fertilisers, etc.).

Each revenue stream introduced above has to undergo an assessment to ascertain its reliability, supplier/payer, scale, and other relevant characteristics. To facilitate this evaluation, Global Canopy (Tobin-de la Puente & Mitchell, 2021) devised a framework for assessing potential revenue sources based on six primary criteria:

- Scale: The amount of funding involved
- Timeframe: The duration over which capital is collected
- Level: here finance is aggregated
- Payer: Identifying who is paying and who should pay
- Value: Understanding the rationale for clients/users to pay
- Generation: Determining the type of revenue generation

Currently, some of the revenues and cost reductions are captured by market actors (for instance, the reduction in energy consumption due urban greening), but some others, particularly those delivered in the long term, such as reduction of damage costs due to flooding, are not. Therefore, innovative business models need to address the lack of clarity on return on investment, which is challenged by the 'public good' nature of many adaptation projects and nature-based solutions. It is also worth noting that business models for some adaptation and nature-based solutions should consider the appreciation of such solutions that occurs over time (unlike infrastructure projects, where solutions depreciate over time) (Mayor et al., 2021).

Narrowing down to nature-based solutions applied in urban settings, primarily and involving sectors such as tourism, infrastructure and conservation, the EU-funded project Naturevation has produced eight business models. Six of which are introduced below, given their actual or potential to attract private financing (Table 2.4). Yet, it is worth noting that alternate business models have been defined elsewhere.[8] This is testimony to the embryonic nature of this research and innovation space.

Table 2.4. Business models for urban nature-based solutions. Adapted from (Mayor et al., 2021)

Business Models	Description	Revenue Streams
Green densification model	Increases real estate value through greening peri-urban and urban buildings and spaces.	Developers purchase of land to PAs generates revenues that can be used as returns on private investment. Increase in real estate value provides an incentive for developers' investment.
Urban offsetting model	Monetary flows from negative environmental impacts are re-routed to nature-based solution projects.	Offsetting payments by businesses whose economic activities are compensated with positive environmental actions.
Vacant space model	Facilitates the well-being of citizens through low-cost access to underutilised terrains.	Parking fees and sales around underutilised terrains, as well as user-charges for access to recreational facilities.
Green heritage model	Enables preservation and utilisation of pre-existing natural heritage sites through recreational access.	Sales of value-added agricultural produce, as well as tourism user fees (in the form of taxes or entry tickets, e.g.).
Risk reduction model	Reduces financial risks by building resilience against adverse weather events through infrastructure changes.	Future avoided losses due to extreme weather events are yet to be captured financially – novel methods needed to capture avoided losses.
Green health model	Employs active involvement with green spaces to improve citizens' physical and/or mental health.	Future reduced costs in public health care services are yet to be captured financially in the present – novel methods needed to capture benefits.

The revenue streams introduced depend on the actual capture of value (a business term for solution benefits) produced by nature-based solution projects. Value capture is thus about how to generate revenue from goods and services delivered to users and customers. Prior to value capture, there is value delivery/creation and value proposition, as shown in Table 2.5 (introducing examples of how the value is attributed to the three most common stakeholder groups involved in nature-based solution projects).

Tables 2.4 and 2.5 will be useful in WP2 training and the development of Investment Strategies and Investment Plans as they can be used to tailor the financing of adaptation projects in the territories.

[8] A deliverable of the project P2R which is not publicly available at the time of writing. Deliverable 5.2: Catalogue of sources and instruments and adaptation finance process.

Table 2.5. Examples of value attribution in nature-based solutions. Adapted from (Mayor et al., 2021)

Stakeholders	Value Proposition	Value Delivery	Value Capture
Associated with green roofs and walls			
Public administration	Reduction of heat island effect	Creation of milder microclimates	Improvement health and comfort of citizens
Corporations	Implementation of investments	Business opportunities (for utilities, depending upon public incentive schemes)	Increase of revenues
Citizens	Energy savings	Reduction of heating and cooling systems	Savings in energy bills
Associated with sustainable urban drainage systems			
Public administration	Reduction of water run-off	Decrease in flooding events	Reduction of restoration costs
Corporations	Protection of natural assets	Decrease in flood events	Insurance values
Citizens	Protection of residential areas	Decrease in flood events and well-being improvements	Increase of property value
Associated with tree planting			
Public administration	Reduction of the heat island effect	Increase liveability in urban areas	Health improvement
Corporations	Improvement of brand recognition	Business opportunities	Increase economic activity through business sales
Citizens	Tree cover in residential areas leading to health, aesthetic and biodiversity	Health benefits	Improvement of overall neighbourhood
Associated with parks			
Public administration	Regeneration of neglected areas	Improvement of urban well-being and social cohesion	New businesses and new economic opportunities
Corporations	Implementation of investments	Business opportunities (for utilities, depending upon public incentive schemes)	Increase of revenues
Citizens	Recreation	Improvement of health and well-being	Increase in value of properties
Associated with edible city solutions			
Public administration	Urban regeneration and social impacting edible space	Integrative and inclusive social impact in the urban area	Cost–benefit of micro and macro-economic positive impacts
Corporations	Resilient economic activities from small-scaled solutions	Business and social entrepreneurship opportunities	Independent local economic structure providing local socio-economic welfare
Citizens	Social cohesion and opportunities for interaction within and with nature	Social well-being and areas of trust- building in, neighbourhoods, and communities	Ecosystem and socio-economic services

2.4.2. Financial sources and instruments

Financial instruments serve to capture monetary values from revenue streams and reduce risks, so that risk-adjusted returns can be made more attractive to FIEs, when focusing on private financing.

While the financial landscapes of the territories targeted by CLIMATEFIT list which financial instruments and mechanisms (AFFS) have been adopted in each territory (Chapter 4), the range of financial instruments available to finance adaptation is much broader. A demonstration of this is the "Catalogue of financial sources, instruments and best practice case studies" to support financing regional adaptation that was developed within the P2R project (P2R, nd). The catalogue includes a visual overview of 57 sources and 78 instruments, as well as detailed information on each, such as advantages and drawbacks, and key considerations for their use, as well as relevance to the Mission's Key Community Systems. In addition, the catalogue includes 169 case studies of public and private adaptation relevant to European regions. CLIMATEFIT will collaborate with P2R to develop and expand the catalogue in synergy with the international examples database of CLIMATEFIT (Chapter 3.3.1). Planned enhancements include refining and expanding the definitions of sources and instruments, and the incorporation of additional set of detailed case studies on financial instruments developed by CLIMATEFIT. P2R will also host CLIMATEFIT's 20 international best practices (Chapter 6). Figures 2.4 and 2.5 show a general overview of the sources and instruments as included in P2R's catalogue.

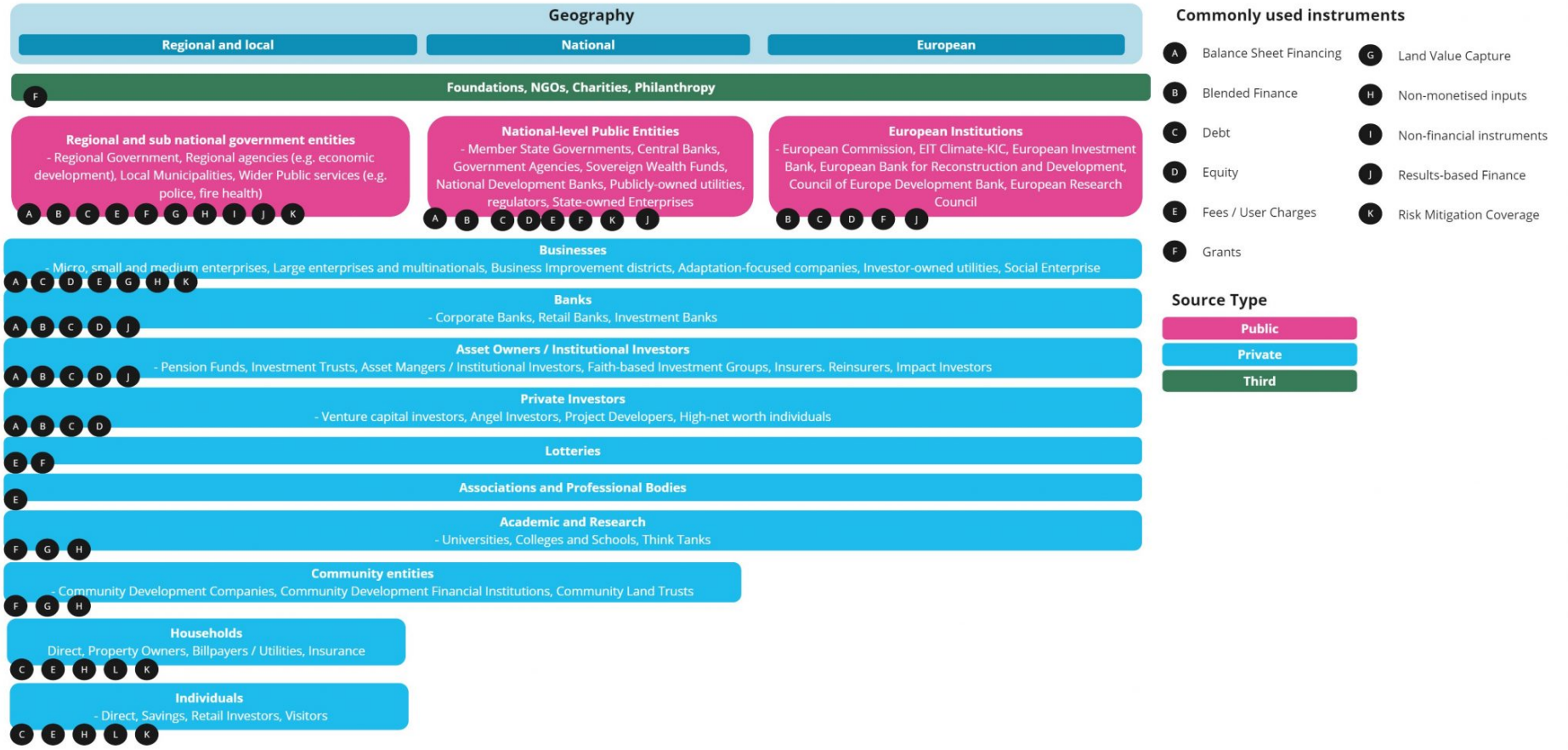


Figure **2.4.** Catalogue of sources (P2R, nd).

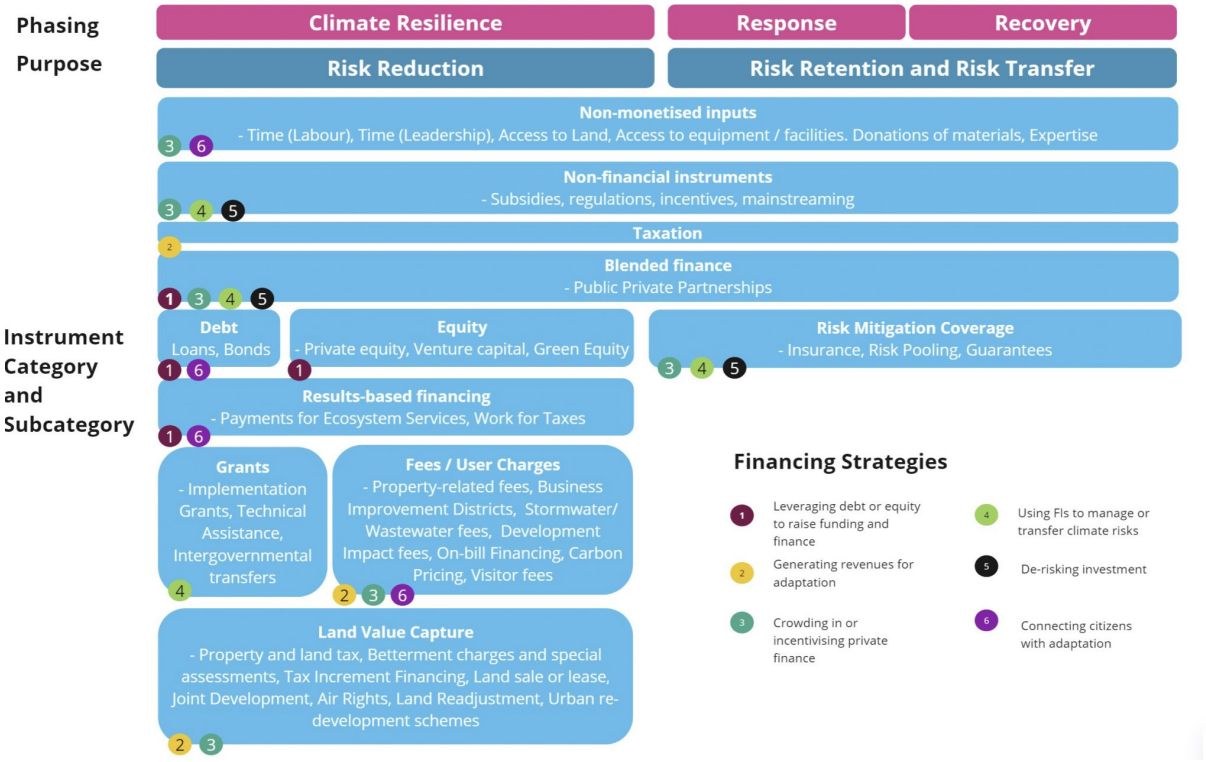


Figure 2.5. Catalogue of instruments (P2R, nd).

2.4.3. Concluding remarks

While adaptation finance has been facing headwind, evident from the downward trend in the past few years, increasing attention and capital has been directed to nature projects. Given the strong interlinkages between the two, development of innovative business models and financial instruments ought to explore that in view of potential benefits and monetary value associated to the implementation of both adaptation and nature projects.

Despite the wide perception that climate adaptation is a common good, innovative business models and financial instruments applied across economic sectors show that there is a significant potential for financing and investing in climate adaptation projects. Yet, the expansion of adaptation financing requires scaling of proven financial instruments, as well as testing of new ones. Such work requires the engagement of FIEs with willingness to take the lead in the market, as well as boost their capacity and maturity. The following chapters dive into such matters.

Chapter 3: Methodology

Against the backdrop of the global adaptation finance gap, the general objective of WP1 is to gain an understanding of the current state of adaptation finance in our CLIMATEFIT territories and their countries, complemented with an analysis of international best practices to scope innovative adaptation financing and funding solutions (AFFS). This means determining a baseline understanding of the context and best practices from which CLIMATEFIT will continue to co-design investment strategies, develop investment plans, and pilot bankable investment cases in the next WPs. To set this baseline, we adopted a three-perspective approach to gain an in-depth understanding of the current state of adaptation finance. When taken together, the three perspectives provide a comprehensive overview of the AIL. Each perspective requires an approach tailored to the subject or target groups. The research approaches of each perspective were developed within their respective sub-task and are described in detail in sections 3.1 to 3.3. The paragraphs below provide a general description of each perspective. Figure 3.1 gives a broad overview of the overall research approach.

The literature study in Chapter 2 helped to further design the research approaches in each task. The research relied mainly on qualitative research methods, including desk research through document analysis of (local and regional) policy documents, reports, and web pages, and interviews with key stakeholders.

To ensure a correct understanding and description of the context of the 20 CLIMATEFIT territories, the work package task leaders collaborated with facilitators to perform desk research and conduct interviews. A facilitator is a consortium partner based in the territory's region or country. There is one facilitator for each of the eight countries. A facilitator can be a research institute, consultancy firm, or service provider. Table 3.1 gives an overview of the facilitators (see Figure 1.1 in Chapter 1 for an overview of the territories). The facilitators are more knowledgeable about the local context and executed research for T1.1 and T1.2 (see Chapter 1.4 for a description of the tasks). Facilitators also act as communicators between the CLIMATEFIT technical partners and local public authorities (PAs) and financing and investment entities (FIEs). This allows them to conduct research and communicate in the local language, after which facilitators translate it to English.

Table 3.1. Facilitators in the CLIMATEFIT project

Facilitator	Description	Country
ALEA	Alba Local Energy Agency is a non-governmental organization whose main role is to contribute to the sustainable development of Alba County by supporting the regional and local sustainable energy policies.	Romania
ENERGAP	Energy and Climate Agency of Podravje is a non-profit public organisation responsible for planning and implementing sustainable energy and climate projects mostly in public sector.	Slovenia
ENVIROS	ENVIROS SRO is a consultancy company providing assistance for companies as well as municipalities in the field of energy, climate, environment and ESG.	Czech Republic
AMBIT	Ambiente Italia S.r.l. is an environmental consulting company that has been operating in the Italian and European market for thirty years.	Italy
APEA	The Agencia Provincial de la Energía de Ávila (APEA) has been established by the Province of Ávila and aims to foster a new developed energy culture within the province.	Spain
AdEPorto	Porto Energy Agency is a private non-profit association with public interest that promotes sustainable development, and climate and energy transitions in the Porto Metropolitan Area, north of the Douro River.	Portugal
University of Antwerp	The University of Antwerp is a leading academic institution in Flanders, Belgium.	Belgium
Strasbourg Climate Agency	ACS is a non-profit and independent agency that serves as a one-stop shop for solutions in housing, mobility, energy efficiency, renewables energy and adaptation solutions covering Strasbourg metropolitan area	France

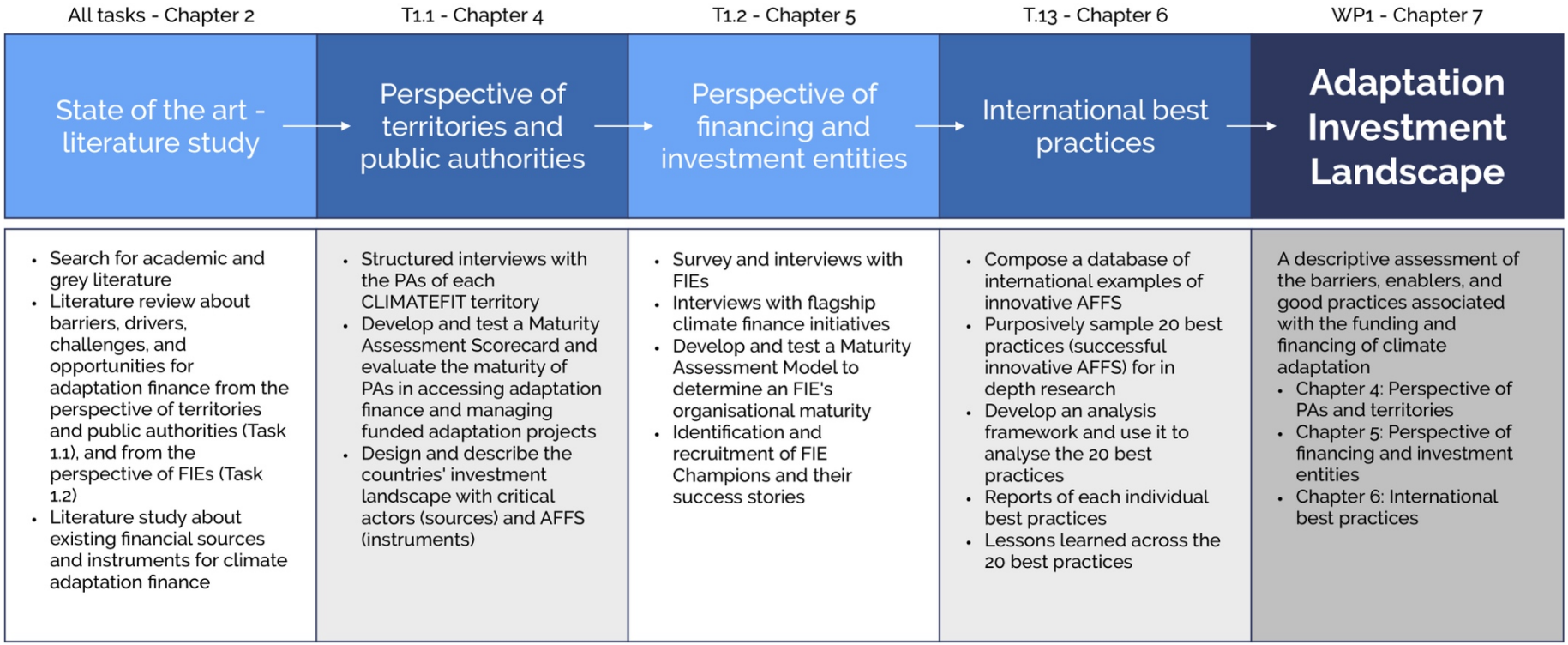


Figure 3.1. Deliverable 1.1. Overview of the research process and approach

Territories and public authorities' perspective. The first perspective adopts a broad view towards the 20 territories and their public authorities. It first considers the climate change and adaptation policy context on a national, regional, and local level. Second, it aims to gain an understanding of the adaptation finance landscape by identifying and mapping current actors and adaptation finance sources. Finally, it takes a deep dive into the 20 territories with the objective of understanding barriers, drivers, enablers, and opportunities regarding adaptation finance experienced by PAs. PAs from the territories were interviewed by the facilitators. PAs are responsible for developing and implementing regional and local climate adaptation policies, plans, programmes, and projects. That's why it is crucial to understand the challenges they are facing regarding climate change and adaptation finance.

Financing and Investment Entities' perspective. Contributions from the financial sector are necessary to close the adaptation finance gap. It is therefore important to understand climate finance from the perspective of FIEs. CLIMATEFIT focuses on how FIEs can be involved in AFFS for investment strategies and investment plans designed by public authorities. This project does not focus on insurance products, which is the scope of the EU project PIISA. Unlike the 20 territories, FIEs were not all predefined and had to be identified and contacted. This was mainly done in the four leader territories' countries (Belgium, France, Italy, Romania). Understanding FIEs' viewpoints regarding adaptation finance complements the first perspective and grows the AIL.

International best practices' perspective. Regional and local governments struggle to develop investment strategies and investment plans for adaptation with secured financing or funding, while FIEs are hesitant to invest in adaptation. Both PAs and FIEs stress the need for best practices. In-depth analyses of innovative AFFS can inspire how to finance and implement adaptation actions. It helps PAs understand how other regions or municipalities succeeded in securing public and private capital, and it helps FIEs understand that adaptation finance can be commercially interesting or can generate direct or indirect revenue streams. Best practices make adaptation finance tangible and concrete, which complements the PA and FIE perspectives in the AIL. Following this third perspective, a database was composed with more than 250 international examples of innovative financing and funding solutions to climate mitigation and adaptation, from which 20 cases were selected for an in-depth analysis.

3.1. Researching the perspective of territories and their PAs (T1.1)

In the initial CLIMATEFIT proposal, we identified from existing literature that PAs are struggling to develop and deliver compelling investment plans with positive and clear risk-return horizons and expectations, and hence missing out on the potential of leveraging private sector capital for adaptation. To find solutions to boost climate adaptation finance in the CLIMATEFIT territories, it was important to first gain an understanding of the barriers and challenges that the 20 territories currently experience, and to describe critical actors and existing AFFS in the territories. To do so, **T1.1's research approach included four main steps**.

First, a **literature study** of academic literature was performed to understand already documented barriers and challenges for PAs (Chapter 2). Second, structured interviews were conducted by the facilitators with the PAs of each CLIMATEFIT territory to understand their experienced barriers, challenges, drivers, or best practices. Third, a **maturity assessment scorecard (MASC)** was developed as a tool to understand the territories' degree of preparedness to mobilise a broader range of financing solutions. The MASC was tested in the four leader territories (Alba Iulia municipality, Brescia municipality, Flanders region, Strasbourg Eurometropolis). Fourth, the facilitators visually described the country-wide adaptation **investment landscape**, including critical actors and current AFFS.

Technical partners (Actierra, WCF, UA) from T1.1 developed materials and tools that facilitators tailored for their respective territories to execute the second, third, and fourth steps. Table 3.2 describes the roles of the facilitators and the territories within T1.1.

Table 3.2. The role of facilitators and territories in T1.1

Facilitator's role	Territories' role
• Act as a liaison between the project and territories and FIEs • Identify contact persons for territories that are not yet part of the project as beneficiaries • Act as a support partner to implement the analytical tools and methods within the territories	• Provide data to facilitators • The four leader territories had to provide feedback on methodologies and tools developed during T1.1, and they tested the Maturity Assessment Scorecard

Figure 3.2 gives an overview of the collaboration process between Actierra, the lead of T1.1, and the facilitators for steps two to four. This process, including the supporting materials for facilitators, has been presented and updated on several occasions: during coaching sessions with facilitators, during technical meetings, and via regular email updates.

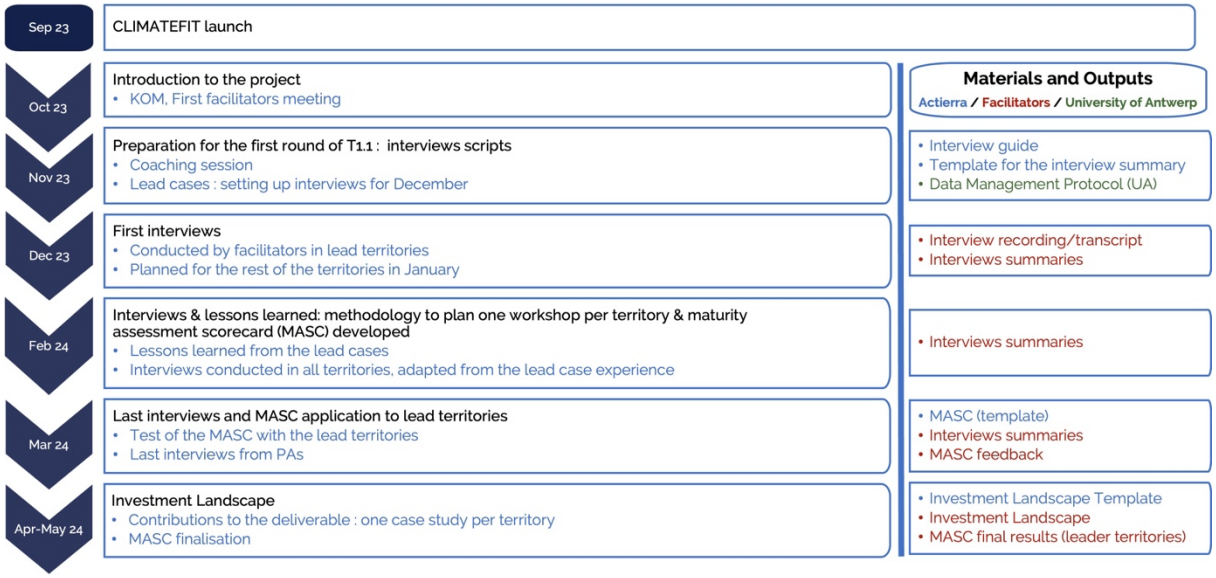


Figure 3.2. T1.1 process, including steps, materials and outputs by task leader Actierra and the facilitators. Source: Actierra

3.1.1. Interviews

Structured interviews were conducted to assess the barriers and drivers for overcoming the adaptation finance gap in the 20 CLIMATEFIT territories and their corresponding PAs. A structured interview is a data collection method that relies on asking questions in a set order to all participants to collect data on a topic. The questions were open-ended, and there was an opportunity for discussion between the interviewer and the interviewee(s), but overall, the interviewers stuck to the list of questions that Actierra prepared. This makes it a structured rather than a semi-structured interview approach. This method allows us to describe recurring forms of financial challenges driven by interconnected factors, encompassing strategic, operational, financial, and institutional dimensions. Notably, this method offers a high degree of replicability across various contexts. The interview script is not location-specific and could be applied in other territories or countries too.

To structure the interview script, Actierra clustered the fifteen archetypes identified in Moser at al. (2019) in seven focal points around which the adaptation finance challenges are clustered (Moser et al., 2019):

- Establishing climate change risks and adaptation as a matter of concern.
- Establishing the funding need, which involves assessing and justifying adaptation expenditures.
- Proving the financial standing (capacity) of the funding seeker (demander).
- Identifying and accessing funding providers.
- Accessing different types of funding or financing.
- Navigating specific funding mechanisms.
- Having or creating the ability to use and administer funds.

Moser et al. (2019) identified fifteen archetypes, which they clustered into seven points. "Archetype analysis aims to identify patterns of repetitive associations of attributes, and relationships among them, that hold across numerous cases or observations" (Moser et al., 2019, p. 27). Although these archetypes were identified in a study of local governments in the US state of California, they are broad and can also be recognised in studies that focus on other locations, including EU countries. Actierra adapted Moser et al. (2019)'s typology to the EU context, taking into account structural differences between case studies and the above-mentioned study. The 20 CLIMATEFIT territories represent a broad range of geographical and institutional contexts, divided into southern, eastern, and northern clusters of the EU. This allows us to address a wide range of regional characteristics and test the focal points from Moser et al. (2019) in different contexts.

A first version of the interview guide was developed based on the seven focal points. Multiple feedback rounds from technical partners and facilitators led to a simplification of the interview guide with, finally, 5 categories and 18 questions specifically about barriers relevant to EU regions, complemented with a few questions on training needs for PAs. For each category, interviewees were asked to share their perspectives and experienced challenges and solutions by responding as completely as possible to each open question. Their answers allowed us to better understand the unique barriers and drivers shaping the landscape of climate adaptation financing in 20 CLIMATEFIT territories. Mainly PA representatives (e.g., politicians, officials) were interviewed. In some territories, additional interviews were also conducted with private sector actors (e.g., consultancy firms, NGOs, interest groups) knowledgeable about climate finance in that territory. Table 3.3 gives an overview of T1.1 interviewees.

Table 3.3. Overviews of the interviews conducted with the territories for T1.1

	Territory	Status	Number of interviewees	Type of stakeholders interviewed
EASTERN CASE STUDIES	**ROMANIA**		**5**	
	Alba Julia	Leader	5	Technical director, technical agent, City manager, Financial manager
	Centru	Strategist	*No interview conducted*	
	SLOVENIA		**7**	
	Maribor	Planner	2	Technical Director, technical agent
	Radje ob Dravi	Strategist	2	Mayor, City Manager or equivalent
	Lovrenc na Pohorju	Strategist	1	Mayor
	Selnicz ob Dravi	Strategist	2	City Manager or Equivalent, Financial expert
	CZECH REPUBLIC		**7**	
	Liberec	Planner	4	Financial expert, Technical agent
	Jihlava	Strategist	3	Technical director, Technical agent
SOUTHERN CASE STUDIES	**ITALY**		**12**	
	Brescia	Leader	4	Elected representative, Technical director, Technical agent
	Bergamo	Planner	4	Financial Manager, Technical agent
	West Brianza	Strategist	4	Technical director, Other
	SPAIN		**6**	3 interviews with other stakeholders
	Diputacion Avila	Planner	1	Technical agent
	Barco de Avila	Strategist	1	Mayor
	Navaluenga	Strategist	1	Mayor
	PORTUGAL		**7**	1 interview with another stakholder
	Porto Municipality	Planner	2	Technical Director, other
	Maia Municipality	Strategist	1	No consent form
	Matosinhos Municipality	Strategist	3	City Manager, Technical agent
NORTHERN CASE STUDIES	**BELGIUM**		**12**	5 private sector stakeholders
	Flanders	Leader	2	climate change and environment policy advisor
	Genk	Planner	5	Director environment, expert spatial planning, Politician (alderman), head of sustainable development, financial director
	FRANCE		**7**	
	Strasbourg	Leader	7	Technical Director, Financial Manager, Financial Expert, Technical Agent
		Total	**63**	

A set of materials have been shared with facilitators to prepare them for the interviews:

- The **interview guide (Annex 4)**: a document including a brief methodological introduction, an extract of the glossary, and a few comments specifying the questions if needed.
- The **interview script (Annex 4)**: a cleaned version of the interview guide, including only the questions that were send to PAs before the interview.
- The **interview summary**: a template for facilitators to summarize the interview transcripts before analysis. The template included the questions from the interview script and asked facilitators to provide a summary of the answers for each question, and a synthesis of the interview for each of the five question categories.
- The **data management protocol**: a set of instructions about how to collect and manage interview data. This also included an information form and an informed consent for interviewees to comply with ethical guidelines.

We presented the first version of the materials during a coaching session with the WP1 task leaders and all facilitators to gather feedback and clarify all steps of the process. It has been an opportunity to warn facilitators about the main biases that they could encounter during interviews and provide suggestions on how to address them:

- **Differentiate between adaptation and mitigation**: The introduction of the interview guide clarifies both terms. The facilitators must ensure that the interviewee's responses are about adaptation, not mitigation.

- **Tailor the question to the context**: facilitators are free to adapt the script to the interviewee or its context by rephrasing the question if needed to clarify the meaning and interpretation. Facilitators did not add new questions to the script but could ask for more details through follow-up questions about certain answers. If needed, interviewees were given the time to think about a question and reply to it later during the interview.
- Encourage the interviewee to provide **concrete examples**, feedback and lessons learned from their projects and institutional knowledge. Examples must not focus **only on negative experiences** and barriers but can also be about best practices and positive experiences.

If deemed necessary, facilitators translated the interview scripts and conducted the interviews in their local language to ensure that the interviewees understood the questions. Interviews were recorded and/or transcribed by the facilitators. The recording and/or transcript of the interview was then used by facilitators to write an interview summary in English, using translation tools if needed. Actierra was available to attend online interviews if requested by the facilitator. The interview script was tested first with the leader territories, including Actierra's presence in the interviews with the French territory. Feedback on the script led to clarifying the meaning of some questions, after which all facilitators conducted interviews with their territories.

With these interviews, we were able to tap into PAs' knowledge, gaining valuable insights into the challenges and opportunities associated with accessing finance for adaptation and resilience projects. The information gathered during those discussions also contributed to constructing an assessment scorecard in the next step, evaluating the maturity of territories in accessing adaptation finance.

3.1.2. Maturity Assessment Scorecard (MASC)

The **maturity assessment aims to measure the capacity and evaluate the maturity of PAs in accessing adaptation finance and managing funded adaptation projects**. With the objective of bridging the existing finance gap for adaptation, it is critical to assess the capacities of Public Authorities (PAs) to access and attract finance for climate adaptation from both the public and private sector. To measure maturity, a Maturity Assessment Scorecard (MASC) was developed as a diagnostic tool that provides information on adaptation finance readiness for a chosen territory. It highlights areas of success and areas of improvement to access finance for adaptation, with the final aim of helping to answer the following questions:

- How can a territory improve its performance in accessing and attracting finance for adaptation?
- What capacity gaps remain in accessing finance for climate change adaptation?
- What institutional changes or new requirements are needed for accessing finance for climate change adaptation?

The main objectives of the Maturity Assessment Scorecard (MASC) are:

- To work as a baseline analysis to help PAs assess their maturity in accessing finance for adaptation. The assessment scorecard highlights areas of improvement, and areas where the territory performed well.
- To serve as a useful tool to identify needs for capacity building taking place in the Work Package 2 of CLIMATEFIT.
- To be used as a self-assessment tool for PAs.

The maturity assessment scorecard was built based on existing maturity and readiness frameworks to access climate finance, borrowing the strongest conceptual elements from each of them:

- The Resilience Maturity Model provides a common understanding of the resilience building process (Hernantes et al., 2019). The model is used to help cities identify the correct policies to implement for the city to evolve towards the next maturity stage. It offers an operational and a strategic planning framework meant for public authorities.
- Climate Finance Readiness Frameworks (Nakhooda et al., 2013; Vandeweerd et al., 2015), and their context specific developments (Steinbach et al., 2014).

These existing scorecards and frameworks focus mostly either solely on climate adaptation or on climate finance, and use different scales of research, ranging from city level to country level. We adapted the scorecard to the specificities of accessing adaptation finance at a territorial level in the EU based on the literature review on barriers and drivers of accessing adaptation finance for local governments, the first step of T1.1.

The MASC developed for CLIMATEFIT creates a holistic view of the capacity elements of a territory's maturity to attract financing for adaptation. The MASC is structured around four pillars: national policy and regulatory frameworks, strategic, operational and technical capabilities, and mobilisation of resources, encompassing necessary conditions for accessing finance for adaptation. For every pillar, relevant sub-topics have been elaborated. Each sub-topic entails a question that must be answered with a score of 1 to 5. A guide was developed that explains for each sub-topic the meaning of each score. Each question can be considered as a criterion for measuring the maturity, skills, and capacities held by PAs for accessing finance for climate change

adaptation. **The final scorecard is an Excel spreadsheet. The spreadsheet includes a guide that explains the scoring values for each criterion/question, it includes the scoring tool itself, and a sheet that automatically generates a radar chart (or spider chart) of the scores**. The scorecard is included in Annex 5.

The team is aware that the selection of interviewees and facilitators may introduce bias into the process: the viewpoints of certain stakeholders may be overrepresented or underrepresented. While efforts were made to validate the data and discuss the scoring outcomes with facilitators and PAs, the extent of validation may remain insufficient to ensure the accuracy and reliability of all responses. Some criteria may remain inadequately answered, leading to small gaps in the assessment. For that reason, and because of limited time within WP1, the MASC has been tested only with the four leader territories. Based on these test results and the feedback from PAs and facilitators, there is an opportunity to further refine and test the MASC in other WPs of CLIMATEFIT. We believe this could be further developed in a structured and replicable approach for data collection, analysis, and validation that can make PAs self-aware of their maturity and thereby inform decision-making about climate finance. In any case, PAs that complete the MASC must be given the opportunity to discuss and agree on a final score that they want to display in the scorecard, including a written justification for any scoring choices made.

3.1.3. Investment landscape

The final step of T1.1 is the description and visualisation of the investment landscape for each of the territories' countries, including critical public/private actors and their relationships, and current AFFS, meaning which financial sources and instruments are currently used for adaptation projects. Describing the investment landscape helps to understand the current climate adaptation finance practices in these territories' countries. The interview summaries from step 2 could be used by facilitators to draft the investment landscape. The investment landscape is composed of two parts:

- A diagram that maps the most important stakeholders for climate adaptation (finance), including public sector and private sector stakeholders. Public sector can be governments at different levels, government agencies, public owned enterprises (e.g. utility companies), etcetera. Private sector includes a wide variety of actors, including banks and financial service providers (insurance companies, asset managers, pension funds…), but also companies, foundations, cooperatives, households, investment companies, real estate, etcetera. The diagrams also visualise the relationships between different entities or groups.
- A description of current AFFS, meaning financial instruments or models currently used in each country to finance and fund climate adaptation. Facilitators were also asked to provide examples for the country and territories of each AFFS. This was done in table form based on Figure 3.3.

Facilitators were supported in different ways for this step. First, in preparation of the CLIMATEFIT project proposal, Whittaker (2023) developed a graphical overview of an investment landscape, as seen in Figure 3.3. This overview template lists many possible sources (PAs and FIEs) and instruments (AFFS), for climate finance. The visual helped facilitators to understand which entities (sources) and which AFFS (instruments) they could search for, and how to structure their country's investment landscape. Although this taxonomy was developed before the start of CLIMATEFIT and our sister project Pathways2Resilience (P2R), it uses similar language as in P2R's catalogue of sources, instruments, and best practices (P2R, nd), by also specifying sources and instruments.

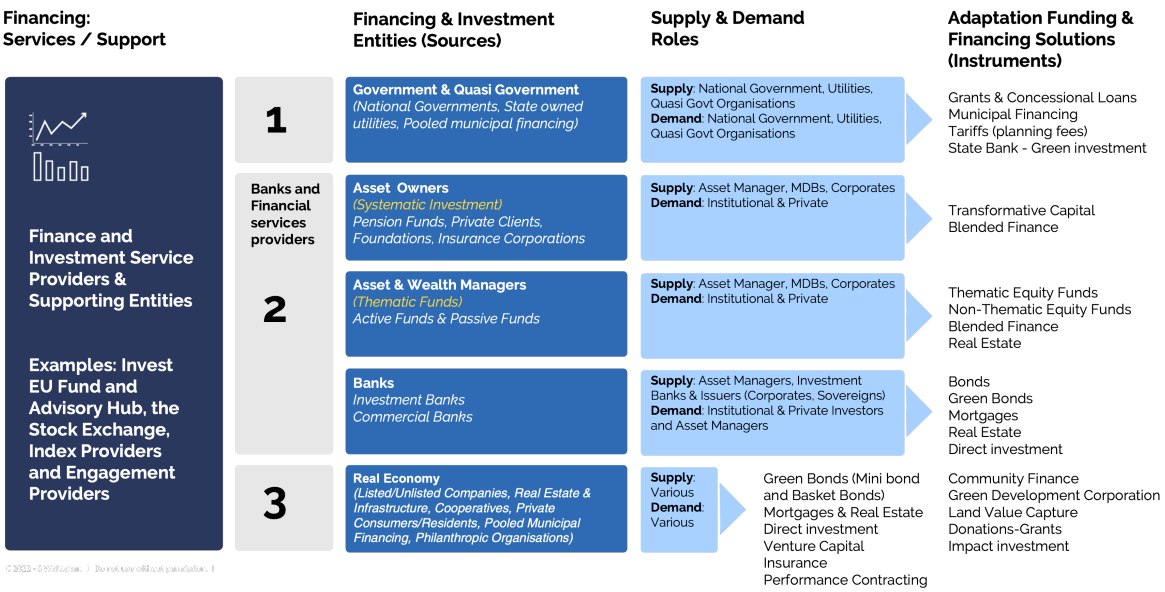


Figure 3.3. Template for the investment landscape, including possible sources and instruments for climate finance. Source: Whittaker (2023)

Second, University of Antwerp, facilitator for Belgium and the territories Flanders region and Genk municipality, performed a draft version of the diagram and the AFFS table, which was then shown to the other facilitators. Third, support was provided via World Climate Foundation by students at the Copenhagen Business School. At the exception of Portugal for which AdEPorto did most of the work, they drafted the investment landscapes for the non-leader territory countries and adjusted it after feedback from those countries' facilitators.

Overall, the investment landscape operates as a useful visual tool mapping financing actors and adaptation actors, sources of climate finance, and AFFS. By presenting both supply and demand, the financing landscape offers a holistic view of current practices and unexplored opportunities to bridge the adaptation financing gap.

3.2. Researching the perspective of FIEs (T1.2)

The research as outlined in Figure 3.4 includes three main tasks for researching the investment landscape from an FIE perspective: a literature review (scholarly and practitioner), empirical research of FIE activity in our lead territories (through an FIE survey, FIE interviews, review of flagship projects in adaptation finance, research of the policy landscape), and assembling of the research results. The results will be used to inform CLIMATEFIT activities in three key areas: (1) addressing barriers and opportunities to adaptation finance, (2) growing the maturity of the adaptation finance market, and (3) exploiting opportunities to engage and build commitment in FIEs.

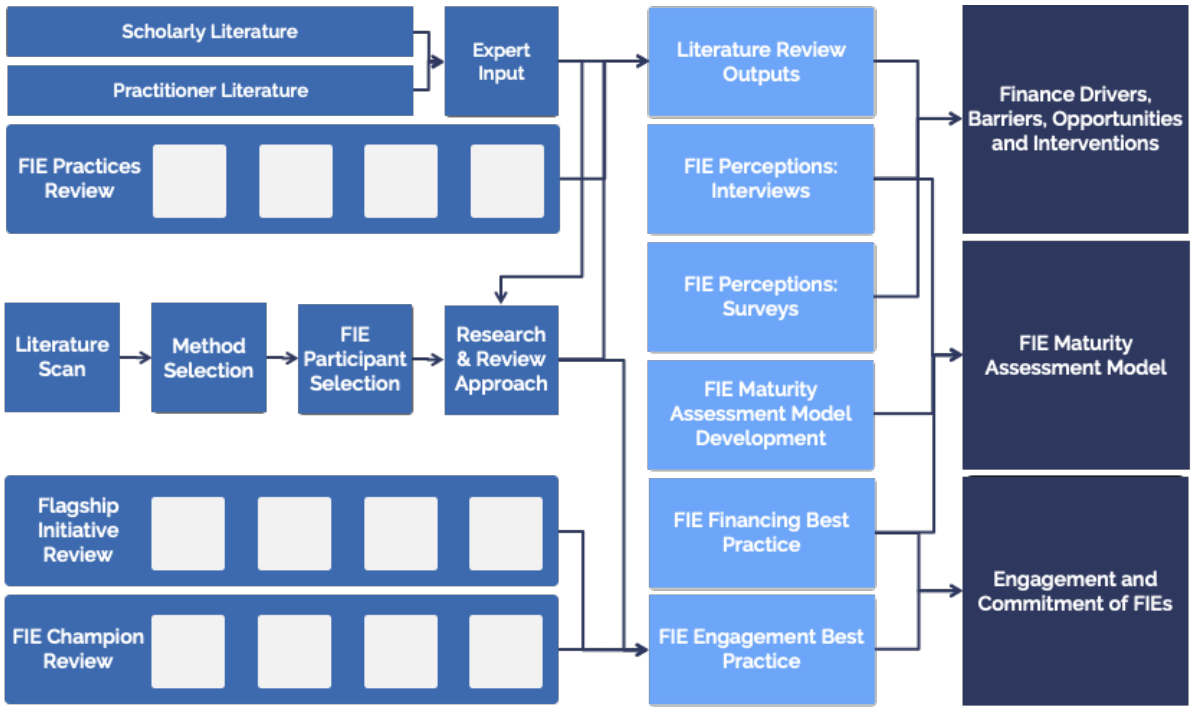


Figure 3.4. T1.2, overview of the research approach and process. Source: WCF

3.2.1. Interviews with FIEs and global FIE initiatives

CLIMATEFIT leader territories (France, Romania, Belgium & Italy) and other areas

FIE data was collected from a separate survey (n=37) and separate interviews (n=31) conducted from January to March 2024 (Tables 3.4 and 3.5). The survey included eight enabling FIE organisations (affiliated members of CLIMATEFIT) that completed only the survey. Unfortunately, not all interviewees completed the survey and not all survey respondents were interviewed. A diverse range of FIEs (banks, institutional investors, asset managers, insurance impact investors, philanthropic organisations, corporations, developers) were selected for interviews from the four lead territories and other European countries (The Netherlands and the UK) (n=32). Each FIE was asked to complete a pre-interview survey (see Annex 6 and Annex 8 for the FIE survey script and interview script respectively). The interview sample included banks (retail and commercial) (B) (12), institutional investors (II) (5), asset managers (AM) (3), insurers (INS) (4), other entities such as NGOs (7) and regulators (REG) (1). The interviewed FIEs included representatives from Belgium (4), France (4), Italy (5), Romania (3), the UK (10), the Netherlands (2) and other areas (Denmark) (4). To gain this number of respondents, the CLIMATEFIT research team reached out to more than 50 FIEs.

Additional interviewees were also sought from financial regulators in Europe. Investors from the London market were also interviewed due to the importance of the capital market in London. State Investment Banks (SIB) and other organisations involved in adaptation finance across Europe were also approached for interviews. In addition, further insurance sector interviewees were sought through the Horizon Europe PIISA project.

Interview and survey participants:

- Pre interview survey completed by all participating FIEs (n=39) (includes CLIMATEFIT Consortium FIE Advisers (n=8).
- Qualitative FIE interviews conducted by CLIMATEFIT Facilitators in four leader territories (n=16).
- Additional London interviews (n=10)
- Interviews of regulators in the lead territories and Europe-wide (n=1).
- Other interviews (n=4).

Table 3.4. FIE Investors interviewees and survey participants

Organisation type	Interview participants	Survey participants (non-interviewees)	Country
Institutional Investor/Pension Fund	4	4	BE, UK
Bank	8	9 (1)	BE, FR, IT, NL, RO, UK

Asset Manager	6	3	IT, UK
Insurance	6	4	BE, IT, NL, Global
Other Finance (includes Philanthropic Organisations, NGOs, Finance Consultants etc)	7	6(6)	RO, FR, UK

Table 3.5. Total FIE participants by country (by type and activity)

Country	Participant type		Participant activity		Total
	Investors	Other	Interviews	Participants from surveys	
BE	4	0	4	0	4
FR	2	3	4	1	5
IT	5	1	4	2	6
RO	3	2	4	1	5
UK	7	3	10	0	10
EU	4	5	6	3	9
Total	25	14	32	7	39

The surveys were analysed in the software Qualtrics to extract barriers and enablers etc. All interviews were anonymised, and codes were allocated to each interviewee to indicate their country and type of investor. They were then transcribed and entered into ATLAS.ti software for coding. Inductive coding was used following a strategic niche management: niche empowerment theoretical framework (Smith & Raven, 2012). The transcripts were also coded for the barriers and enablers identified in the literature and for maturity assessment categories and subcategories. We also coded for funding and financing sources, investor types, investment concepts (IC), and solutions (AFFS) etc. Coded responses were exported to Excel for additional analysis (Annex 9).

The team took steps to make interview data available in a variety of formats to consortium members and project stakeholders, as well as to other EU adaptation and nature projects. Following FAIR principles, the interview data has been analysed and sorted into accessible and searchable Excel and Word formats (refer to Annex 9). We will be working with other Horizon adaptation projects, such as TransformAr, to combine this dataset with the FIE data from the FIE interviews and focus groups they are conducting. It is envisaged that this collaborative step will not only increase the sample size and validity/integrity of the research but will also allow for a comparison of investors' perspectives on nature and adaptation finance. This comparative research will be an important new addition to the academic and practitioner literature.

The data from the informants has been analysed to highlight FIE opinions, biases, maturity, barriers, drivers, and current practices. The information will contribute to the investment landscape compiled for the territories by the CLIMATEFIT facilitators which will be included in D1.1.

FIE Champion Interviews

We identify FIE Champions (n=5) across the four lead territories. These are selected from the interviewed FIEs in the CLIMATEFIT leader territories. More details are provided in section 4.5 of Chapter 4.

Flagship Climate Finance Initiatives Interviews

The CMCC Foundation identified criteria for the selection of a small number of top global knowledge and networking initiatives involved in climate finance. The CMCC Foundation carried out the interviews and the transcripts were exported into Excel for analysis. The analysis sought to highlight the success factors and lessons learned and preferred FIE capacity-building and engagement approaches. We were especially interested in successful FIE engagement activities that address adaptation finance barriers.

3.2.2. FIE Maturity Assessment Methodology

There are several methods and approaches for assessing the maturity or readiness of investors to finance adaptation, these include:

- The Adaptation Working Group of the UNEP FI Principles for Responsible Banking: Aligning finance with adaptation and resilience goals Targets and Metrics for Financial Institutions: Technical Note (Bernhofen & Ranger, 2023)
- PRI's Investor Resource Guide: For incorporating climate change in private markets. This also includes the Investor Agenda's Expectations Ladder - Investor Climate Action Plans (ICAPs). (UNEP FI, 2022)
- World Bank Group's Index Assessment Framework. (Stenek & Amado, 2013)

These assessments/guides aim to facilitate and inform discussions around how investors operationalise adaptation or resilience aligned investment. They can assist FIEs in strategising, allocating, tracking, measuring,

disclosing and creating opportunities for adaptation investment. This next section explores two of these maturity assessment models.

An Investor Resource Guide (PRI) and the Expectations ladder (Investor's Agenda)

The guide is intended for both direct and indirect private equity and real asset equity investors to assist them in discovering publicly accessible resources and initiatives that can support the integration of climate change considerations into every stage of the investment process.

The Investor Agenda Group has an 'Expectations Ladder' for climate action (Figure 3.5). This tool assists investors in taking comprehensive climate action (mitigation and adaptation). It provides a framework for self-assessment and transition planning, drawing upon existing initiatives and resources. The tool is designed for all investors, regardless of their position in terms of their climate change efforts. The Expectations Ladder outlines actions across four graded tiers of activity, from net zero standard-setters (Tier 1) to those just starting to consider climate issues (Tier 4). It covers the Investor Agenda's four focus areas: investment, corporate engagement, policy advocacy, and investor disclosures. It serves as a self-assessment checklist to identify progress and areas requiring further development.

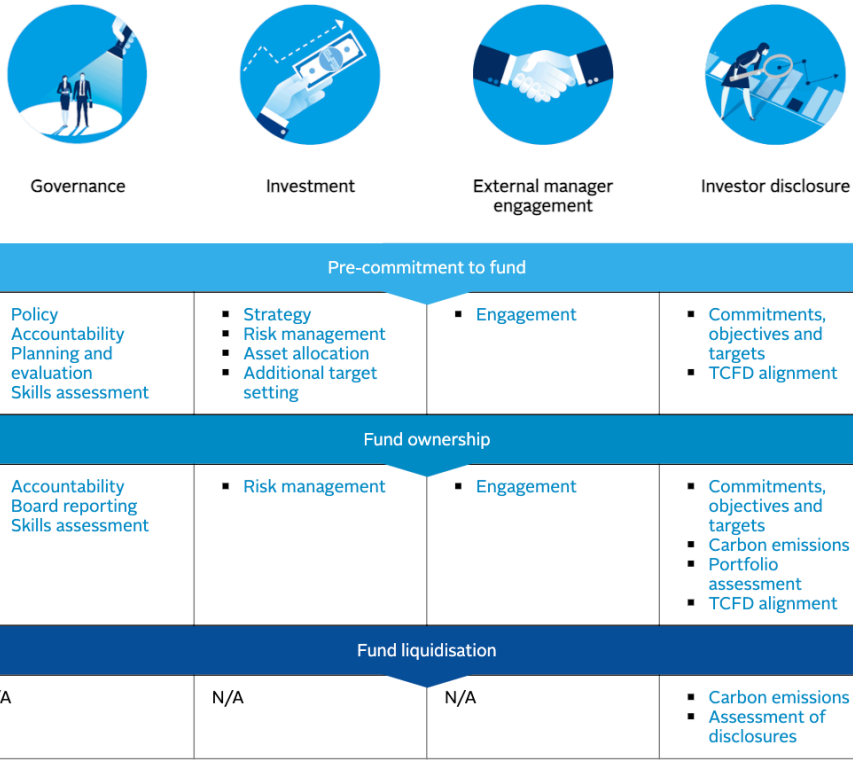


Figure 3.5. ICAPs Expectation Ladder. Source: UNEP FI (2022)

Index Assessment Framework (World Bank Group)

The International Finance Corporation (IFC) aimed to take a closer look at what conditions enable/incentivise and create barriers to adaptation actions by the private sector. It does not assess the size of private sector investments but attempts to assess the motivation for private sector engagement in climate change adaptation. It is designed to be used at a nation-state level and assesses several factors that are seen to influence private sector adaptation. The five factors include the availability and scope of (1) climate data and information, (2) private sector institutional arrangements, (3) public and investment policies, (4) economic incentives for adaptation, and (5) communication, technology, and knowledge on climate risk. Although developed for a nation-state level assessment, many of the indicators can be adapted to an individual investor level.

CLIMATEFIT Maturity Assessment Model (MAM)

A draft MAM (Table 3.6) has been developed that draws upon these existing frameworks (See Annex 10 for more details about the MAM pilit results). These two existing frameworks have been developed for entirely different purposes and would need refinement to fit the task in this research. For instance, the Expectations Ladder is an FIE climate action (mitigation and adaptation) framework, and the Index Assessment Framework has been designed for nation-states and covers the enabling conditions for adaptation action. Neither of these frameworks specifically covers adaptation financing and maturity, nor do they nest in a theoretical framework such as the one we are using from Smith and Raven (2012) The nesting of our approach in a recognised

theoretical framework from the sustainable transitions and strategic niche management literature adds additional credibility to the MAM.

The intention has been to pilot a new model on a number of FIEs participating in WP1. The results of this trial of the MAM are detailed in Chapter 5.2.4. If found to be both useful and practical, then it will be further developed by the CLIMATEFIT team and applied to multiple participating FIEs. It is possible that results from the early stages of the project can be compared with results from FIEs at the close of the project to provide a means of evaluating the effectiveness of the CLIMATEFIT project in boosting the maturity of participating FIEs.

The MAM uses conditions found across all the reviewed maturity models detailed here, such as exposure, commitment, policy/strategy, disclosures, institutions, knowledge, technology, etc. Risk management and board conditions, as well as cost-benefit analysis and evaluation, were excluded in this first version. The included conditions were also those that aligned with the strategic niche management theoretical framework (Smith & Raven, 2012).

The FIE Maturity Assessment is a qualitative assessment approach that aims to be a CLIMATEFIT resource, with the functionality and scope of the approach primarily tailored to:

1. PAs, that can use it to identify and understand the FIEs in their territory - their adaptation finance capabilities and appetite. This information/intelligence can assist PAs in selecting FIEs for deep engagement in CLIMATEFIT and in general in the long term for potential partnering on adaptation finance.
2. CLIMATEFIT consortium members, that can use it to better understand the maturity of the FIEs involved in CLIMATEFIT, giving the ability to prioritise engagement activities with those with higher maturity ratings.
3. A potential CLIMATEFIT academic paper on growing FIE maturity (participating FIEs will be surveyed at different stages of the CLIMATEFIT).
4. Further development into a potential industry endorsed standard for climate adaptation aligned investment (endorsed by a climate finance network).

In this piloting phase the MAM is a high-level subjective assessment of maturity based upon two researchers and an interviewer's judgement of whether an activity is present or not in the interviewed financing organisation (FIE) (e.g. does the FIE screen investments for climate risk). There is no scoring or ranking of the interviewee's responses, there was not enough information provided in the interviews in WP1 to score the responses. It is proposed that the MAM will be further developed and that at a later stage in its development a scoring could be included. This is discussed further in Chapter 5.2.4.

Table 3.6 Draft maturity assessment model based upon strategic niche management theory. (Source: adapted from Smith and Raven (2012), Whittaker (2024) and (Whittaker et al., 2024).

Conditions	Intervention categories
Established Industry Structure (Industrial)	• Organisational and user-producer networks plus industry platforms • Shared industry routines, heuristics, vision etc. • Industry leadership/ commitment • Resource allocation, human capital, and industry capabilities
Public Policy/ Agency/Governing (Political)	• Legislation/regulations • Policy goals and guiding principles • Political power • Governing structures/processes of incumbent industries
Markets/Finance (Market)	Financial • Financial regulation • Financial Instruments/mechanisms (price etc.) • Market institutions and private financing • User practices, preferences, and routines (track record/trust signalling etc.) • New business models
	Fiscal: Fiscal measures
	Monetary: Supply and demand market interventions
	Market • Market rules • User practices, preferences, and routines (track record/trust signalling etc.) • Business models • Supply/demand initiatives
Established Knowledge/Education Base (Socio-cognitive)	• Formal research programs and groups • Advice/Education • Procedures and preferences • Knowledge base
Dominant Technologies/Infrastructure (Technological)	• Technical standards • Infrastructural requirements

Culture (Cultural)[9]	• Media preferences, • Cultural value of innovation and technology

The MAM is organised by five of the six conditions of Table 3.6 (cultural was excluded due the measurement difficulties) and into two interlocked levels (represented by the columns in Table 3.6): (1) enabling conditions and (2) intervention categories associated with the enabling conditions. The interview data from the FIEs in the lead territories was analysed against the MAM criteria by two researchers and then checked by the interviewers (which in most cases was the CLIMATEFIT Facilitator in the territory). It is a qualitative assessment. In later application of the MAM, it is proposed that the FIEs are involved in the assessment process. There was not sufficient time in WP1 to do this.

3.3. aResearching international best practices of AFFS (T1.3)

T1.3 aims to understand and capitalise on good practices by conducting 20 in-depth international best practices analyses, and understanding how they could be applied to the CLIMATEFIT territories (and the EU in general). We undertook a rigorous approach to select, analyse, and report about 20 international best practices. The first step included the development of a database of international examples of innovative AFFS by reviewing the numerous recent resources and toolkits on funding and financing climate resilience available in the EU and globally. Second, we developed a sampling procedure to select 20 cases from this database. Third, an analysis framework was developed to guide the analysis of the selected cases, after which data was collected and analysed through document analysis and interviews. Finally, the findings of each best practice were reported in a report, called factsheets. The details of these steps are explained in the following sub sections. **A full report of each best practice will be a downloadable file on the CLIMATEFIT website**.

In the CLIMATEFIT glossary, a good practice is defined as "a thread common to most definitions implies strategies, plans, approaches and/or activities that have been shown through research and evaluation to be efficient, sustainable and/or transferable, and to reliably lead to desired results". In our international best practices research, the term 'best practice' resonates with the definition of good practice, but its scope is limited to successfully and efficiently raising financial resources and channelling them to the implementation of climate adaptation measures (or mitigation in some cases). In other words, the AFFS in each researched international best practice has successfully enabled climate related investments. AFFS is defined in CLIMATEFIT as "an umbrella term covering individual or combinations of financial instruments, mechanisms, products and vehicles suitable to finance adaptation initiatives and projects". Being a good practice from a financial perspective does not guarantee the cases are good practice from other perspectives, for example, justice and broader socio-economic impacts.

3.3.1. From database to selecting 20 best practices

We adopted a **multi case study research approach** whereby the cases were selected through **purposive case study sampling**, meaning cases are selected with a specific purpose in mind (Ishak & Abu Bakar, 2014). In this situation, the purpose is to find cases that exemplify successful and innovative adaptation funding and financing solutions for climate measures. Data was collected and analysed through a combination of **document analysis** (desk research) and **semi-structured interviews**. "A case study is an empirical method that investigates a contemporary phenomenon in depth and within its real-world context" (Yin, 2018, p. 15). A multiple case study approach means studying two or more cases "simultaneously or sequentially in an attempt to generate a broader appreciation of a broader issue" (Crowe et al., 2011, p. 2). In our research, studying cases of AFFS best practices helps us to learn lessons from multiple cases about how to successfully finance and fund climate measures in innovative ways. By comparing multiple cases, it allows a better understanding of the conditions in which AFFS can or cannot be applied (Clark et al., 2021). Purposive case study sampling is a procedure for selecting cases to research that "uses the judgment of an expert in selecting cases, or the researcher selects cases with a specific purpose in mind" for an in-depth investigation (Ishak & Abu Bakar, 2014, p. 32). We had the specific purpose to find cases that exemplified innovative AFFS with some form of private capital involvement.

To purposively select cases for in depth investigation, we needed a pool of cases from which we could sample 20 best practices. For that reason, we first composed a **database of international examples of innovative AFFS, with special attention to some form of private capital involvement (financing and/or funding)**. Multiple sources were used to identify cases for the database, including academic literature (with special attention for recent review papers because they encompass large bodies of literature)); grey literature; government documents; deliverables and reports from previous and ongoing EU Horizon projects; and online databases, platforms, and knowledge hubs (e.g. OPPLA, Climate Adapt, Urban Nature Atlas…), suggestions

[9] The cultural condition was not included in the draft MAM due to assessment complexity for this condition. It may be added to a future version of the model.

from other CLIMATEFIT partners. Table 3.7 gives an overview of the sources used to find examples for the database.

The academic literature includes the recent review papers about finance and climate adaptation, green-blue infrastructure, or nature-based solutions. Review papers capture a large body of existing literature and are thus representative for the state of art in scholarly literature. Grey literature includes recent EU reports about nature or climate and finance, and reports we found through snowball sampling in other sources or examples. The third category of sources includes cases found in previous EU Horizon projects about climate or nature with a finance component, and main European or global platforms that include climate adaptation and mitigation, or nature-based solutions cases. We searched these websites and platforms for cases that mentioned innovative AFFS. We possess a list of other sources that we have not yet explored because of time constraints in WP1. This provides an opportunity to further expand the database in the future. The database provides a collection of innovative AFFS for climate measures, mainly adaptation but also mitigation examples. **As of May 2024, the database contains 260 international examples of innovative funding and financing solutions for climate adaptation, and some relevant mitigation examples from all around the world**.

The database itself was not part of the project proposal's description of WP1 and is therefore in its current form not publicly accessible. We developed this so we could purposively select 20 cases for further research, rather than randomly selecting 20 cases without having a better overview of documented cases globally. This database has synergies with P2R's recently published 'catalogue of sources, instruments, and best practice case studies' (P2R, nd), which also includes an impressive roster of 169 case studies, many of them also included in the CLIMATEFIT database. CLIMATEFIT and P2R signed a non-disclosure agreement and are currently exploring the opportunity to merge both databases. **To our knowledge, a joint P2R and CLIMATEFIT database would become the largest climate and nature projects database with a finance perspective**. It became apparent from academic and grey literature, and our WP1 research that the public and private (financial) sectors need good examples to boost climate finance. A joint P2R and CLIMATEFIT database would complement platforms with smaller number of finance-perspective cases (CCFLA, IISD) and platforms that document climate and nature cases but with a lesser focus on finance (Urban Nature Atlas, OPPLA, Climate-ADAPT).

Table 3.7. Sources used to find cases for the database.

Type of source	Sources
Academic literature	Brears (2022); (den Heijer & Coppens, 2023; Droste et al., 2017; Dyca et al., 2020; Grant, 2018; Jiang, 2023; Liberalesso et al., 2020; Mamedes et al., 2023; Mandle et al., 2019; Peterson et al., 2020; Seyfang & Longhurst, 2013; Thompson et al., 2023)
Grey literature and reports	(Body et al., 2018; Bulkeley et al., 2020; Castellari et al., 2021; EEA, 2017; EIB, 2020; Hudson et al., 2023); Matzdorf et al. (2014); (Merk et al., 2012)
Online platforms and websites, other EU projects	CCFLA, Urban Nature Atlas (Naturevation), Network Nature, OPPLA, Climate-ADAPT, Climate Change Fund (Asian Development Bank), IISD innovative financial instruments, Interlace Hub Atlas,

In the database, we included the types of information listed below for each of the entries. Within the time available to compose the database, we believe these information types allow to understand and compare entries of the database.

- A brief description and general information: timeframe of the best practice implementation, location, source of information
- Sectors to which the case study applies; water management, agriculture, forestry, coastal areas, mountain areas, urban areas (built environment and infrastructure), ecosystem conservation. This will be redefined to Key Community Systems to align the database's terminology with the Implementation Plan of the EU Mission of Adaptation to Climate Change (European Commission, 2021). Although different in terminology, the current database categorisation and the EU's Key Community Systems are very similar in their meanings.
- Climate hazards that were addressed by the case: heat waves, droughts (water scarcity or fires), floods/heavy precipitation, landslides/avalanches, sea level rise/coastal erosion, biodiversity and quality loss. These are based on Castellari et al. (2021).
- AFFS used in the case for financing and funding the climate investment. Because there are many different financial instruments, we made five categories to improve the database's readability, based on den Heijer and Coppens (2023). In a separate column we also describe the main financial

instrument of the AFFS. The five categories are: public budgets[10], debt or equity[11], land value capture[12], market-based & revenue generating models[13], community or private-party based models[14]. When further developing the database for public use in later stages of the project, we will align the financial terminology with the Catalogue of Sources, Instruments, and Best Practices produced by the EU Horizon project Pathways2Resilience (P2R, nd). This catalogue is currently not available for public use.

- Defining whether the financing and funding comes from public, private, or hybrid (public and private) sources. Financing means providing the resources to make the investment and implement a project. Funding refers to the ultimate payment of the investment.
- The governance level of the climate change investment: local or supra-local. Local means the case only involves one local government. Supra-local means that multiple local governments or governments at different levels are involved.

At the end of project month 1 (September 2024), we stopped adding entries to the database because of time constraints as explained previously and moved on to the next step of purposively sampling 20 best practices from the database. **Figure 3.6 shows the different steps of the sampling procedure**. We decided from the onset of the procedure that we would create two shortlists. Shortlist A contains 20 cases that are of primary interest for analysis; Shortlist B contains back-up cases if one or more of the cases from shortlist A cannot be properly researched due lack of data, difficulty to contact someone for an interview, or when it appears the case is not a best practice example. The sampling procedure had three steps:

1. Two researchers analysed the cases in the database and each individually assessed the eligibility of the cases for the shortlist. Two criteria were used to assess the cases' eligibility: priority was given to cases about climate adaptation over climate mitigation; and the cases had to be relevant for the CLIMATEFIT territories, meaning the specific context of Eastern, Mediterranean, and Northwestern Europe in terms of climate hazards and main sectors impacted by climate change. Cases were either marked as YES (eligible), or NO (not eligible). Cases marked with a YES by both researchers were considered for selection for the shortlists. This reduced the list to 107 eligible cases.
2. A second round of eligibility assessment was then performed by one researcher, with the aim to select 40 out of the 107 cases for the final selection. Again, two main criteria were used to select cases. The first criteria were to have a diversity of financial models/mechanisms and keep the ratio of financial models in the list of 107 cases. For example, if the list of 107 cases included ten Payment for Ecosystem Services cases, then four or five cases were selected for the selection of 40 cases. A second criteria was a first assessment of the transferability to the CLIMATEFIT territories, meaning whether and how easy or quick the cases' financial models could be applied to the CLIMATEFIT territories. The result of this step was a selection of 40 cases for final consideration for shortlists A and B.
3. In the final step, the 40 cases were divided among shortlists A and B. Again, two criteria were used to perform the final selection of shortlist A and B. Diversity and ratio of financial models was considered similar as explained in the previous step. Additionally, we also ensured different areas (countries and continents) were represented. For example, if the 40 cases contained 4 carbon offsetting cases, of which 2 from the same country, then we would not put them in the same list. Second, we made a first assessment about data availability and the maturity of the case. More mature cases are those that have a longer implementation or operational time, or in which climate change projects have already been realized and financed/funded through an innovative financial model.

This form of sampling is considered a combination of critical case sampling, maximum variation sampling, and criterion sampling. With **critical case sampling**, "researchers choose cases because they display features that are central to the phenomenon of interest. These cases are most likely to reveal the most information with respect to the research questions" (Clark et al., 2021, p. 379). In our research, we looked for cases that would reveal the most information possible about innovative AFFS. With **maximum variation sampling**, researchers "describe common features that exist across a wide variety of contexts, and then select cases or units to ensure as wide a variation as possible in terms of those characteristics that are believed to influence data the most." In our research, we looked for variation in financial models and instruments, and geographical areas (Clark et al., 2021, p. 379). **Criterion sampling** involves sampling cases that meet a particular criteria (Clark et al., 2021, p.

[10] The direct (and creative) use of public budgets for climate adaptation investment: taxation, co-financing, grants, subsidies, endowments, participatory budgeting.
[11] Loans, green bonds, revolving loan fund, equity finance, insurance-based finance, debt-for-nature-swap, concessional finance.
[12] Instruments related to a value increase of land because of climate adaptation investments: developer obligations, betterment levies/taxes, TIF, special assessment districts, BID/NID/CID/PID.
[13] Instruments make climate adaptation investments attractive because (for private parties) because of revenue generation or financial (dis)incentives: blended finance/leverage instruments (fund, pooled capital; incentives), utility/user fees, commercial exploitation, TDR, offsetting/credit trading systems, crypto currencies, PES, PPP.
[14] Instruments where initiatives are taken by, or where financing and funding responsibilities are transferred to local communities or (local) private parties, without any direct monetary benefits: community asset transfer, land trusts, community currency, household or business investment, collective private commissioning, crowdfunding, charity, philanthropy, donations.

379). In our research, we stuck to the four criteria mentioned at the beginning of this chapter. Additionally, we considered feasibility criteria such as data availability and maturity of the case. Throughout WP1, we replaced some of the cases from Shortlist A and Shortlist B.

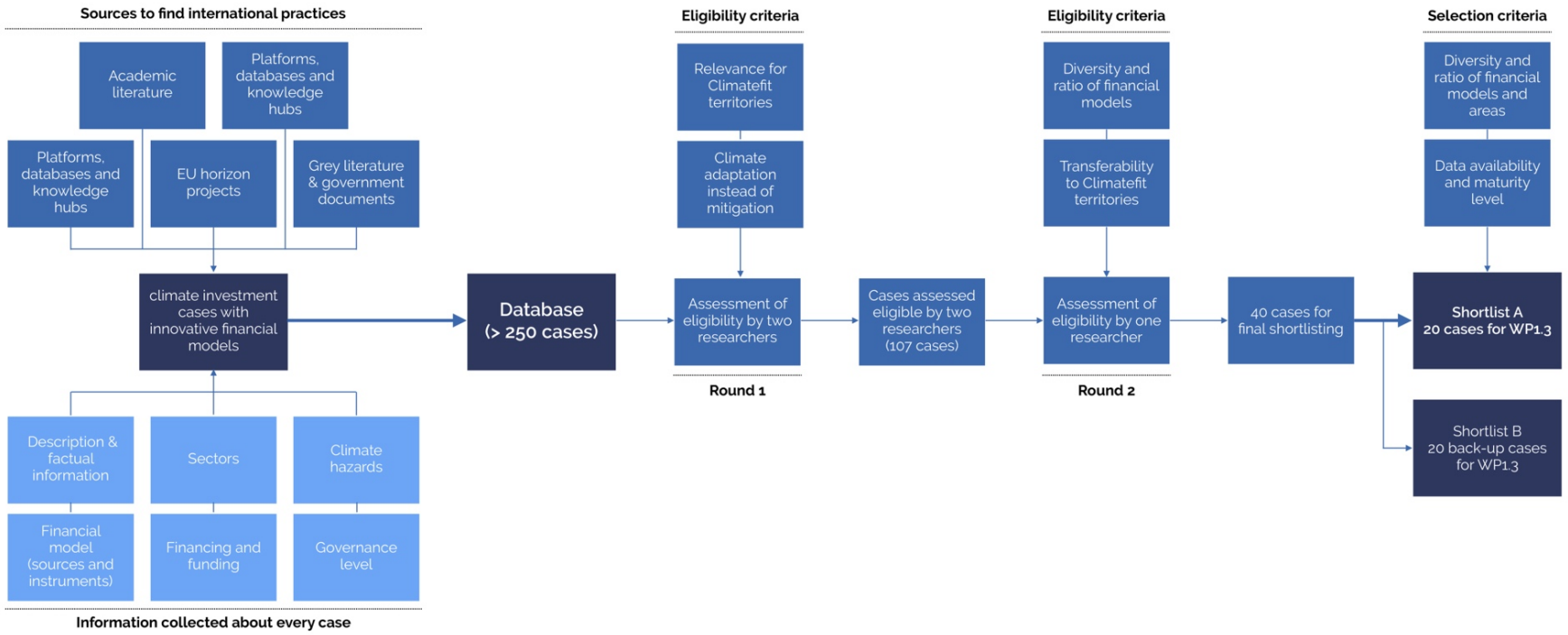


Figure 3.6. Sampling procedure to select 20 international best practices from a database of 250 cases. Source: UA

Table 3.8 contains an overview of the 20 selected best practices. The database contains many interesting cases that would be worthy of further research. almost of the cases are about adaptation, and we included some on mitigation because they have an innovative financing and funding solution that could be applied to adaptation cases too. To comply with CLIMATEFIT's terminology, we use the term AFFS throughout this report, but this can encompass mitigation and adaptation examples in the case of Chapter 5. Different shortlists could have been created depending on the researchers doing the process, and the process itself. In the end, we had to make difficult choices and exclude projects in step 2 and 3 that we would have liked to include in shortlist A. Purposive sampling is a common approach to scope research material for qualitative case study research. It inevitably involves (subjective) decisions from the researchers (e.g., personal assessments and interests). The aim was to have a shortlist of 20 cases with financial models that show an initial potential for transferability to different regions in Europe, specifically the CLIMATEFIT territories.

Table 3.8. Overview of the 20 best practices researched for T1.3

Name	Location	AFFS
Greater Cape Town Water Fund (GCTWF)	Cape Town, South Africa	Water Fund with contributions from corporates, municipality, philanthropy
Clean Water Partnership (CWP)	Prince George's County, Maryland, USA	Community-based public-private partnership (repayment through bonds and water charges)
Cloudburst Management Plan (CMP)	Copenhagen, Denmark	co-financing from municipal budget, public utility water tariffs, landowner direct investment
Ecomarkets	Victoria, Australia	Offsetting mechanisms used for Payment for Ecosystem Services
NICE GREEN Nagoya	Nagoya, Japan	Greenification certificates system with preferential interest rate on loans
Groenfonds	Midden-Delfland, The Netherlands	Developer contributions fund reimburse farmers for green services (PES)
Washington Stormwater Retention Credit System (Washington SRC)	Washington DC, USA	Stormwater credits
Resilient Hampton	Hampton, Virginia, USA	Environmental impact bond
Paris Climate Bond (PCB)	Paris, France	Climate bond
Flood Buyouts	USA	Public budget: local sales tax increase
Lower Don Valley Flood Defense Project (LDV)	Sheffield, UK	Business Improvement District and public grants
Dorset Heathlands	Dorset, UK	Developer obligations
Project Finance for Permanence (PFP)	North/Central/Latin America	Project Finance for Permanence
RPPNM Program	Curitiba, Brazil	Transferrable Development Rights
Seychelles Debt for Nature Swap (SDNS)	Seychelles	Debt for Nature Swap
Viveracqua Hydrobond	Veneto, Italy	Pooled mini bond
Wetland Mitigation Banking Program (WMBP)	USA	Offsetting mechanism used for Payment of Ecosystem Services
Gothenburg green bond	Gothenburg, Sweden	Municipal green bond
Bilbao Flood Proof District	Bilbao, Spain	Public Private Partnership
Edwards Aquifer Protection Program (EAPP)	San Antonio, Texas, USA	PES program paid by local sales tax and municipal green bond

3.3.2. Analysis framework for the in-depth investigation of best practices

Based on academic and grey literature, we composed a comprehensive analysis framework to research the 20 best practices, as shown in Figure 3.7 In key literature, we wanted to identify the key elements that are important in climate mitigation or adaptation programmes or projects and research the 20 best practices for those elements.

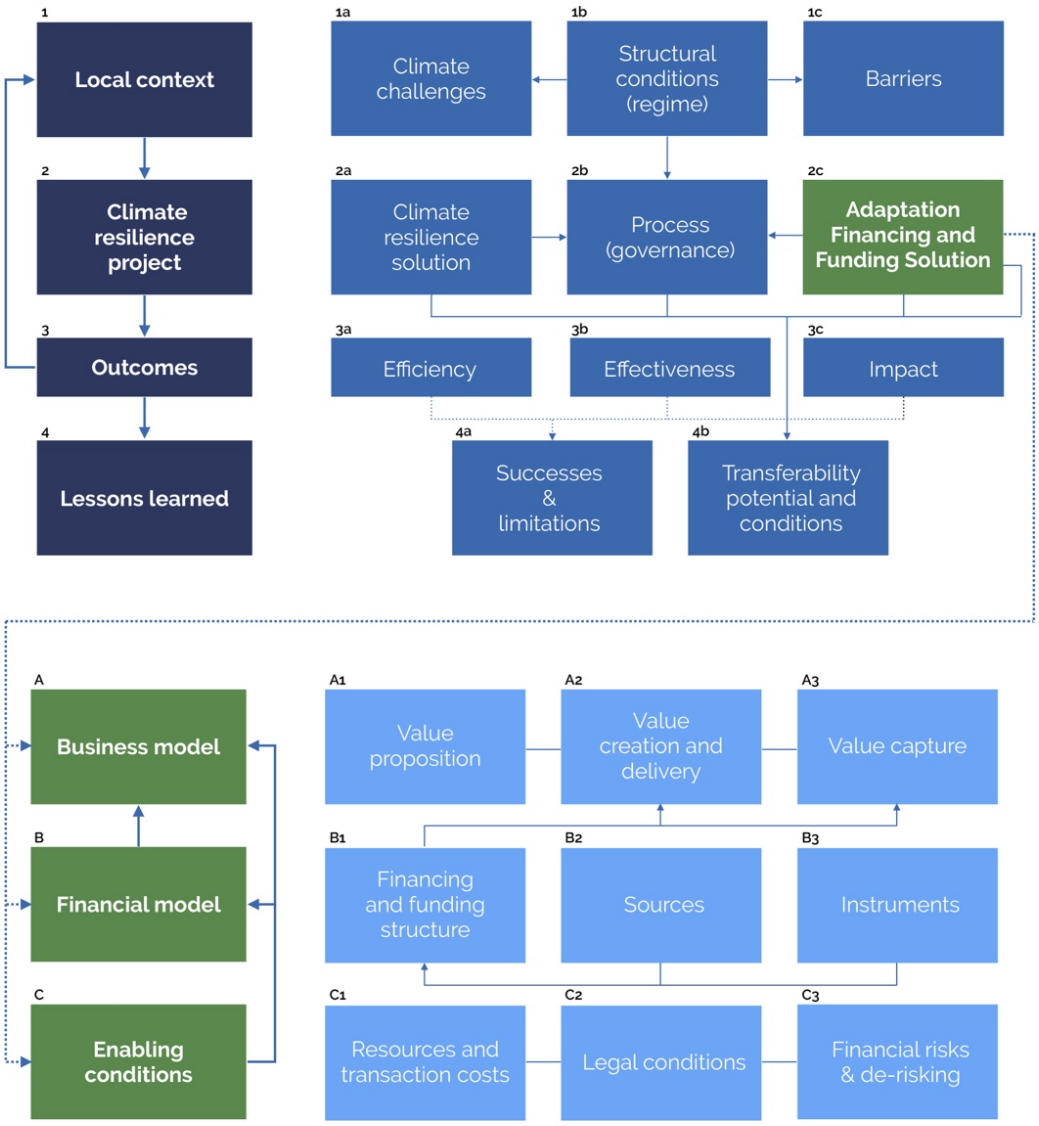


Figure 3.7. Analysis framework for the 20 best practices. Source: UA

Based on the literature referred to below, we identified elements that can be clustered in four domains:

1. **Local context**. The structural conditions and regime (1b) of an area determine the climate challenges (1a) and the barriers (1c) to the adoption of and investment in climate resilience.
    - **Climate challenges (1a)**, including climate hazards/risks and the sectors to which they apply, as described in section 2.3.1. (Calliari et al., 2022; Castellari et al., 2021)
    - **Structural conditions (1b)** that make up the local regime, meaning the cultural, geographical, political, institutional... structures of the case study area. (Dorst et al., 2022; Sarabi et al., 2020)
    - **Barriers (1c)** that inhibit the adoption of climate resilience projects and investments by public and private parties. (Deely et al., 2020; den Heijer & Coppens, 2023; Dorst et al., 2022; Kabisch et al., 2016; Matthews et al., 2015; Mayor et al., 2021; Moser et al., 2019; O'Donnell et al., 2017; Sarabi et al., 2020; Toxopeus & Polzin, 2021)
2. **Climate resilience project** coming forth from the local context, with the aim to tackle climate resilience challenges, to overcome barriers for climate investments and project implementation. The process (2b) is influenced by the structural conditions (1b), the choice of climate resilience solution (2a), and the business case and financial model (2c).
    - **Climate resilience solution (2a)**. The measure or strategy to address the climate resilience challenge(s) and to improve climate adaptation (e.g., a NBS, a policy...). (Calliari et al., 2022; Castellari et al., 2021)

- **Process (2b)** is the governance and decision-making process for planning, designing, financing/funding, and implementing the project. This also includes the legal structures and procedures through which the project is implemented. (Thompson et al., 2023)
- **The adaptation financing and funding solution (2c)** describes the rationale of how an organisation creates, delivers, and captures values, including mechanisms used to secure financing and funding for a climate resilience project. This can include one or more sources and instruments. We use the term AFFS because this is a key term in CLIMATEFIT. Some best practices are more about mitigation than adaptation, as explained in section 2.3.1. (Bisaro & Hinkel, 2018; den Heijer & Coppens, 2023; European Commission & DG RTD, 2021; Mayor et al., 2021; Mell, 2018; Thompson et al., 2023)

3. **Outcomes** are a direct consequence of the climate resilience solution (e.g., measures, program, one or more projects…). The outcomes can impact the local context (1), altering one or more dimensions (1a, 1b, 1c). If data is available, outcomes can be compared between cases or project types (for example, grey vs green infrastructure)
   - **Efficiency (3a)** relates to the (transaction) costs and time needed to implement and operate a climate resilience project in comparison with other projects (instruments, business models, climate adaptation solutions, process structures)
   - **Effectiveness (3b)** of the climate resilience solution to address the climate resilience challenge, and of the business model to ensure the realisation and financial viability of the project. (Kabisch et al., 2016)
   - **Impact (3c)** is the distribution of costs and benefits among society, determined by place (context), process, and payment (business case and financial model). Environmental, economic, socio-cultural impacts. (Thompson et al., 2023)
4. **Lessons learned (4)** with the purpose of upscaling climate resilience projects and AFFS (in an EU context).
   - **Successes and limitations (4a)** determined by the project outcomes. Successes are elements reported as positive, or factors that determined the success of the best practice. Limitations are not failures, but constraints or challenges experienced in the best practices. We focus on successes and limitations with regard to the AFFS.
   - **The potential and conditions for transferability (4b)** of the project's solution, business case, financial model, or process structure for the realization of climate resilience projects in other contexts (within the same or in different area).

Because the AFFS of each best practice is of key interest to CLIMATEFIT, this is further detailed in a second main part of the analysis framework, composed of three domains:

A. **The business model** as defined in the CLIMATEFIT glossary "describes in detail the services or products offered, the target markets, the cost structures and the resources required in a business or project. Often the business model goes hand in hand with a business model canvas, a visual representation of the business idea". The business model describes how the project works and is organized to create, deliver, and capture value. The business model is made up of three elements, based on the business model canvas for NbS by the EU project Connecting Nature. (McQuaid et al., 2019)
   - **Value proposition (A1)** is the consideration of the environmental, social, and economic values that the project offers to different groups of beneficiaries.
   - **Value creation and delivery (A2)** is composed of five elements:
     - **Key activities** are the key activities required to deliver the value proposition.
     - **Key resources** are the key resources needed to deliver the proposed values and the key activities. Examples are money, expertise, technical advice, etcetera.
     - **Key partners** involved to deliver the value proposition, to deliver the key activities and provide or fulfil resources.
     - **Key beneficiaries** are the key (direct or indirect) beneficiaries of the value proposition.
     - **Governance** is the organisational structure on an ongoing basis.
   - **Value capture (A3)** includes the cost and revenues associated with the activities and delivery of the project.
     - **Cost structure**: the costs of delivering/maintaining the climate resilience project.
     - **Cost reduction**: ways in which costs can be reduced through the climate resilience project compared to other or no measures.
     - **Capturing value**: ways in which value can be captured from the climate resilience project in the form of direct or indirect revenues, or public goods with non-monetary value.

B. **The Financial model** is part of the business model (A). It is the mechanism and strategy to secure financing and funding for the project, including sources and instruments. To define sources and instruments, we rely on the ' Catalogue of Sources, Instruments, and Best Practices' that is developed in the Pathway2Resilience (P2R) project (P2R, nd). The sources (B2) and instruments (B3) determine the financing and funding structure (B1).

- **The financing and funding structure (B1)** describes how financing and funding is secured, by whom, and how much. This includes a description of the financial flows between two or more actors, from actor(s) to climate resilience solution (investments), or from climate resilience solution to actor(s) (revenue streams). It determines the processes of value creation and delivery (A2), and value capture (A3).
- **Sources (B2)** refer to where the financing and funding comes from, and specifically which actor (public sector, private sector, third parties). This goes beyond public financing, to think about the range of private actors and their role in adaptation more broadly.
- **Instruments (B3)** are the specific financial mechanisms used to enable the provision of finance from one actor to another, or to a dedicated project which delivers adaptation. Financial mechanisms are used to secure financing and funding.

C. **Enabling conditions** required to implement the climate resilience project (2) through the business model (A) and financial model (B). Enabling conditions are **resources and transaction costs (C1)** (e.g, time, staff, expertise...), **legal conditions (C2)** (e.g., legal changes, legal framework, procedures), and **financial risks and de-risking mechanisms (C3)** (i.e., how financial risks are mitigated, shared, allocated, managed). These three broad categories were identified prior to the literature reviews that were performed in T1.1 (public sector) and T1.2 (private/finance sector) about barriers and enablers.

3.3.3. Data collection and analysis: document analysis and semi-structured interviews

Each case was researched by one of the two researchers from UA involved in this task. The research for every case started with collecting sources for **desk research**. Sources include scholarly or grey literature, case study documents, and web pages. Scholarly and grey literature are articles written about the case by one or more authors that were not involved in the case. Case study documents are information sources produced by actors from the case, including a business case, annual reports, information brochures, presentations, etcetera. Websites include web pages about the case usually hosted by one of the key stakeholders, reports about the case on platforms such as Climate-ADAPT or OPPLA, and news articles. The number of documents and level of detailed information available varied from case to case (see more about research limitations in 3.3.4). For the final selection of 20 cases, a minimum of data and information was available to at least describe the AFFS (business model and financial model). The sources obtained were analysed in NVivo, a software for qualitative data analysis. A coding tree was developed in NVivo before the analysis, including all the elements of the analysis framework in the same hierarchy as described in 3.3.2. Additional codes were inductively created to define specific enabling conditions and lessons learned to allow comparison across cases.

When the document analysis of a case was completed, one or more key stakeholders were identified and contacted for a semi-structured interview. Within the time available, the aim was to conduct one interview for every case, involving one or more stakeholders. The purpose of the interview was to obtain additional information that we did not find in the document analysis. We managed to have an interview with at least one person for 16 of the 20 cases (Table 3.9). In the other four cases, we did not receive a reply after multiple emails or the request for an interview was declined. Interviewees received the interview script (Annex 13) before the interview. The interview script included questions about all elements of the analysis framework. An opening question asked for the interviewees to introduce themselves and to describe how the current AFFS differed from business-as-usual in their case. Questions related to elements of the analysis framework for which sufficient information was obtained in the document analysis, were not asked to keep the interview duration within one hour. Additionally, case-specific questions were prepared by the interviewee to dive deeper into certain details of the case, specifically the AFFS. The interviews were recorded and transcribed. Transcriptions were sent back to the interviewees for proofreading. The transcriptions were analysed in NVivo using the same coding tree as for the document analysis.

Table 3.9. Overview of the interview respondents for the 20 international best practices.

Best practice	Interviewee's organisation	Interviewee's role
Greater Cape Town Water Fund (GCTWF)	The Nature Conservancy	Director of TNC in South Africa
Clean Water Partnership (CWP)	Corvias Solutions	Managing director
Cloudburst Management Plan (CMP)	City of Copenhagen	Project manager CMP
	City of Copenhagen	Copenhagen ambassador
	Aarhus University	Senior researcher
Ecomarkets	Department of Energy, Environment and Climate Action	Biodiversity officer
NICE GREEN Nagoya	/	/
Groenfonds	Midden-Delfland	Groenfonds secretary
		Groenfonds treasurer
Washington Stormwater Retention Credit System (Washington SRC)	Department of Energy and Environment	Branch chief of the Green Infrastructure Incentives and Assessment Branch

		Lead for the off-site compliance portion of the SRC program
		Lead of the SRC Price Lock program
Hampton Environmental Impact Bond (EIB)	City of Hampton	Senior planner (former)
	Quantified Ventures	Team leader
Paris Climate Bond (PCB)	City of Paris	Head of Cash Management Fund
Flood Buyouts	University at Albany	Researcher
Lower Don Valley Flood Defense Project (LDV)	Sheffield Chamber of Commerce	CEO
Dorset Heathlands	Dorset Heath Partnership	Team manager
Project Finance for Permanence (PFP)	WWF	Landscape finance director
		Senior director strategic planning and finance
RPPNM Program	Municipality of Curitiba	Retired urban economist
Seychelles Debt for Nature Swap (SDNS)	/	/
Viveracqua Hydrobond	Veneto, Italy	Pooled mini bond
Wetland Mitigation Banking Program (WMBP)	National Resources Conservation Service	Senior Biologist
Gothenburg green bond	/	/
Bilbao Flood Proof District	/	/
Edwards Aquifer Protection Program (EAPP)	City of San Antonio	Project Manager

The full reports written for every case, available on the CLIMATEFIT website, follow the structure of the analysis framework. The reports were sent back to the interviewees for proofreading and were also reviewed internally by our consortium partner Stockholm Environment Institute, Oxford office.

3.3.4. Research limitations

It is important to understand that this research was done with a specific purpose, i.e., to research best practices of innovative AFFS, whereby, as explained at the beginning of section 3.3, the best practice scope is limited to successfully raising financial resources for financing and funding of climate adaptation, or other climate-related investments or initiatives. We purposively sampled for best practices of innovative AFFS, which leads to two first important limitations. First, we did not research unsuccessful attempts of AFFS. When comparing the 20 best practices, we were able to find a correlation between success factors and outcomes in certain types of AFFS and best practices, but we cannot determine if there is a causal relationship. This would require comparative research between best practices and unsuccessful practices, to determine which elements contributing to success are exclusively present in best practices or not. We believe this would be a difficult task nonetheless, since the success of the best practices depended on the combination of multiple factors.

Second, a successful innovative AFFS does not mean that the case is also a best practice overall. The AFFS does not guarantee positive societal or environmental impacts. If data was available, we disclosed as many outcomes as possible about the efficiency or effectiveness of the AFFS, but also the effectiveness of the climate (adaptation) intervention in a case, and broader impacts. However, broader societal and environmental impacts were not the purpose of this research. In some of the best practice factsheets, we disclose limitations that point at negative externalities as a direct or indirect consequence of the AFFS. Due to time constraints, the desk research for each case was limited to analysing documents about the cases themselves, and we did not do in depth research about the positive or negative consequences of specific financial instruments or mechanisms used in each AFFS. We only conducted one interview for each best practice, which nearly always included interviewees that were somehow actively involved in the best practice. These interviewees were recruited because they were best suited to give additional information about the best practice and the AFFS that was missing in the documents. Because of their role within a best practice, we are aware that their views were largely positive, which made it difficult to identify many limitations overall.

Because of these limitations, the individual best practice factsheets present an overall positive story of each case, but that story must be understood within the defined scope of an innovative AFFS, not broader societal or environmental impacts of the best practice. The lack of critical standpoints and limitations is more present in a few best practices where we were not able to recruit an interviewee, or where data was limited. We believe these best practices remain valuable cases because we were still able to describe the innovative AFFS with only desk research.

Chapter 4: The investment landscape in the CLIMATEFIT territories

This chapter first gives an overview of each country and their CLIMATEFIT territories, including the following:

- A **general description of the context of CLIMATEFIT's territories**, based on data provided by facilitators. The case studies are presented by country and display demographic and climate features. Information in the overview tables is based on data available from the project proposal, which has been reviewed and updated by the facilitators.
- The **investment landscape** of supply and demand, including critical actors, main legislation for climate adaptation, and existing sources or adaptation funding and financing solutions. The investment landscapes are not meant to be exhaustive overviews of all actors involved. They show main groups of actors and relationships between them.
- A **general overview of the interview results for all territories**. It only includes results from interviews conducted with members of the public authorities. In some instances, private actors were interviewed, such as consultancy firms that often take assignments from local and regional governments Therefore, the landscape described for each territory in the following section is not critically challenged by private actors, but they never outnumbered public authority participants. The views can be different depending on the type of actor. An elected official will tend to be more positive than an administrator.
- The **results of the maturity assessment that has been tested in the four leader territories** only. These results generate feedback that allows us to improve the MASC during next steps of CLIMATEFIT, and possibly apply it the other CLIMATEFIT territories too. The goal is to provide a baseline on maturity and to compare the results before and after the project to assess the impact of CLIMATEFIT methodologies at a local level. Each score presented here is an average of the score given by facilitators and PAs to sub-criteria that were explained in detail in the guidelines (Annex 10). The analysis is based on the comments provided during the self-assessment.

After the country-specific results, we compare the empirical results with barriers identified during the literature review. Additionally, we give an overview of recurring barriers across all territories, including a synthesis of our findings about barriers, drivers, challenges and opportunities for adaptation finance in the CLIMATEFIT territories from a PA perspective.

As described in Chapter 3.1.1, interview materials were based on 5 thematic items that were detailed in several questions. For each of these themes, an analysis is conducted using the archetypical barriers identified by (Moser et al., 2019). These archetypical barriers are explained below.

Establishing climate change risks as a matter of concern:

- Conflict of interest. The PA has interest in ignoring climate risks because of the expenditures and lost revenues involved. Indeed, the long-term nature of climate change does not give great near-term benefits to adaptation measures.
- Low priority. Lack of knowledge and interest in climate change from the PA.
- Lack of champions, leadership. There is a lack of leadership from decision makers and chiefs of staff on climate change.
- Disproportionate burden. Current issues such as education, housing, infrastructure are more pressing vulnerabilities from the point of view of the PA.

Establishing adaptation funding needs, costs and benefits:

- Inappropriate funding scale. Climate risks do not respect jurisdictional boundaries. This can create a mismatch between potential solutions and the authority of the PA. This barrier also entails the question or responsibility and accountability for climate change impacts.
- Siloed governance. Disconnect between departments, creating unclear responsibilities, leadership, and accountability.
- Inability to make the economic case. Inability to assess the need for action, challenge of valuing risks and benefits, ability to valuate monetary and nonmonetary value.

Proving the fiscal standing of the PA (adaptation funding seeker):

- Chronic underfunding. The PA is dependent on grants because of its inability to effectively raise tax.

Identifying and accessing adaptation funding sources:

- Lack of capacity and staff constraints to apply to fundings. The PA has limited staff limiting the capacity to apply to fundings. The PA does not have dedicated personnel focused on adaptation.
- Discontinuous funding: Short term projects for adaptation, although climate change needs very long-term funding plans
- Aversion to innovation. Adaptation is a deviation from traditional projects that is not always welcomed by the bureaucracy.

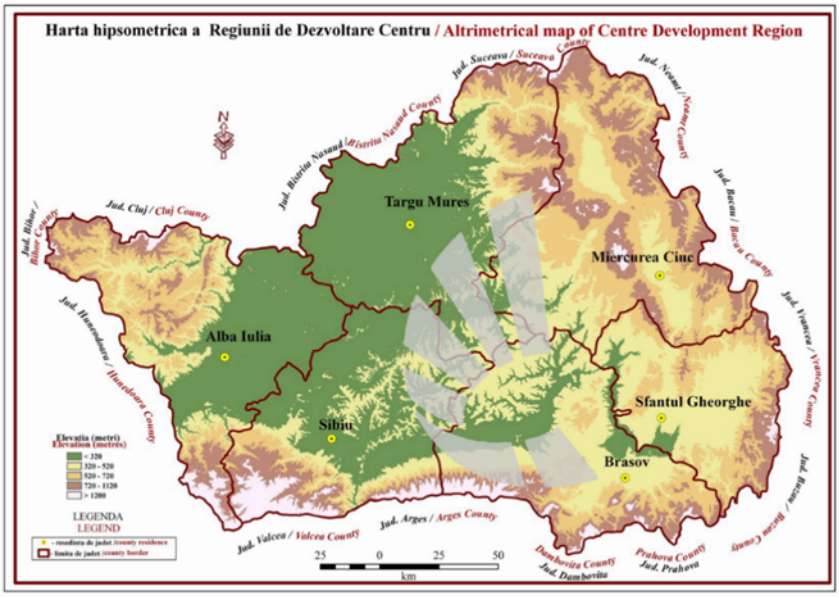
Having or building capacity to research, use, and administer adaptation funds:

- Funding biases: Perception that there is only limited funding for adaptation implementation and planning.
- Lack of knowledge about sources: Difficulty to find relevant funding sources for adaptation.
- Restrictions, conditions, eligibility criteria. The PA has difficulties meeting eligibility criteria for grants.
- Lack of capacity to administer funds. The PA lacks the capacity to administer received funds.

4.1. Romania

4.1.1. Territory context

Table 4.1. Context of Romania

ROMANIA			
			
Source of map: AGENTIA PENTRU DEZVOLTARE REGIONALA CENTRU			
	Alba Iulia	**Centru Region**	**Details/Reference**
Demographic features			
Surface (km²)	104	34 000	INSEE – tempo online
Population	74 653	2 646 560	INSEE – tempo online
Climate features			
Main Climate Risks	UHI (urban areas), Flash floods, Heatwaves, droughts		Climate Change Mitigation and Adaptation Plan (Alba Iulia) - CCMAP; SECAPs of municipalities from Centru Region
Other climate risks	Forest Fires, Landslides; rock falls, avalanches (mountain areas), ecosystem imbalance, wind gusts		News reports have covered storms, floods, and droughts
Vulnerabilities	Urban areas (built environment, energy and transportation infrastructure)		
Adaptation Landscape			
Adaptation strategies and plans	SECAP 2019, CCMAP 2022 (Alba Iulia), National Climate Change Adaptation Strategy (2020-2030), other SECAPs and adaptation plans of Centru Region municipalities		CCMAP is the integrated local Climate Adaptation and Mitigation Action Plan
Public Actors for adaptation	Environment Fund Administration Centru DR 6, ANPM, Centru Region County councils; municipalities, National Administration of Romanian Waters; National Institute of Hydrology and Water		Environment Fund Administration Centru DR 6, ANPM, Centru Region County councils; municipalities, National Administration of Romanian

	Management (INHGA); The Agency for Land Improvements; Payments and Intervention, Agency for Agriculture (APIA); National Directorate of Forests (ROMSILVA); National Meteorological Administration (ANAR)		Waters; National Institute of Hydrology and Water Management (INHGA); The Agency for Land Improvements; Payments and Intervention, Agency for Agriculture (APIA); National Directorate of Forests (ROMSILVA); National Meteorological Administration (ANAR)
Other Actors (NGOs, civil society, private)	The Association of Romanian Municipalities, 2°C, The National Agency for Environmental Protection, Alba Local Energy Agency, Energy Cities Romania, The Regional Development Agency Centru		The Association of Romanian Municipalities, 2°C, The National Agency for Environmental Protection, Alba Local Energy Agency, Energy Cities Romania, The Regional Development Agency Centru
Funding and Financing			
Main Financers for adaptation plans and projects	• National Environmental Fund; • Ministry of Investments and European Projects; • EEA grants - Iceland Liechtenstein Norway; • Local water company; • Energy Distribution Systems Operators. • Building/land owners; • European Commission through programs such as INTERREG Europe, URBACT, HORIZON, etc. • National Recovery and Resilience Plan • Regional Operational Development Programs • Environment Fund Administration through various programs	• Centru Regional Development Agency; • National Environmental Fund; • Ministry of Investments and European Projects; • National Recovery and Resilience Plan • Regional Operational Development Programs	
Type of Financing	Grants		
Total budget available for adaptation	~10 mil. € estimation (based on measures already included in local planning tools for 2030)	~200 mil. € estimation (minimum required until 2030)	SECAP, CCMAP (Alba Iulia)

Municipalities within the Centru Development Region of Romania exhibit similar climate-related challenges. The primary variance in climate hazards derives from the elevation of the terrain and the proximity to water bodies, which influence the flood risk impacting each municipality.

Interventions aimed at preventing and adapting to climate hazards at the local level represent one of the most expensive types of infrastructure projects. These initiatives heavily depend on the availability of data and comprehensive studies that show the financial implications for municipalities in the absence of such actions. Notable climate hazards, which have been observed to increase in both frequency and intensity at the local level in Alba Iulia and other municipalities within the Centru Development Region, include Urban Heat Island (UHI) formation in urban areas, flash floods, heatwaves, and droughts. Additionally, forest and vegetation fires pose a significant hazard in numerous municipalities depending on seasonal conditions, with a clear trend towards increased frequency.

In Romania, national companies and institutions (as detailed in the public actors for adaptation in the table above), along with their regional or county subsidiaries, play a significant role in financing and mitigating the territorial impacts of climate hazards. Municipalities often lack the financial capacity to execute costly climate adaptation projects independently and therefore typically rely on external financing mechanisms. There is also a lack of collaboration between citizens, local authorities, and national entities regarding adaptation efforts. The limited budgets of these key national actors are predominantly allocated by the government across the entire country.

Since the approval of the first SECAP in the region in 2018, there has been an ongoing effort to enhance awareness and gather data on the most critical climate hazards affecting municipal sectors. Alba Iulia successfully developed a more comprehensive Adaptation Plan (CCMAP) in 2022, funded by Norway Grants administered locally through the Ministry of Environment, Water, and Forests. While numerous measures for climate adaptation and hazard mitigation have been identified, there remains a significant gap in the financing

mechanisms necessary to support the implementation of these measures (applicable to both Alba Iulia and other municipalities in the region). Currently, we possess a clear understanding of the required actions to mitigate some climate change impacts in our municipalities; however, there is an absence of substantial financial support for local implementation. The increasing risks and calamities already experienced by numerous political decision-makers will hopefully facilitate the funding necessary for these measures.

Residents of the Centru Development Region are increasingly affected by climate hazards such as UHI formation, heatwaves, and flash floods, which impact their lives, family budgets, and safety. During periods of drought, these impacts extend to water scarcity and reduced availability of safe food. Another critical concern is the housing stock, which necessitates expensive interventions to endure the current and anticipated environmental conditions, predominantly heatwaves that jeopardise inhabitants' health and intense rainfall that threatens the structural integrity of residential infrastructure.

4.1.2. Investment landscape

Figure 4.1. AFFS in Romania. AFFS present in the country are highlighted in yellow. Source: ALEA

The investment landscape for climate adaptation in Romania is characterized by a strong reliance on EU grants complemented by municipal budgets. Like other EU countries, private sector involvement in climate adaptation financing is still rather limited. This is also the case in the municipality of Alba Iulia, located in the Centru Region, two CLIMATEFIT territories.

Public sources

Public funding is the primary source for adaptation projects in Alba Iulia (municipality), largely driven by EU funding mechanisms. Alba Iulia can be considered a champion when it comes to obtaining EU funding. Key EU contributions include:

- **EU Structural Funds**: Significant portions of funding come from various EU structural and investment funds, aimed at enhancing resilience and supporting sustainable urban development.
- **European Regional Development Fund (ERDF)**: This fund plays a crucial role in financing projects that improve energy efficiency and infrastructure resilience.
- **Cohesion Fund**: Supports large-scale infrastructure projects, which include climate adaptation measures.
- **Horizon 2020 and Horizon Europe**: Provide funding for research and innovation projects related to climate change adaptation.

National and municipal governments co-finance projects alongside EU funds:

- **Local Budget Allocations**: in Romania, municipal budgets are allocated to match the support from EU-funded projects, ensuring local contributions to adaptation measures.
- **National Programs**: While there is limited direct national funding for climate adaptation, there are programs aimed at environmental protection and sustainability that indirectly support adaptation efforts.

Private sources

Private sector involvement in adaptation financing in Alba Iulia remains minimal, with most private investments focused on climate mitigation rather than adaptation. Bilateral grants from international partners also contribute to funding specific projects, but these are relatively rare. The **commercial and investment banking sector** in Romania is gradually recognizing the importance of climate adaptation, but specific financial products for adaptation are limited. Key developments include:

- **Green Bonds**: Issued by some municipalities to fund sustainability projects, including climate adaptation.
- **Environmental Loans**: Provided by commercial banks, these loans typically focus on energy efficiency and renewable energy projects, with limited direct funding for adaptation.

The **insurance sector** in Romania is beginning to offer products that incentivize adaptation measures, such as reduced premiums for properties that have implemented flood defences. However, these products are not yet widespread.

Conclusion

Overall, the investment landscape for climate adaptation in Alba Iulia and Romania at large relies heavily on public and EU funding, with limited engagement from the private sector and commercial banks. To enhance climate resilience, there is a need for more integrated national strategies and increased private sector participation.

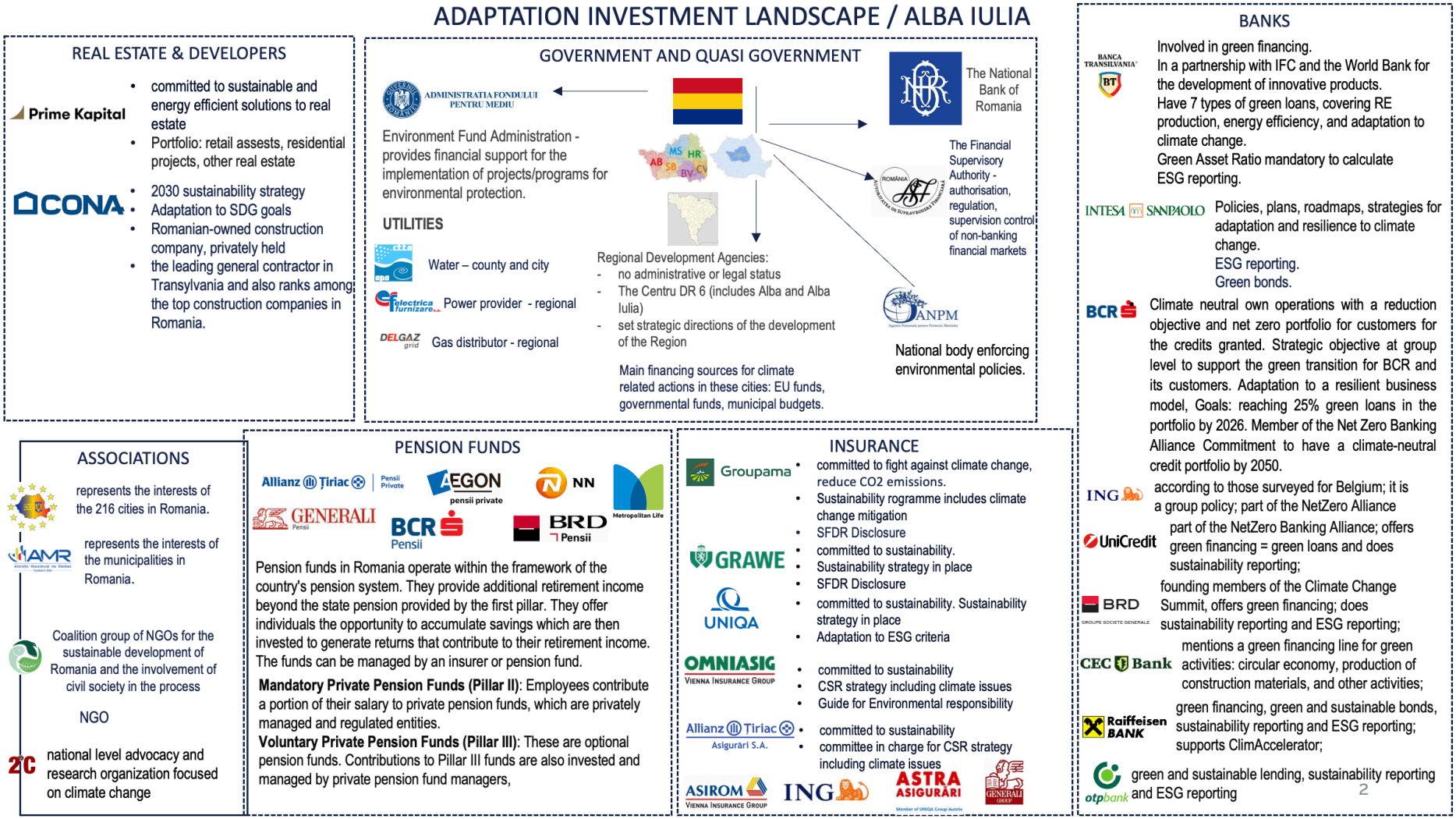


Figure 4.2. Investment landscape of Romania and Alba Iulia. Source: ALEA

4.1.3. Interview results

Alba Julia (Leader)

Establishing Climate Change Risks as a Matter of Concern

In Alba Iulia, climate change is recognized as a central issue, rated 4/5 in terms of priority. However, finding appropriate funding remains a significant challenge. Energy efficiency often takes precedence over adaptation topics, with little distinction made between mitigation and adaptation efforts. This confusion is exacerbated by a lack of knowledge within administrations, where staff may specialize in climate topics but there is no formal team with a cross-sectional view on climate risks and adaptation (siloed governance). On a political level, climate change risks are slow to gain attention, reflecting a lack of leadership and a low prioritization of these issues.

Establishing Adaptation Funding Needs, Costs, and Benefits

Alba Iulia follows a national strategy on adaptation, which includes prioritizations, proposed budgets, and funding guidelines. However, structural underfunding hampers the fulfillment of adaptation needs. This issue is emphasized by other pressing vulnerabilities that need funding and the long-term nature of climate change, which does not provide immediate benefits and often conflicts with short-term funding priorities (discontinuous funding). Additionally, there is incomplete knowledge about the variety of available funding sources. To address this, Alba Iulia often seeks external help for feasibility and impact assessments.

Proving the Fiscal Standing of the PA

Inflation has negatively impacted the financial capacity of the Public Authority (PA) in Alba Iulia. The PA is heavily dependent on EU funding, which represents half of its budget. Local budgets are limited, and numerous other vital priorities compete for funding, creating a disproportionate burden on available resources.

Identifying and Accessing Adaptation Funding Sources

Adaptation projects in Alba Iulia are primarily funded by the EU, local budgets, and loans. There is a strong will and aim to find more diversified sources of funding, especially from government actors, though there is a general lack of knowledge about funding sources. Due to siloed governance, there is often internal competition for funding within the administration. Despite these challenges, Alba Iulia is a pioneer in private funding and is recognized as a credible partner.

Having or Building Capacity to Research Adaptation Funds

Alba Iulia has extensive knowledge about EU funding and maintains a large team (40 people) dedicated to applying for such funds. Consequently, the PA focuses primarily on EU funding and has limited knowledge about Public-Private Partnerships (PPPs) and other innovative types of private funding solutions. This specialization allows for effective utilization of EU resources but indicates a gap in exploring other potential funding avenues

Centru (Planner)

No interview was conducted with people the Centru region.

4.1.4. Maturity Assessment of Alba Iulia

Alba Iulia has demonstrated notable strengths in addressing climate and energy projects, particularly in cooperation, legitimacy, and the capacity to identify funding sources.. These strengths can be attributed to the city's extensive experience and reliance on external funds for environmental projects. Such experience likely provides a robust framework for identifying and capitalizing on funding opportunities, ensuring effective collaboration among stakeholders, and maintaining legitimacy in their initiatives. However, the chart highlights several significant challenges that may impede the effectiveness of Alba Iulia's efforts. The most prominent obstacles include:

- The **policy environment** is a significant barrier, potentially due to restrictive or non-supportive national policies for adaptation. One of the overarching issues is the low level of prioritization due to challenges in other sectors that are more prioritized (**disproportionate burden**)
- **Legal and regulatory constraints** are critical challenges as well. These frameworks may be outdated, overly complex, or not conducive to the types of projects Alba Iulia seeks to implement.
- **The monitoring and evaluation system** is identified as a major weakness. Effective monitoring and evaluation are essential for demonstrating project impact, ensuring accountability, and meeting the reporting requirements of funding bodies.
- There is a **greater level of commitment**, but depending on the fluctuating political will, given by the varying levels of priority given to environmental projects within the local government. Strengthening commitment could involve increased advocacy, awareness-raising, and aligning local priorities with sustainable development goals.

- Alba Iulia has **a strong capacity to borrow** thanks to its credibility. However, the municipality has limited capacity to generate a high source of income needed for the implementation of big climate related project.
- While not among the weakest areas, there is room for improvement in the resources allocated to research and application processes. Enhancing these resources can improve the quality and success rate of funding applications.

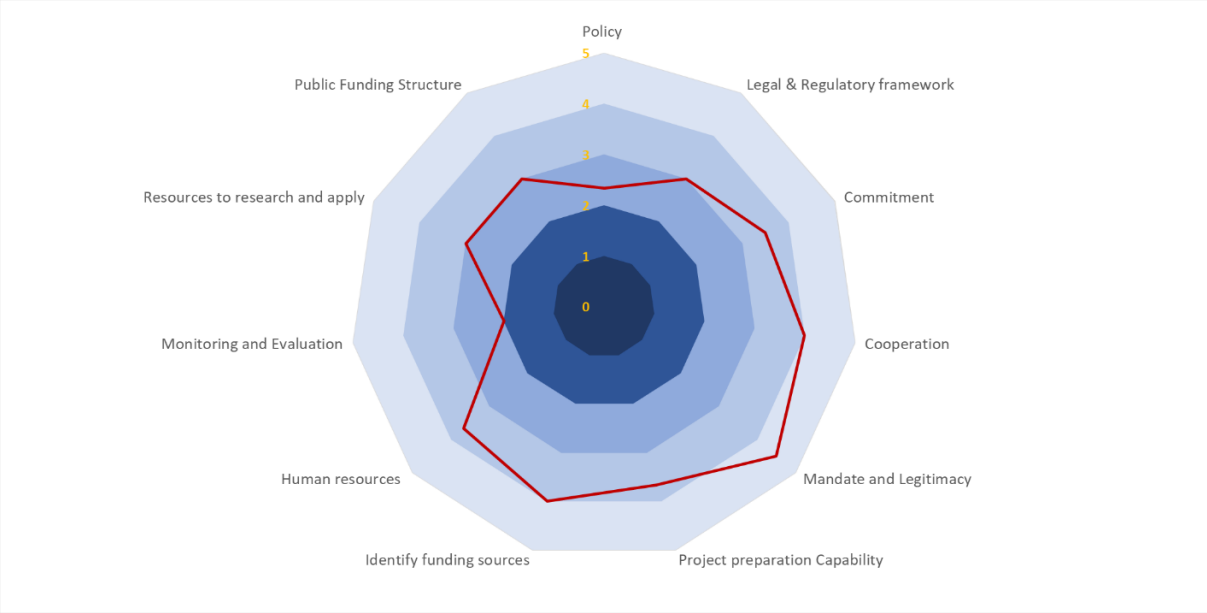
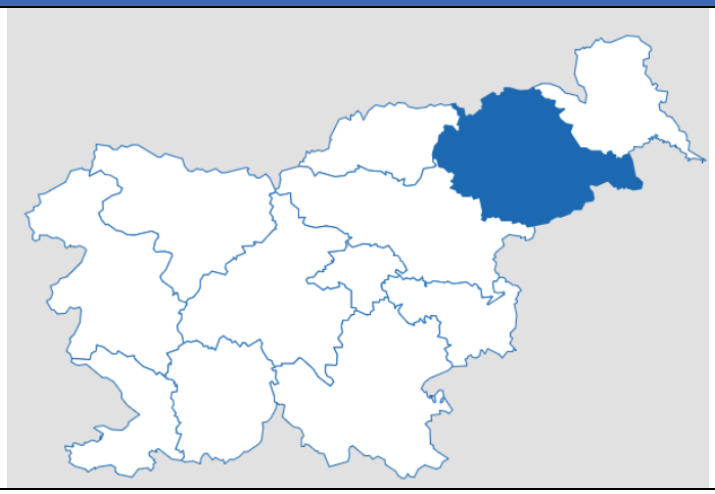


Figure 4.3. Alba Iulia (Romania). Maturity assessment results. Source: ACTIERRA

4.2. Slovenia

4.2.1. Territory context

Table 4.2. The context of Slovenia

SLOVENIA


Source: Statistical Office of the Republic of Slovenia (SURS)

Cultivated plains along Drava River and hilly area of Kozjak

	Maribor Municipality	Radlje ob Dravi Municipality	Selnica ob Dravi Municipality	Lovrenc na Pohorju Municipality	Details/Reference
Demographic features					
Surface (km^2)	148	94	64	84	SiStat Database, Statistical Office of the Republic of Slovenia, year 2023
Population	113 000	6142	4473	2944	SiStat Database, Statistical Office of the Republic of Slovenia, year 2023
Climate features					
Main Climate Risks	Heat waves Heavy precipitation – heavy rainfall, flash/surface floods	Heavy precipitation - – heavy rainfall, flash/surface floods Landslides			Extreme weather events in July and August 2023
Other climate risks	Landslides	Heat waves			Extreme weather events in July and August 2023
Vulnerabilities	Infrastructure in flooded/landslide areas				
Adaptation Landscape					
Adaptation strategies and plans	No action plan				
Public Actors for adaptation	The adaptation action plan for each municipality is under preparation based on RVA for Podravje region that is under finalization.				
Other Actors (NGOs, civil society, private)	Ministry of Environment, Climate and Energy (MOPE) Slovenian Environmental Agency (ARSO) Regional Development Agencies (RRA) Local Energy Agencies (LEA)				
Funding and Financing					
Main Financers for adaptation plans and projects	Municipalities, Slovenian Environmental Public Fund, Climate Change Fund				
Type of Financing	Grants, loans, PPP				
Total budget available for adaptation	5.5M	0.3M	0.3M	0.3M	

In Slovenia, municipalities are the only level of self-government; they have an extensive role regarding spatial and urban planning, housing, water management, economic development, tourism and environmental protection. The Podravska region is geographically diverse, featuring cultivated plains along the Drava River and heavily forested hills in the sub-alpine mountains. These geographical differences influence the region's climate, vulnerabilities, and adaptive capacities. Podravska is the second most populated statistical region in Slovenia, with a population density of 150 inhabitants per square kilometer. In 2022, the employment rate was 63,8%, with 18% of employed persons working outside their region of residence. The region contributed 12.7% of the national GDP.

A national vulnerability assessment in 2014 highlighted Podravska's high vulnerability to climate risks, including droughts, floods, landslides, temperature increases, and heat waves. The assessment also identified a low level of adaptive capacity, especially in the water and infrastructure sectors. To address these issues, a regional climate risk and vulnerability assessment and adaptation strategy were being prepared and are currently under finalization. In 2022, the municipalities involved signed the Covenant of Mayors initiative, demonstrating a commitment to climate action. Podravska region also joined EU Mission Adaptation to Climate Change and become part of adaptation community.

Funding for climate resilience projects primarily comes from municipal budgets, the Cohesion Fund, the Environmental Public Fund–(until now PPP is in use only for mitigation projects)–. Despite these efforts, municipalities face significant challenges in increasing climate resilience. Major barriers include a lack of human resources, insufficient knowledge to translate theoretical concepts into practical solutions, limited awareness of climate issues, and a lack of political will.

4.2.2. Investment landscape

Figure 4.4. AFFS in Slovenia. Source: ENERGAP

The investment landscape for climate adaptation in Slovenia is currently underdeveloped, primarily due to the absence of a clear national adaptation strategy. Historically, Slovenia had not prioritized climate adaptation. However, following the catastrophic floods in August 2023, the focus has shifted towards flood protection, reconstruction, and rehabilitation measures.

Public sources

Public funding remains the primary source of financing for adaptation projects in Slovenia, sourced from various public entities including the **European Union (EU)**, the national government, and municipal governments. The EU plays a significant role, providing substantial funding through different programs. Notable EU contributions include:

- **Slovenia Recovery and Resilience Plan:** €344 million allocated for climate adaptation projects.
- **Cohesion Policy Program:** Over €90 million committed to flood protection in the past decade.
- **Post-flood Reconstruction:** €100 million advance payment approved for reconstruction efforts following the August 2023 floods.
- **Other EU Funds:** Additional support from Horizon 2020, LIFE, the European Investment Bank, and the European Bank for Reconstruction and Development.

The Slovenian **national government and local municipalities** co-finance European and international sources while independently financing other measures. Key initiatives include:

- **EcoFund:** A significant source of financing for environmental projects.
- **Fund for the Reconstruction of Slovenia:** Established to address post-flood reconstruction.
- **Support Measures:** Various subsidies and exemptions provided for flood relief to households, municipalities, and the economy.

Despite these efforts, municipalities like Maribor have begun drafting climate and energy frameworks, but specific strategies for adaptation finance are lacking. Some municipalities have small financial resources for adaptation, but these are not exclusively dedicated to adaptation measures.

Private sources

On a bilateral level, grants from the EEA and Norway support climate adaptation projects in Slovenia. However, there is little clarity regarding the involvement of asset owners in climate adaptation investments. Notably:

- **Asset Owners:** There is a general lack of significant asset owners or foundations actively financing climate adaptation projects.
- **Pension Funds:** Tend to adopt traditional, low-risk investment strategies with minimal involvement in climate projects.

The **commercial and investment banking sector** in Slovenia shows limited engagement in climate adaptation finance. Some examples include:

- **Sustainable Bond:** The Slovenian government raised €1.25 billion from institutional investors through a ten-year sustainable bond, primarily funding environmental and social goals with minimal focus on climate adaptation.
- **Bank Products:** While commercial banks do not offer specific climate adaptation products, they provide climate mitigation products such as green leasing and green loans for various environmental issues. For example:
    - **NLB and Nova KBM:** Offers green bonds and climate mitigation products.
    - **SKB and Intesa Bank:** Provide green housing loans but have fewer green products overall.

Insurance companies in Slovenia offer discounts on insurance rates for clients undertaking climate adaptation projects, as these projects lower the clients' risk categories. However, these discounts are not prominently advertised.

The **corporate sector** has limited involvement in climate adaptation. Some companies offer performance contracting for climate mitigation, and a few cooperatives have been established for photovoltaic electricity production in 2023.

Conclusion

Overall, Slovenia's investment landscape for climate adaptation is nascent, heavily reliant on public funding and EU support. Private sector engagement, particularly from asset managers and commercial banks, is minimal. There is a need for a comprehensive national adaptation strategy to guide and stimulate further investment in this critical area.

Figure 4.5. Investment landscape of Slovenia. Source: ENERGAP

4.2.3. Interview results

Maribor (Planner)

Establishing Climate Change Risks as a Matter of Concern

In Maribor, the Public Authority (PA) is responsible for environmental missions across nine municipalities, focusing on sustainable mobility and biodiversity conservation. Despite these efforts, the PA faces significant challenges due to a lack of qualified staff, internal communication issues, and an absence of a dedicated adaptation plan. Knowledge gaps are particularly evident among older generations within the administration. Additionally, there is no specific department for climate change, resulting in a siloed governance structure where adaptation is treated as a framework across various departments rather than a unified approach.

The extreme weather events, such as the massive flooding that struck Slovenia last summer, have heightened the seriousness of discussions around adaptation. This year's budget reflects an increase in funding for landslides. However, interviewees believe that current efforts are more focused on dealing with the aftermath of catastrophes rather than implementing preventive measures. The lack of attention to adaptation for improving resilience to extreme weather events, which are expected to increase annually, remains a concern.

Although adaptation is gaining more attention, primarily due to priorities set by the EU Commission, there is still much to be done. Interviewees note significant inertia among national policymakers, reflecting a lack of leadership and conflicting interests. While the country does not have a comprehensive long-term adaptation plan at the national level, various strategies do exist.

Establishing Adaptation Funding Needs, Costs, and Benefits

The municipality of Maribor has not yet specifically addressed the financing needs for adaptation alone, largely due to the inability to make a clear economic case. Adaptation efforts are scattered among different departments, and there is no dedicated budget line for climate change and adaptation. Feasibility studies, analyses, and assessments are typically conducted by external specialized companies.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

The PA in Maribor suffers from chronic underfunding, which severely limits resources for adaptation initiatives. This financial strain is compounded by a general lack of awareness and priority given to adaptation issues, further diminishing the PA's capacity to secure necessary funds.

Identifying and Accessing Adaptation Funding Sources

Climate mitigation and adaptation projects in Maribor are primarily funded through public funds. However, private partners are not yet involved in financing adaptation. Municipalities have experience with public-private partnerships in the mitigation area, particularly those based on financing from energy savings.

Internally, the administration needs to establish its own priorities for adaptation. Currently, municipalities often wait for calls for tenders from ministries and prepare projects based on these calls. Interviewees indicate that those designing tenders at the national level often lack sufficient knowledge about adaptation, resulting in low priority for these projects. Additionally, there is a general lack of knowledge within the PA about potential funding sources.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

There is a significant lack of knowledge and human resources to identify and pursue innovative financing mechanisms for climate adaptation in Maribor. Respondents believe that while human resources could be available, their allocation depends on the municipality's priorities, which often do not prioritize adaptation due to disproportionate burdens and low prioritization. Comprehensive training is needed to build competencies in managing adaptation funds effectively

Radje ob Dravi (Strategist)

Establishing Climate Change Risks as a Matter of Concern

In Radlje ob Dravi, climate change is rated as a high priority. However, due to its small size (6,200 inhabitants), the municipality lacks the human resources to focus specifically on adaptation. The summer storms have highlighted the necessity of active adaptation measures, pushing it higher on the agenda and overcoming the low priority barrier that previously existed.

Establishing Adaptation Funding Needs, Costs, and Benefits

The municipality has not yet conducted a specific financing needs assessment for adaptation alone, reflecting an inability to make the economic case. There are numerous open challenges related to adaptation, including technical and design issues, linked to standards that are not yet adapted at the national level, leading to a funding bias and inadequate funding scale.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

Slovenia is considered to be lagging behind on the topic of adaptation, which explains the absence of a holistic strategic approach for adaptation, in contrast to the more developed strategies for mitigation. This gap hinders the ability of the PA to present a solid fiscal standing for seeking adaptation funds.

Identifying and Accessing Adaptation Funding Sources

Climate mitigation and adaptation in Radlje ob Dravi are primarily funded through public funds. Private partners are not yet involved in financing adaptation. The municipality faces challenges when applying for adaptation-focused projects due to standards that are not yet adapted and professional services that lack a sufficient understanding of adaptation needs. This results in a funding bias and inadequate funding scale.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

There is a significant lack of knowledge and human resources to identify and pursue innovative financing mechanisms for climate adaptation in Radlje ob Dravi. The PA believes a dedicated agent for adaptation financing and funding administration is necessary. Currently, the focus remains primarily on mitigation, both at the municipal and national levels. Developing capacity in these areas is crucial for improving the municipality's ability to finance and implement climate adaptation projects.

Lovrenc na Pohorju (Strategist)

Establishing Climate Change Risks as a Matter of Concern

The Municipality of Lovrenc na Pohorju, with fewer than 3,000 inhabitants and a small administration of just 10 employees, faces significant limitations in addressing climate adaptation. Environmental concerns are rated as a top priority, but the municipality lacks the human resources to focus on adaptation as a specific topic. Each employee covers multiple areas, making it difficult to dedicate specific attention to adaptation efforts.

Establishing Adaptation Funding Needs, Costs, and Benefits

The municipality does not have a plan for dealing with adaptation financing. While funding is available at the national level, Lovrenc na Pohorju primarily relies on cohesion and other public funds. Individual calls for tenders have started to include adaptation elements. Feasibility studies, analyses, and assessments are typically conducted by external specialized companies due to the lack of internal capacity.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

Lovrenc na Pohorju suffers from a limited budget, which poses a significant challenge in responding to tenders due to resource and time constraints. This chronic underfunding hampers the municipality's ability to effectively seek and utilize adaptation funding.

Identifying and Accessing Adaptation Funding Sources

Climate mitigation and adaptation projects in Lovrenc na Pohorju are funded using public funds. Private partners are not yet involved in financing adaptation efforts. The municipality needs to improve its capacity to identify and access various funding sources to support its adaptation initiatives.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

The municipality lacks both the knowledge and human resources required to effectively research, use, and administer adaptation funds. The field of adaptation is multisectoral and multidisciplinary, which makes it particularly challenging for smaller municipalities like Lovrenc na Pohorju. They often rely on external expertise to bridge these gaps, highlighting the need for better internal capacity and resources to manage adaptation projects on a suitable scale.

Selnicz ob Dravi (Strategist)

Establishing Climate Change Risks as a Matter of Concern

In Selnica ob Dravi, climate change is a top priority, a focus heightened by the summer catastrophes. The municipal administration, consisting of 14 employees, has two individuals dedicated to environmental and spatial planning. However, the small size of the municipality makes it difficult to have specialized staff for adaptation, leading to capacity and staff constraints when applying for funding. The municipality has set targets in the area of climate risk and conducts awareness-raising actions. While national guidelines on adaptation exist, there is nothing operational at the local level.

Establishing Adaptation Funding Needs, Costs, and Benefits

The municipality has limited knowledge about climate adaptation financing sources, compounded by severe resource constraints as only two employees handle all environmental topics. Feasibility studies, analyses, and assessments are usually outsourced to external specialized companies due to the lack of internal capacity.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

The municipality faces significant challenges in finding additional funding due to limited resources. This makes proving the fiscal standing of the Public Authority (PA) and securing necessary funds for adaptation projects particularly difficult.

Identifying and Accessing Adaptation Funding Sources

Climate mitigation and adaptation projects in Selnica ob Dravi are primarily funded using public funds. Private partners are not yet involved in financing adaptation efforts. Some professional institutions may discourage applications for tenders that include adaptation elements due to their established practices and aversion to innovation. This further limits the municipality's capacity to identify and access various funding sources effectively.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

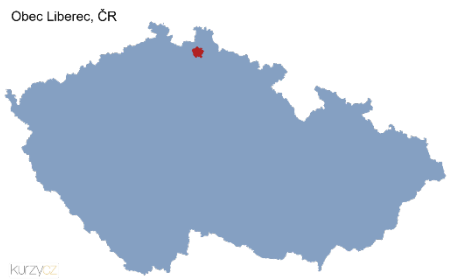
There is a notable lack of knowledge and human resources to identify and pursue innovative financing mechanisms for climate adaptation in Selnica ob Dravi. The respondent believes that even at the national level, operational project designers are predominantly oriented towards mitigation rather than adaptation. This highlights the need for improved internal capacity and resources to manage adaptation projects effectively and explore new funding opportunities.

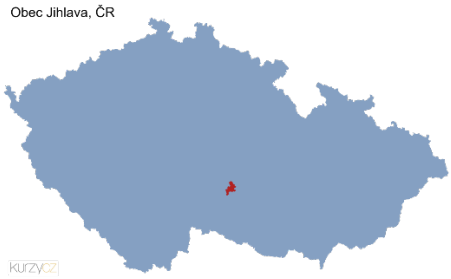
4.3. Czech Republic

4.3.1. Territory context

Table 4.3. The context of the Czech Republic

CZECH REPUBLIC





Source: kurzy.cz

Source: visitliberec.eu, seznamzpravy.cz

	Liberec	Jihlava	Details/Reference
Demographic features			
Surface (km^2)	106	88	Czech Statistical Office, 2023
Population	107 400	52 500	Czech Statistical Office, 2023
Climate features			
Main Climate Risks	Heatwaves, Droughts, Floods		Extreme droughts every summer since 2015

Other climate risks	Wildfires		2500 wildfires on total area of approximately 1715 ha in 2022
Vulnerabilities	Rural areas		
Adaptation Landscape			
Adaptation strategies and plans	National Adaptation Action Plan, SECAP, Strategy on Adaptation to Climate Change in the Czech Republic		
Public Actors for adaptation	Ministry of Environment, State Environmental Fund of the Czech Republic		
Other Actors (NGOs, civil society, private)	T.G. Masaryk Water Research Institute Czech Hydrometeorological Institute		
Funding and Financing			
Main Financers for adaptation plans and projects	EU, municipalities, Ministry of the Environment, The State Agricultural Intervention Fund		
Type of Financing	EU and national grants and subsidies		
Total budget available for adaptation	City budget: 40M EUR Funds: 18M EUR	City budget: 5M EUR Funds: 2M EUR	Current estimates

Region Bohemia (Czech Republic): The Czech Republic, a land-locked country with a climate transitional between an oceanic and a continental climate is represented in this project by the city of Jihlava and the city of Liberec. Czech Republic has adopted its national adaptation strategy in 2015 which was among the latest within the EEA countries[16]. The strategy as updated and amended by an adaptation action plan in 2021.[17] In parallel most (but not all) the regions and regional capitals have prepared their adaptation strategies or plans. In the meanwhile, there are several granting schemes available for financing adaptation measures, mainly for municipalities. The biggest source comes from European structural funds and from national sources, however the total allocated resources (hundreds of mil. Euro) are by a magnitude lower to the national and EU funds which are and will be available for climate mitigation measures.

City of Liberec is a capital of Liberec region. Liberec has approved its SECAP plan and participates in the participates in the 100 EU´s climate neutral and smart cities initiative. It also has recently finished a comprehensive climate adaptation strategy. Both strategy documents have identified a wide range of possible adaptation and mitigation measures, but the city lack investment fund and capacities to realise most of the measures. Liberec is a capital of a rural region, with the 5th highest unemployment in the Country (out of 15 regions)[18], the 3rd biggest share of inhabitants under an enforced debt collection (9,32% of the population), 3th lowest GDP/capita[19] . Liberec is ranked 75th in the quality of life ranking among 200 Czech cities. [20] Liberec region belongs to the 4th worst ranking regions in Czechia, the other 3 regions are part of the Just Transition schema and entitled to specific funding from Just Transition fund, the Liberec regions is not. Liberec region is a popular winter sports region. 1,3% of the GDP created in the region and 3,7% of the employment comes from tourism, which ranks 3rd resp. 5th among Czech regions. Climate change is expected to negatively impact in particular winter tourism in the region due to lack of snow.

Jihlava city has recently also finished its adaptation strategy with a much wider range of identified measures than they are able to finance and realize. The city has 50 thousand inhabitants, which is half the size of Liberec city. It is a capital of Vysocina region. It is also a rural region (with second lowest share of inhabitants living in cities among the 15 regions), however is better off in most socio-economic indicators to Liberec region, in most indicators Vysocina ranks around average of the country, for example Vysocina region is 7th in GDP/capita, 7th in unemployment rate, 6th in average salary. The city of Jihlava ranked 70th in the quality of life ranking among

[16] Advancing towards climate resilience in Europe: status of reported national adaptation actions in 2021, page 11 URL
[17] Ministerstvo životního prostředí
[18] Český statistický úřad
[19] Český statistický úřad
[20] Aktuálně.cz

200 Czech cities.[21] Jihlava is the second smallest regional capital (after Karlovy Vary). The climate change impact are going to be in particular redinous in regards of impacts on the forests, as the whole region is a highland covered by spruce monocultures which are continuously drying out due to higher temperatures and spreading of the bark beetle.

4.3.2. Investment landscape

Public sources

The public sector plays a crucial role in financing climate adaptation projects in the Czech Republic. Key public sources include:

- **European Union (EU):** The EU provides substantial funding through various programs:
  - **Operational Programme Environment (OPE):** Allocates approximately €400 million specifically for climate change adaptation.
  - **Other EU Funds:** European Structural and Investment Funds (ESIF), Just Transition Fund (JTF), National Recovery Plan (NRP), Modernisation Fund, and Innovation Fund contribute up to €30 billion for broader climate actions.
  - **Norway Grants:** Provided by the EU and EEA, supporting various environmental and adaptation projects.
- **National Government:** Funding is provided through several national programs managed by different ministries, such as:
  - National Programme Environment (NPZP)
  - Integrated Regional Operational Programme (IROP)
  - Landscape Care Program
  - Programs for restoration of natural functions and flood prevention
- **Regional and Municipal Governments:** The Czech Republic consists of 14 regions, each with its own administrative structures and budgets. Examples of regional funding include:
  - **Jihomoravsky Region:** Allocates around €0.8 million in 2024 for various municipal adaptation projects.
  - **Municipal Level Initiatives:** Many cities are developing adaptation strategies and leveraging national/EU subsidies. The city of Pilsen, for example, seeks funding through partnerships with companies and NGOs, as well as micro-grants. The city of Jihlava offers discounts on "investors' fees" for specific adaptation measures.
  - **State-Owned Enterprises and Utility Companies:** These entities contribute to climate adaptation through tariffs, concessional loans, green infrastructure blended finance, climate resilience bonds, and other mechanisms.

Asset Owners

The involvement of asset owners in climate adaptation is emerging but still limited:

- **Pension Funds:** These funds operate within the national pension system, contributing to long-term investments that include climate resilience projects.
- **Insurance Companies:** Kooperativa Insurance, a member of the Vienna Insurance Group, supports smaller municipalities with grants for feasibility studies on landscape restoration.
- **Foundations:** Two notable foundations, Partnerstvi nadace and Karel Komarek Promeny Foundation, focus on climate issues and provide limited grants for adaptation projects.

Private sources

There is limited direct involvement of **asset and wealth managers** in climate adaptation investments, but some activities related to climate finance in general are noted:

- Green Bonds: Czech Railway issued the first green bond in the Czech Republic.
- ESCO Projects: Energy Service Companies (ESCO) and similar entities provide private capital primarily for renewable energy and mitigation, often through Energy Performance Contracting (EPC) projects with municipalities or public entities.

While there is no significant direct investment by **banks** in climate adaptation, there are several initiatives in climate finance:

- **Development Bank:** The Czech Development Bank provides financing or guarantees for environmental, transport, and energy sector mitigation projects, and is expanding to include municipalities.

[21] Aktuálně.cz

- **Commercial Banks:** Major banks like UniCredit, CSOB, and CSAS offer specialized loans co-financed by EU funds for climate mitigation and potentially adaptation. They also participate in sustainability initiatives and provide ESG barometers for companies.
- **Sustainability Working Group:** Includes representatives from various banks working on sustainability issues.

The **real economy sector** includes companies, cooperatives, consumers, NGOs, and philanthropic organizations that contribute to climate adaptation:

- **Ministry of Environment:** Collaborates with businesses to create an adaptation platform for sharing and finding adaptation projects, investment opportunities, and knowledge exchange.
- **Subsidy Programs:** Government programs like the Green Savings Program support households in implementing energy savings and some adaptation measures, such as green roofs and rainwater collection.

Conclusion

The Czech Republic's climate adaptation investment landscape is heavily supported by public sources, including significant EU funding and national government programs. While the private sector's involvement in direct adaptation investments is still developing, there are promising initiatives in green finance, insurance grants, and collaboration between public entities and private companies. The emergence of adaptation platforms and subsidy programs for households indicates a growing focus on integrating climate resilience into broader economic activities.

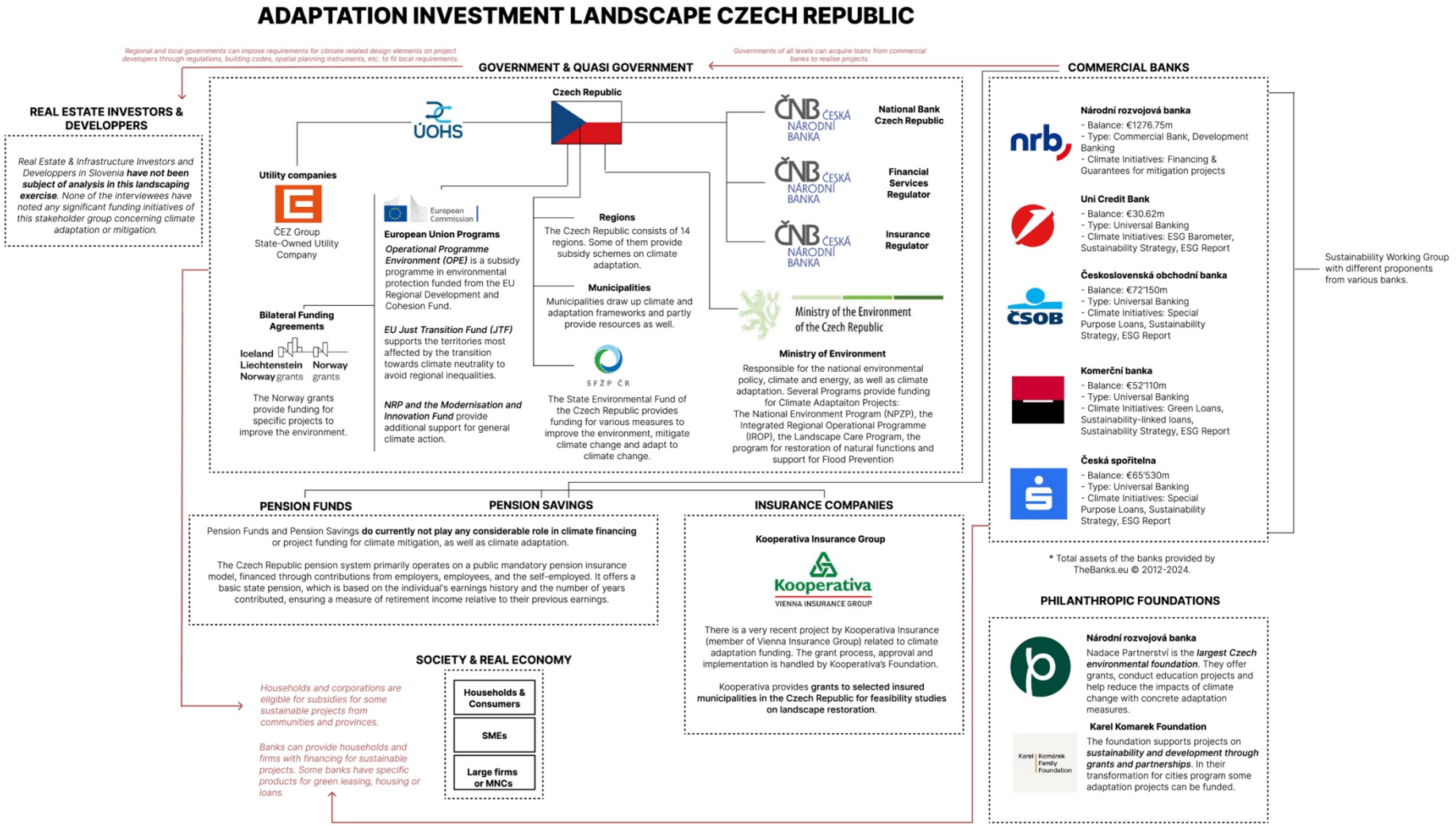


Figure 4.6. Investment landscape of Czech Republic. Source: ENVIROS

4.3.3. Interview results

Liberec (Planner)

Establishing Climate Change Risks as a Matter of Concern

In Liberec, climate change is not considered a high priority according to interviewees. Environmental responsibilities are dispersed across several departments, leading to siloed governance and a lack of cohesive strategy. Mitigation measures that offer clear economic benefits, such as energy savings, are preferred over adaptation measures that do not provide immediate returns on investment. This creates a conflict of interest and an inability to make a compelling economic case for adaptation. Although there are national and regional plans for adaptation, they have not been fully embraced or implemented at the local level.

Establishing Adaptation Funding Needs, Costs, and Benefits

Interviewees report a significant lack of leadership in promoting adaptation initiatives. The long-term nature of climate change, coupled with limited short-term benefits, poses a substantial barrier to prioritizing adaptation efforts. This situation is exacerbated by a lack of knowledge on how to specifically budget for adaptation projects. Without a clear understanding of the financial requirements and benefits, it is challenging to allocate funds effectively.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

The availability of funds for adaptation in Liberec is highly contingent on current political priorities, resulting in discontinuous and low-priority funding. Existing dedicated funds are typically allocated for public spaces rather than for climate change adaptation specifically. This makes it difficult to secure consistent and adequate funding for adaptation projects.

Identifying and Accessing Adaptation Funding Sources

Adaptation projects in Liberec primarily rely on the national environmental programme and regional grant funds. However, the most significant barrier to executing these projects is not the cost but the administrative burden associated with eligibility criteria and other bureaucratic processes. Additionally, there is a widespread lack of knowledge about potential funding sources and a general confusion between mitigation and adaptation, further complicating efforts to secure necessary funds.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

There is a notable deficiency in knowledge and human resources required to identify and pursue innovative financing mechanisms for climate adaptation in Liberec. This lack of capacity is linked to the municipality's priorities, which do not currently favor adaptation initiatives. To address this, comprehensive training and capacity-building efforts are needed to develop the competencies required to manage adaptation funds effectively

Jihlava (Strategist)

Establishing Climate Change Risks as a Matter of Concern

In Jihlava, climate change is given high priority, with a strategy approved by the council. Despite this commitment, the municipality faces financial constraints and slow administrative processes that complicate the implementation of adaptation measures, reflecting an aversion to innovation and discontinuous funding. Both a national adaptation plan and a local adaptation plan are in place, guiding the city's efforts.

Establishing Adaptation Funding Needs, Costs, and Benefits

The Public Authority (PA) in Jihlava has not systematically assessed the funding needs for adaptation projects, resulting in an inability to make an economic case for these initiatives. There are difficulties in assessing operational costs, and no dedicated funds are available for feasibility studies, highlighting a lack of capacity and staff constraints.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

Jihlava has an ecological fund, which is under political pressure, placing a disproportionate burden on it. The city also has an investment plan for the next 10 years. However, integrating adaptation measures into all projects remains challenging.

Identifying and Accessing Adaptation Funding Sources

A dedicated department in Jihlava is responsible for searching for subsidies. Despite this, there is a limited overview of funding possibilities due to chronic underfunding and limited knowledge about sources. Politicians

and the mayor have been involved in creating partnerships with businesses for infrastructure projects. Most of the funding for climate adaptation comes from EU programs.

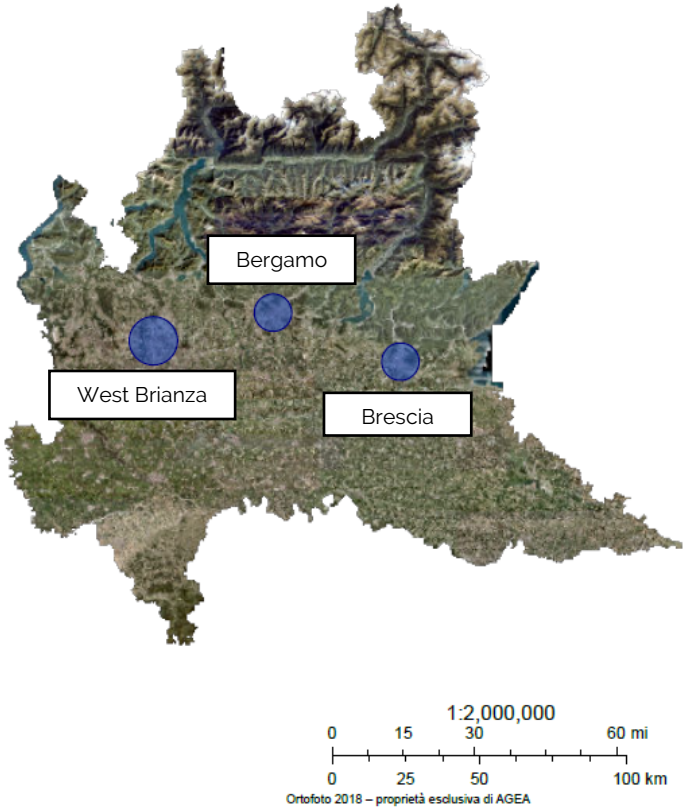
Having or Building Capacity to Research, Use, and Administer Adaptation Funds

According to respondents, the main issue in Jihlava is not in finding funds but in the capacity to administer them effectively. This includes the ability to manage the implementation of projects, indicating a need for enhanced administrative capabilities to support adaptation efforts

4.4. Italy

4.4.1. Territory context

Table 3.4. The context of Italy

ITALY				
				
	Brescia	**Bergamo**	**West Brianza**	**Details/Reference**
Demographic features				
Surface (km²)	90	40	79	
Population	200 000	120 000	210.000	
Climate features				
Main Climate Risks	Flood, Heavy rains, droughts, heat waves (urban heat islands)			
Other climate risks	Forest fires, Landslides, Windstorms		Landslides, Windstorms	
Vulnerabilities	Infrastructure in flooded area, Dense and old population (heat waves), Lack of Urban Greenery and permeable surfaces			

Adaptation Landscape				
Adaptation strategies and plans	SECAP 2020 STC-Strategia Transizione Climatica 2021 The municipality is drafting its first PAC (Air and Climate Plan)	STC-Strategia Transizione Climatica 2021 SECAP 2024	Part of the municipalities have adopted STC 2021 Two municipalities adopted a Mitigation and Adaptation Strategy AgriCiclo 2030, in 2023 The West Brianza macro-area approved a common SECAP in 2022.	Climate Transition Strategy (STC) Brescia Climate Transition Strategy (STC) Bergamo Climate Transition Strategy West Brianza Agriciclo2030
Public Actors for adaptation	Ministero della Transizione Ecologica, Lombardy Region, Provinces, Municipalities, Regional and Local Parks			
Other Actors (NGOs, civil society, private)	Fondazione Cariplo, Legambiente Lombardia, CMCC, Politecnico di Milano, TerrAria	Fondazione Cariplo, Legambiente Lombardia, IUAV University Innova21, Ambiente Italia		
Funding and Financing				
Main Financers for adaptation plans and projects	Fondazione Cariplo, Municipalities, Ministero della Transizione Ecologica, Lombardy Region			
Type of Financing	Private grants, public funding.			
Total budget available for adaptation	6.1 million (STC)	8.5 million (STC)	3.8 million (STC 2021) 3.5 million (Agriciclo)	

Brescia: Brescia is a city with a population of approximately 200.000 inhabitants, located between two geographical regions, the pre-Alps and the Po Valley, the largest agricultural system in Europe. The city of Brescia is an urban environment characterized by the presence of impermeable surfaces, covered with concrete and asphalt, and by few natural areas ("Urbanized Areas" account for 55% of the entire territory). It is therefore an area at risk due to the increase in average and extreme temperatures, the higher frequency (and duration) of heat waves, and intense precipitation events.

The Climate Transition Strategy adopted in 2021 works towards three approaches to redesign the city: Oasis City (integrating nature into urban spaces); Sponge City (prioritizing water retention); and Cities for People (enhancing liveability). Brescia is open to experimenting with various sources of funding and financing, although their structure and expectations must be aligned with the city's human resource capabilities. A successful example is the Strategy, which was co-financed by a private foundation through a grant system.

Bergamo: Bergamo has historically been characterized as an area of high performance with a lively productive fabric, high production capacity, and low unemployment rates. With around 120,000 inhabitants, Bergamo is one of the most populated cities in the Lombardy Region, with a density of around 3.000/km^2.

The occurrence of extreme weather events in the city has a significant impact on urban floods, posing risks to infrastructures, urban mobility, and traffic safety. Heatwaves have been increasingly affecting mortality rates among vulnerable population groups. Forest fires are another phenomenon closely monitored by the municipality and Civil Protection, as the city has been classified as level 3 on a 1-5 risk scale.

The Climate Transition Strategy's vision is to contain the expansion of urbanized areas in favour of their transformation based on regeneration processes, attributing a key role to green areas and agricultural lands in counteracting the effects of climate change.

The city has experience mostly with public funding and private grants, as other options (e.g. private financing and European programmes) have proven to be more challenging.

West Brianza: The area is characterized by an extremely high degree of urbanization and industrialization, with a strong presence of extensive productive and residential areas, and a dense network of road infrastructures that have a significant impact in terms of land consumption and air quality. The natural areas, on the other hand, are characterized by a very high degree of fragmentation. The watercourses are almost entirely artificial, without natural floodplain areas for flood regulation. The population density is among the highest in the country, with peaks of about 3,100 inhabitants/km^2.

The anticipated increase in average and maximum temperatures will lead to a rise in summer energy demand to maintain thermal comfort levels. Furthermore, the likely intensification of the hydrological cycle, with an increase in the occurrence of both very rainy and very dry seasons with pronounced seasonality, and the

probable increase in the frequency and intensity of flood events, would consequently raise the risk for structures, infrastructures, and movable assets, as well as for the exposed population.

The adaptation actions in this territory are coordinated by Innova21, an association whose members are the municipalities itself: Innova21 helps gathering resources as well as knowledge and networking opportunities. Being a territory composed by small municipalities, it is crucial to act as a collective, to compete for grants and fundings with bigger cities and more resourceful administrations.

4.4.2. Investment landscape

Figure 4.7. AFFS in Italy. Source: AMBIT

The investment landscape for climate adaptation in Lombardy, Italy, reveals a complex interplay of public funding, EU support, and private sector engagement. Public funding from regional grant, and private funding from the Cariplo Foundation form the backbone of adaptation investment.

Public sources

Public funding is critical for climate adaptation projects in Lombardy, supported by both national and regional initiatives:

- **National Adaptation Funds:** Although national funding opportunities are rarely labelled specifically for adaptation, the Ministry of Environment and the PNRR (National Recovery and Resilience Plan) have launched several initiatives that support projects aimed at enhancing adaptation in the territories.
- **Regional Adaptation Plans**: Lombardy has developed a regional strategy to address local climate risks and local policies, allocating regional budgets for resilience projects.
- **Municipal Projects**: Cities like Brescia and Bergamo undertake significant local adaptation measures, often co-financed by regional and national funds.
- **State-Owned Enterprises and Utilities**: Entities like the publicly-owned water utilities in West Brianza and Brescia play a key role in implementing adaptation projects, focusing on sustainable water management and infrastructure resilience.

The **EU** significantly supports Lombardy's adaptation efforts through various funding mechanisms:

- **European Structural and Investment Funds (ESIF)**: Major source of funding for regional development and resilience projects.
- **Horizon Europe and LIFE Program**: Financing research, innovation, and pilot projects on climate adaptation.
- **NextGenerationEU**: Post-pandemic recovery funds directed towards green and resilient infrastructure improvements.

Private sources

While the private sector's focus has traditionally been on mitigation, there are notable developments in adaptation finance:

- **Foundations and NGOs**: Entities like the Cariplo Foundation provide grants and technical assistance for local climate initiatives. The Cariplo Foundation funded 11,5 million euros in 2023 for environmental projects.
- **Green Bonds and Loans**: Issued by the public sector (e.g. Region and CDP, the National Investment Institution) and corporations to finance sustainable and resilient infrastructure, including adaptation projects.

Italian banks are progressively integrating climate considerations into their financial products:

- **Green Financial Products**: Banks such as Intesa Sanpaolo and UniCredit offer green loans and bonds, primarily focusing on energy efficiency and sustainability, with a growing interest in direct adaptation finance.
- **Insurance Companies**: Insurance companies like UnipolSai and Generali are developing products that incentivize adaptation measures, offering discounts and specialized insurance for climate risk reduction.

The **corporate sector**, including real estate and infrastructure companies, is beginning to incorporate climate adaptation into their business models. There are **real Estate Developers** involved in urban regeneration and sustainable development projects that integrate climate adaptation strategies. Projects like the development of highways and the Winter Olympic Games village in Lombardy incorporate climate resilience and sustainability standards.

Conclusion

Overall, the adaptation investment landscape in Lombardy is characterized by a particular situation, where the financial burden is shared between public regional and national funding, and private funding from the Cariplo foundation. The Cariplo foundation funding mechanisms need to be further studied, as it constitutes the only consequent private financing solution found in our case studies. Yet, enhanced integration of adaptation strategies into private financing mechanisms and stronger public-private partnerships are crucial for further advancing climate resilience in the region.

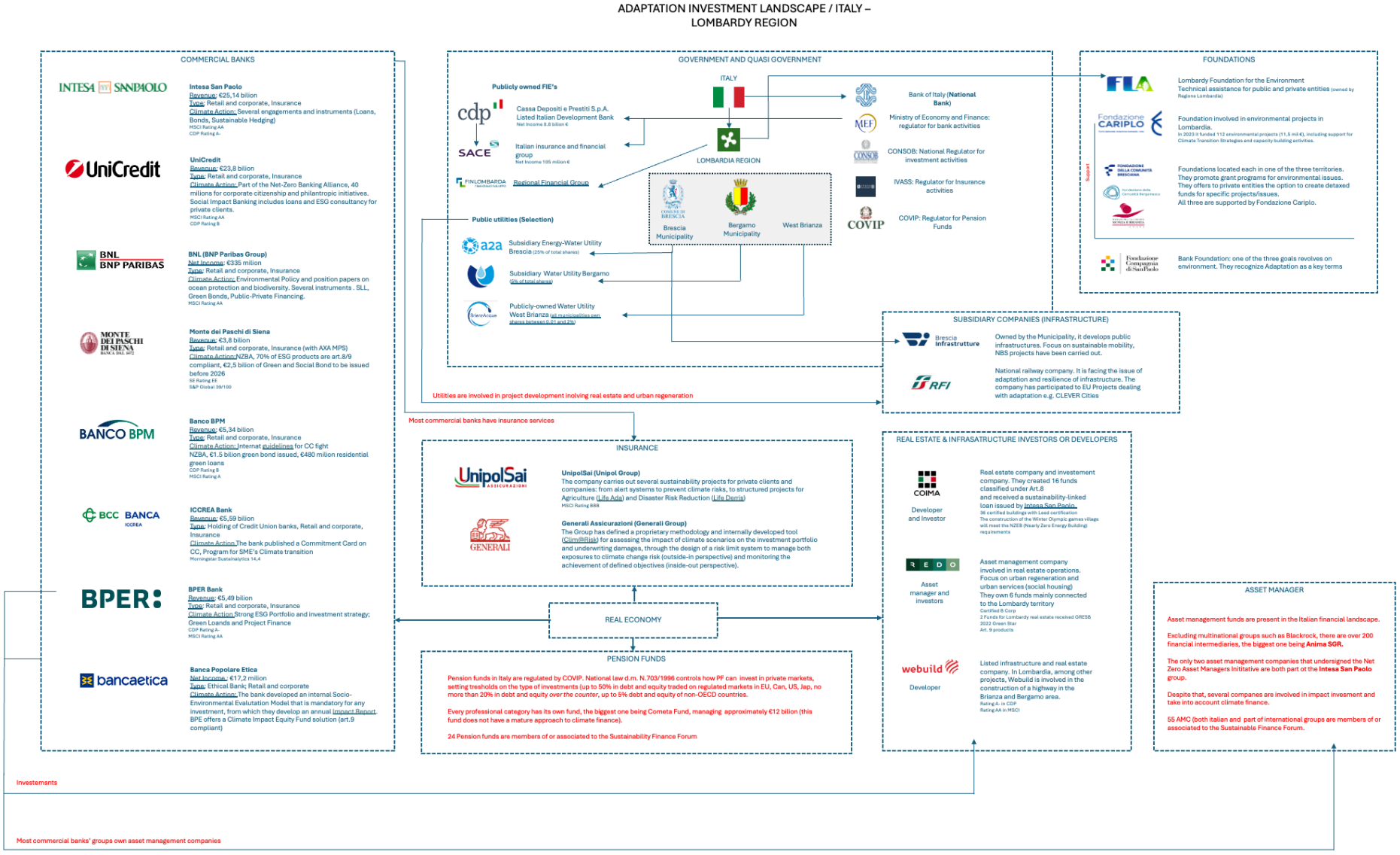


Figure 4.8. Investment landscape of Italy. Source: AMBIT

4.4.3. Interview results

Brescia (Leader)

Establishing climate change risks as a matter of concern.

Climate change has been identified as a key priority thanks to political continuity, making attention to adaptation a consistent element of the administration's political agenda. Supported by Fondazione Cariplo, the city has developed a Climate Transition Strategy that has guided the city's actions for three years, providing both financial coverage and serving as a pilot for future developments. The city is drafting an ambitious Municipal Action Plan (*Piano Aria e Clima*) for adaptation that will further address these issues.

The city's population size (200,000 inhabitants) allows for constructive exchanges with citizens, fostering citizens participation. However, some frictions persist because adaptation is still a relatively new topic both for the population and the administration. Climate adaptation actions may be perceived as a *complication* of the *status quo* and its benefits are often overshadowed by its costs. (aversion to innovation, medium priority)

A cultural effort still needs to be made to raise risk awareness and to help the public to understand the necessity of adaptation.

Establishing adaptation funding needs, costs and benefits

The city administration encounters a lack of standardized procedures and a centralized system for identifying and mapping funding needs. (siloed governance) There is not a systemic seek for adaptation funds: this activity mostly relies on sector-specific initiatives and responses to occurring proposals. The Climate Transition Strategy provided a strong framework, which will be inherited by the upcoming Municipal Action Plan (*Piano Aria e Clima),* which should provide a solid structure to address adaptation, and help mapping financial needs.

Analysis and assessments are generally externalized to either research entities, public companies or private firms

Proving the fiscal standing of the PA (adaptation funding seeker)

The city does not experience specific challenges or opportunities in allocating public budgets for climate adaptation investments or establishing stable funding sources. However, the main challenge is the improvement of planning (discontinuous funding). A systematic budget for climate adaptation could be an advantage. The city is also trying to shift its approach to public maintenance, including adaptation solutions to ordinary small-sized interventions.

Adaptation is still mostly considered as a cost (inability to make the economic case)

Identifying and accessing adaptation funding sources

Generally speaking, complex regulatory frameworks do not help local planning, burdened by a lack of internal resources. A common problem is that the administration struggles to apply for funding opportunities that require ready-to-propose project, as project designs are typically prepared only when secure funding is assured. (staff constraints and internal resources)

The Cariplo Foundation has proved to be a solid private financer, with a good understanding of the territory and the administration needs. However, other private financing possibilities are met with suspicion around their accountability.

Overall, the PA has little knowledge on innovative financing mechanisms.

Having or building capacity to research, use, and administer adaptation funds

Brescia's Public Authority has the experience, the resources and the skills to successfully research, use and administer adaptation funds, yet if faces challenge in coordinating. several sectors potentially involved in adaptation (siloed governance). This issue has been addressed by the current administration introducing a new organizational structure.

More Human resource could certainly bolster the municipality's capacity to administer funds; however, integrating new staff implies a generational shift, necessitating additional training on technical topics such as reporting.

Bergamo (Planner)

Establishing climate change risks as a matter of concern

The Municipality sees climate change as a moderately high matter of concern, although there is still room for improvement in the implementation of concrete actions.

Adaptation poses a question in terms of resource allocation, because of its long-lasting nature that can goes beyond political terms (conflict of interest). The Administration approved a Climate Transition Strategy, focused

on adaptation, although the topic is addressed in other key documents (such as the Territorial Governance Plan).

Establishing adaptation funding needs, costs and benefits

The actions of the Strategy are mostly financed by the Cariplo Foundation, together with the other partner of the project (such as Municipality of Bergamo, Legambiente Lombardia association, Local Park *"Parco dei Colli di Bergamo")* and the Lombardy Region.

Apart from the Strategy, the administration has not conducted additional assessments on the need for specific funds for adaptation (inability to make the economic case). Assessment and feasibility activities are usually outsourced.

A "European Project" office has been created to independently look for tender and grant opportunity and informs the appropriate sectors, which can then decide whether to apply.

Proving the fiscal standing of the PA (adaptation funding seeker)

The municipality does not encounter particular difficulties for obtaining non-repayable funds or for funds with minimum co-financing from the municipality. However, there is a challenge in securing long-term investments (discontinuous funding). On the other hand, financing and funding options that require cash advance are usually difficult to manage for the administration

Identifying and accessing adaptation funding sources

The administration has found that applying for funding opportunities often requires a considerable effort in gathering extensive information and preliminary documents.

Parallelly, public opportunities such as European Projects present a disparity between the amount of effort required for reporting and coordination, and the actual benefits that can be derived from participation (heavy reporting).

In contrast, Cariplo Foundation is a recurrent private financer for the Municipality, providing greater flexibility and allowing more easily for adjustments throughout the implementation of a project.

Having or building capacity to research, use, and administer adaptation funds

The Administration has the resources and the skills to research and manage funds, yet now it does not coordinate successfully. Adaptation spans across sectors, posing challenges in both identifying funding opportunities and administering funds. A new internal governance has been established to address this issue and ensure better efficiency and coordination.

West Brianza (Strategist)

Establishing climate change risks as a matter of concern

There is a high level of awareness among municipalities regarding Climate Change risks, particularly due to recurring river floodings that have caused significant damages in the past. Despite this awareness, concrete actions are not always implemented.

Due to the administrations size, at the municipal level there are no specific teams dedicated solely to adaptation efforts. This problem it tackled thanks to the presence of Agenzia InnovA21, an association that network all the municipalities in the area and support them in implementing adaptation projects.

InnovA21 focuses on proposing multifunctional interventions and simplifying access to funding, which increases acceptance among politicians. There is a noticeable disconnect between municipal and regional institutional levels, with bigger cities doing what they can while smaller municipalities strive to follow suit to the best of their abilities. Local initiatives take on a more prominent role in this context (inappropriate funding scale).

Establishing adaptation funding needs, costs and benefits

Currently, there are limited initiatives in place specifically dedicated to assessing funding needs and conducting cost-benefits assessments (inability to make the economic case).

In the area, there are discrepancies among municipalities in terms of their readiness to utilize widely publicized funding channels. While some are better prepared, having ready-made projects to apply with, others lag behind due to insufficient internal resource (lack of resources to apply).

Proving the fiscal standing of the PA (adaptation funding seeker)

The municipalities do not have public budget specifically allocated on adaptation; however, a cultural and political shift is underway, improving a rather rigid internal communication, that might have hindered the adoption of cross cutting investments in the past (siloed governance).

Identifying and accessing adaptation funding sources

Throughout the years, the municipalities of West Brianza have received multiple types of fundings (Regional, private, from subsidiary companies). The administrations do not consider adaptation funding inherently more complicated to access to than other funding: the issue lies in the lack of an established practice for actively seeking adaptation funding. The European level, however, is particularly challenging for smaller entities, as they are often not involved by other organizations, such as consultancy companies, when the consortiums are created. In general, for small municipalities is hard to enter networks, which is where InnovA21 support the territory. (inappropriate funding scale)

Fondazione Cariplo plays a crucial role, funding adaptation projects through grants and working synergically with the municipalities

Having or building the capacity to research, use, and administer adaptation funds

The staff is undersized and ordinary tasks do not allow to look for more funding opportunity (lack of capacity and staff constraints to apply to fundings). The public authority has the qualification to administer funds, thanks to the support of InnovA21

Administrating funds is not a problem per se, but the reporting can be an issue as it can take a lot of time. (reporting problem)

It is challenging to reconcile the adaptation needs with the municipality's possibilities. For example, one of the goals would be to reduce soil consumption, but having fewer revenues from urbanization fees means having fewer municipal funds available. The administrations are open to all solutions, but very often the costs are much higher than those of the "ordinary" solution.

4.4.4. Maturity assessment of Brescia

Brescia shows certain strengths for **securing adaptation financing**. Adaptation seems to be rather well integrated and mainstreamed within different sectors. **A strong local adaptation plan exists, and clear mandate and legitimacy is given to the PA on adaptation matters**. The Climate Transition Strategy allows an adequate mainstreaming of adaptation across different sectors. This mainstreaming is starting to be felt in legal frameworks, with for instance a 2022 building regulation giving guidance on desirable designs. Multiple stakeholders are interested in addressing climate change risks, with foundations such as Cariplo and Campus Edilizia playing prominent roles. The administration uses swiftly credit tools. On operation and technical capabilities, scores are unequal, but vulnerability studies and social impact assessments are well conducted by the PA, although usually outsourced. The municipality possesses a strong competency to present high quality projects, including investment plans and cash flow projections. The PA has a **strong standardized monitoring and evaluation system**

- Similarly to Alba Iulia national policies don't seem to offer much support, although on a regional scale guidance is found with regional adaptation plans.
- Adaptation needs are not well known, and building the economic case is a challenge; Cost Benefit Analyses are rarely used. The disparity between bureaucratic schedules and private financiers' timelines is identified as a significant challenge.
- There is limited knowledge about innovative financial mechanisms outside of the subsidies granted by private foundations that are long time partners.
- The PA lacks Human Resources.
- Brescia has limited capacity to build a steady income flow. Although the municipality has the authority to raise taxes, there does not seem to be the will to do so. It is a highly political decision, making it an uneasy question.

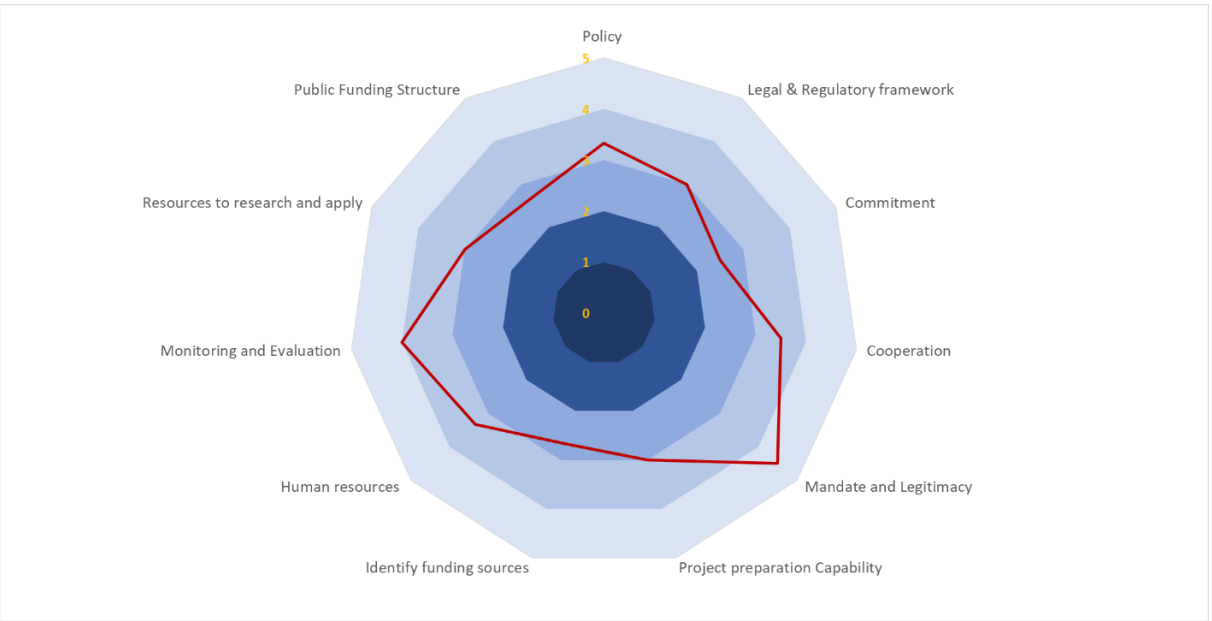


Figure 4.9. Brescia (Italy). Maturity assessment results. Source: ACTIERRA

4.5. Spain

Due to difficulties in securing the participation of Spain facilitator and stakeholders, the Spain study is not as comprehensive as other PAs. This will be addressed in future WPs.

4.5.1. Territory context

Table 3.5. The context of Spain

SPAIN				
	Diputacion Avila	Barco de Avila	Navaluenga	Details/Reference
Demographic features				
Surface (km²)	151	12.68	73.52	
Population	5242	2366	1878	
Climate features				
Main Climate Risks	Droughts, floods, Wildfires			
Other climate risks	Landslides, shrinkage and swelling of clayey?			
Vulnerabilities				
Adaptation Landscape				
Adaptation strategies and plans	No action plan			
Public Actors for adaptation				
Other Actors (NGOs, civil society, private)				
Funding and Financing				
Main Financers for adaptation plans and projects	Government, EU (others?)			
Type of Financing	Public funding, grants for specific projects			

Total budget available for adaptation	15k for projects dedicated to the topic	

Avila: The primary sector economy (agrarian, farming, and forestry) has a high importance in the province.

4.5.2. Investment landscape

Public Sources

Public sources are the primary financiers of adaptation projects in Spain, utilizing various mechanisms and instruments:

- **Grants and Concessional Loans:**
  - National and European Subsidies: Major funding comes from the European Social Fund Plus (ESF+), European Regional Development Fund (ERDF), European Agricultural Guarantee Fund (EAGF), European Agricultural Fund for Rural Development (EAFRD), European Maritime and Fisheries Fund (EMFF), LIFE Programme, Horizon Europe, and the European Investment Bank (EIB).
  - National Strategy: The Plan Nacional de Adaptación al Cambio Climático (National Climate Change Adaptation Plan) outlines strategies for adapting to climate change, including revised construction standards, territorial planning, and land use adjustments.
- **State and Municipal Financing:**
  - Ministry for Ecological Transition and the Demographic Challenge: Coordinates climate adaptation efforts and implements projects with EU funds.
  - Sovereign Green Bonds: In 2021, Spain issued its first 20-year sovereign green bond to finance projects related to climate change mitigation and adaptation, sustainable water use, circular economy transition, pollution prevention, and biodiversity protection.

Private Sources

The private sector in Spain supports climate adaptation through various financial products and services:

- **Commercial and Investment Banks:** Santander, BBVA, CaixaBank, Banco Sabadell, Bankinter, Kutxabank, Unicaja Banco, Ibercaja Banco, and others: These banks offer financial products like green bonds, sustainability strategies, ESG reporting, and loans for climate-related projects. Many are part of the Net-Zero Banking Alliance, committing to reduce greenhouse gas emissions.
- **Pension Funds and Pension Savings:**
  - Pension funds linked to the employment system focus on providing retirement benefits while increasingly adopting sustainable finance practices.
  - Inverco: Represents pension funds in Spain, promoting responsible investment and best practices.
- **Insurance Companies:** Major providers such as VidaCaixa, Mapfre, Mutua Madrileña, Catalana Occidente, and Allianz offer green products and integrate sustainability into their operations.
- **Foundations and Philanthropic Organizations:** Fundación Biodiversidad, Fundación Renovables, Fundación La Caixa: Support environmental projects through grants and funding, focusing on biodiversity, sustainable development, and social welfare.
- **Real Estate and Infrastructure Investors or Developers:** Companies like Merlin Properties, Metrovacesa, Neinor Homes, Acciona, Sacyr, and Aedas Homes engage in sustainable real estate development and infrastructure projects, emphasizing energy efficiency and carbon footprint reduction.
- **NGOs:** Organizations such as Ecologistas en Acción, SEO/BirdLife, and ECODES advocate for sustainability and environmental protection through conservation projects and public engagement.

Conclusion

Spain's adaptation investment landscape involves significant public sector funding from national and European programs, complemented by growing private sector engagement.

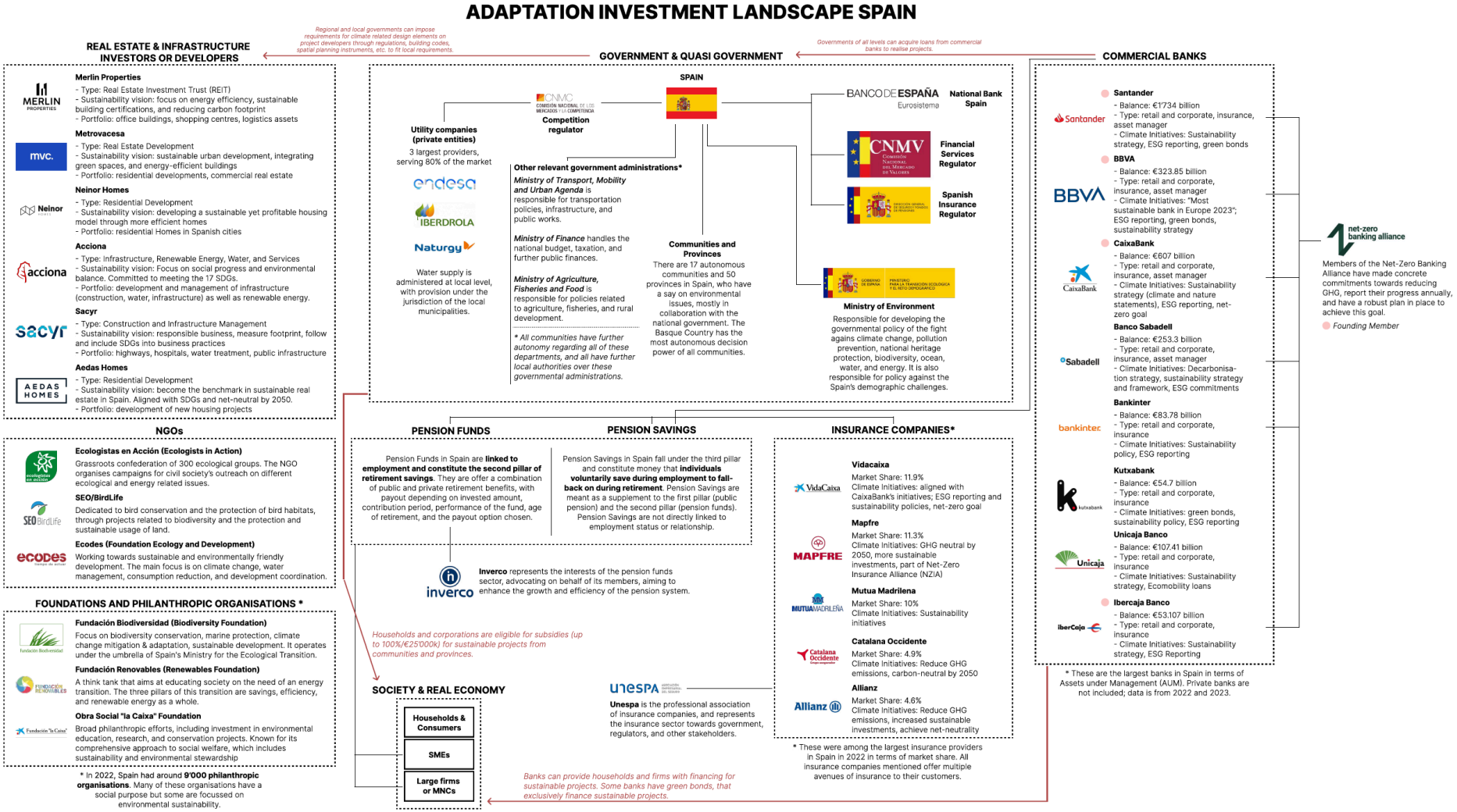


Figure 4.10. Investment landscape of Spain. Source: Copenhagen Business School

4.5.3. Interview results

Diputacion Avila (Planner)

Establishing Climate Change Risks as a Matter of Concern

In Diputación de Ávila, the increasing number of extreme weather events has raised awareness and concern regarding climate adaptation. Although a provincial risk assessment plan exists, respondents believe that water-related risks have not been examined seriously enough. Additionally, adaptation is not a well-defined concept within the PA administration, and there is no national strategy or clear plan for adaptation in place.

Establishing Adaptation Funding Needs, Costs, and Benefits

The Public Authority (PA) in Diputación de Ávila struggles with a lack of human resources and time to identify and apply for existing funds. Currently, the PA does not use feasibility studies or cost-benefit analysis (CBA) to evaluate adaptation needs and funding requirements. This absence of analytical tools hinders effective planning and the justification of adaptation projects.

Identifying and Accessing Adaptation Funding Sources

Efforts to apply for national public funds have been unsuccessful, indicating a lack of experience in managing public funds within the PA. Furthermore, other potential solutions and innovative funding mechanisms have not been explored. This lack of experience and exploration significantly limits the PA's ability to secure necessary funding for adaptation initiatives.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

There is a significant shortage of qualifications and capacity within the PA to effectively administer adaptation funds. This includes insufficient knowledge, skills, and human resources necessary for researching, applying for, and managing adaptation funding. Addressing these capacity gaps is crucial for enhancing the PA's ability to finance and implement climate adaptation projects.

Barco de Avila (Strategist)

Establishing Climate Change Risks as a Matter of Concern

In Barco de Ávila, climate change is recognized as a primary concern. However, there is a significant gap between the perceived level of priority, awareness, and the means allocated to address the issue. The municipality does not have an employee solely focused on climate change, and even less on adaptation. Raising awareness about the importance of existing risks, such as floods and extreme rains, remains a challenge despite their clear consequences. Currently, an analysis is ongoing to develop an adaptation plan for the municipality.

Establishing Adaptation Funding Needs, Costs, and Benefits

The main challenge identified by the respondent is the difficulty in finding funds to improve water management, highlighting a lack of knowledge about available funding sources. The Public Authority (PA) lacks the capacity to make an economic case for adaptation projects and to conduct feasibility studies, which hampers their ability to plan and justify necessary investments.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

The municipality has only been able to secure funds through public grants, primarily from provincial fund plans, specifically for water management. This indicates a narrow focus and limited success in obtaining broader adaptation funding.

Identifying and Accessing Adaptation Funding Sources

Barco de Ávila funds its adaptation initiatives through its own resources and grants. The main challenge identified is the bureaucratic process that complicates applying for and justifying grants, reflecting a lack of capacity and staff constraints in securing funding.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

The municipality recognizes the need for a dedicated specialized staff officer to effectively research, apply for, and administer adaptation funds. The current lack of such a role hinders their ability to secure and manage necessary funding for climate adaptation projects. Enhancing staff capacity in this area is crucial for improving their adaptation efforts.

Navaluenga (Strategist)

Establishing Climate Change Risks as a Matter of Concern

In Navaluenga, the environment is a priority. The municipality has an environmental counsellor who operates independently from the mayor's office. This department handles water management, wildfire prevention, waste management, and land management. Despite these efforts, raising awareness among citizens about climate change risks remains a challenge, indicating that it is perceived as a low priority by the public.

Establishing Adaptation Funding Needs, Costs, and Benefits

The Public Authority (PA) in Navaluenga faces significant resource constraints, which limit its ability to access certain grants. This issue is compounded by a lack of knowledge about potential grants and funding sources. These challenges prevent the PA from effectively identifying and securing the necessary funds for climate adaptation projects.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

While certain grants require healthy financial standings, this has not been an issue for the PA so far. However, ensuring ongoing fiscal health is essential to maintain eligibility for future funding opportunities.

Identifying and Accessing Adaptation Funding Sources

The PA in Navaluenga relies exclusively on public funding. The heavy bureaucracy and staff constraints make it difficult to apply for these funds, reflecting a significant lack of capacity. Additionally, EU funds are challenging to access, likely due to an inappropriate funding scale and the complexity of the application process.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

Staff constraints are the main issue in Navaluenga. While the necessary qualifications are present, the limited number of staff members hinders the PA's ability to research, apply for, and administer adaptation funds effectively. Increasing staff capacity would be crucial for improving the municipality's adaptation efforts and securing necessary fundingthere.

4.6. Portugal

4.6.1. Territory context

Table 4.6. The context of Portugal

PORTUGAL				
 Porto seen from space. ©Thomas Pesquet				
Territory	**Municipality of Porto**	**Municipality of Maia**	**Municipality of Matosinhos**	**Details/Reference**
Demographic features				
Surface (km^2)	41	83	62	Pordata
Population	231 800	134 977	172 557	Statistics Portugal (INE, 2021)
Climate features				

Main Climate Risks	Heacy rainfall (flooding) High temperatures/heatwaves Landslides	Heavy rainfall (floods and flash floods), high temperatures/heat waves leading to forest fires	Coastal flooding	Maia's Municipal Climate Change Adaptation Plan Matosinhos 2030 Sustainable Energy and Climate Action Plan (SECAP)
Other climate risks	Storms/tornadoes	Strong winds, storms/tornadoes	Heavy rainfall (floods and flash floods) Heat waves Forest fires	Maia's Municipal Climate Change Adaptation Plan Matosinhos 2030 Sustainable Energy and Climate Action Plan (SECAP) Municipal Climate Change Adaptation Strategy (2016)
Vulnerabilities	Infrastructure and people in flooded areas; elderly, children and other vulnerable population to heat (e.g. chronic patients)	Infrastructure and people in flooded/burned areas; elderly, children and other vulnerable population to heat (e.g. chronic patients)	Infrastructure and people in flooded/ burned areas; elderly, children and other vulnerable population to heat (e.g. chronic patients)	Maia's Municipal Climate Change Adaptation Plan Matosinhos 2030 Sustainable Energy and Climate Action Plan (SECAP) Municipal Climate Change Adaptation Strategy (2016)
Adaptation Landscape				
Adaptation strategies and plans	• National Strategy for Climate Adaptation (ENAAC) (extended until 2025) • National Roadmap for Adaptation 2100 – Portuguese territorial Climate Change Vulnerability assessment for XXI Century • Coastal Management Action Plan (POOC) • Drought Management Plans (PGSE) • Own municipal strategy (e.g. Municipal Master Plan)			
	Municipal Climate Change Adaptation Strategy (2016) Porto's Municipal Climate Change Adaptation Plan (in development) Porto's Climate City Contract (under evaluation)	Maia's Municipal Climate Change Adaptation Plan	Matosinhos 2030 Sustainable Energy and Climate Action Plan (SECAP)	
Public Actors for adaptation	• Ministry of Environment and Energy • Ministry of Infrastructure and Housing • Ministry of Agriculture and Fisheries • General Secretariat for the Environment • General Directorate of Health • Portuguese Environment Agency (APA) • Directorate-General for Territory (D-GT) • National Innovation Agency (ANI) • Coordination and Development Commission for the Northern Region (CCDRN) • Infrastructures of Portugal (IoP) • Integrated Emergency and Security Network System of Portugal (SIRESP) • Municipal Police and PSP • Captaincy of the Ports of Douro and Leixões - Maritime Authority • Porto District Social Security Centre • Porto Metro			https://www.portugal.gov.pt/pt/gc24 https://www.sgambiente.gov.pt/ APA: https://apambiente.pt/ D-GT: https://www.dgterritorio.gov.pt/ ANI: https://www.ani.pt/ CCDRN: https://www.ccdr-n.pt/ IoP: https://www.infraestruturasdeportugal.pt/ SIRESP: https://www.siresp.pt/ Porto Metro: https://www.metrodoporto.pt/
	Águas e Energia do Porto Porto Ambiente Domus Social	Maia Ambiente Maia SMAS Maia Espaço Municipal	INDAQUA Matosinhos Habit	
Other Actors (NGOs, civil society, private)	Porto Energy Agency (AdEPorto) Association of Municipalities for the Sustainable Management of Waste in Greater Porto (LIPOR)			AdEPorto: https://www.adeporto.eu Lipor: https://www.lipor.pt/pt/ REN: https://www.ren.pt/ E-Redes: https://www.ren.pt/

	REN National Energy Grids E-Redes National DSO EDP Fire Brigades Red Cross			
Funding and Financing				
Main Financers for adaptation plans and projects	European, National, and Private (residual) Municipal	European, and National Municipal	European, and National Municipal	
Type of Financing	Mostly public budgets, Grants			
Total budget available for adaptation	9.5M	0.41M	0.37M	

The municipalities of Porto, Matosinhos, and Maia in Portugal's Northern region are dynamic urban centres with distinct socio-economic profiles. Porto, the region's hub, thrives on tourism, trade, and services, while Matosinhos, with its significant port, focuses on fishing and industry. Maia combines industrial activities with residential growth. However, these municipalities face notable vulnerabilities to climate change, including rising sea levels, increased storm intensity, and urban heat island effects, particularly impacting coastal areas like Matosinhos. Adaptation action plans across these municipalities aim to enhance climate resilience through infrastructural upgrades, sustainable urban planning, and community engagement. Objectives include improving flood defences and readiness for other climate risks, and enhancing green spaces using nature-based solutions. While budgets for these initiatives vary, often supported by EU funds or the public budget, there are gaps in comprehensive execution, particularly in integrating cross-municipal strategies and ensuring long-term funding sustainability. Addressing these gaps is crucial for fostering a coordinated and effective regional response to climate change.

4.6.2. Investment landscape

Public Sources

Public sources are the primary financiers of adaptation projects in the Porto Metropolitan Area, involving several mechanisms and instruments:

- **National and European Subsidies:**
  - Municipalities like Porto, Maia, and Matosinhos rely on national and European grants,
  - Sustainable Energy Action Plan (SEAP) and Sustainable Energy and Climate Action Plan (SECAP).
  - **National Strategy for Climate Change Adaptation (ENAAC):** Guides adaptation efforts across various sectors such as agriculture, forestry, water resources, and coastal zones.
- **Local and National Authorities:**
  - **Local Level:** Municipal authorities handle land use, spatial planning, housing, water, and environmental management, leveraging local budgets and national/EU funds.
  - **National Level:** Plans like the National Energy and Climate Plan (PNEC), Coastal Management Plans (POOC), and Drought Management Plans (PGSE) are key for funding adaptation projects.
- **Ministries and Public Utilities:**
  - **Ministry of Environment and Energy**
  - **Portuguese Environment Agency (APA):** The Environmental Fund aims to provide financial support for environmental policies aimed at achieving sustainable development objectives and national and international commitments on climate change, water resources, waste and nature conservation and biodiversity. It is is the main instrument for financing environmental policy and climate action in Portugal. It is also the intermediary organisation for various components of the Recovery and Resilience Plan for climate action.
  - **Coordination and Development Commission for the Northern Region (CCDRN)**

Private Sources

The private sector in Portugal supports climate adaptation through various products and services:

- **Commercial and Investment Banks:**
  - **Banco Português de Investimento (BPI):** Offers credit lines for energy efficiency and decarbonization projects.
  - **Crédito Agrícola, Banco Santander Totta, Novo Banco, Caixa Geral de Depósitos, Banco Comercial Português:** Provide credit lines for decarbonization, circular economy projects, and sustainable investments.

- **Specific Initiatives:**
  - **Linha BPI/BEI Eficiência Energética:** EIB credit line for energy efficiency projects.
  - **Linha de Crédito para a Descarbonização e Economia Circular:** Funding for decarbonization and circular economy projects.
  - **InnovFin Lines:** Financing for eco-innovation and environmental projects.
- **Pension Funds:** Regulated by the Insurance and Pension Funds Supervisory Authority (ASF), allowing significant investment in securities with sustainable finance practices.
- **Insurance Companies:** Major companies like Fidelidade, Ageas Seguros, Allianz Portugal, Generali, and Zurich Portugal are involved in climate initiatives and use tools like Clim@Risk for assessing climate risks.
- **Foundations: laCaixa Foundation, EDP Foundation, Foundation Calouste Gulbenkian:** Support environmental and adaptation projects with grants and funding.
- **Real Economy:**
  - Companies engage in urban regeneration and real estate projects incorporating sustainability and climate resilience.
  - **Low Carbon Label:** National certification for projects reducing emissions and sequestering carbon.
  - **Philanthropic Organizations:** NGOs like WWF Portugal and Oceano Azul Foundation provide support for adaptation projects.

Conclusion

The adaptation investment landscape in the Northern Region of Portugal, particularly in the Porto Metropolitan Area, is marked by significant public sector involvement and some private sector engagement mainly on mitigation.

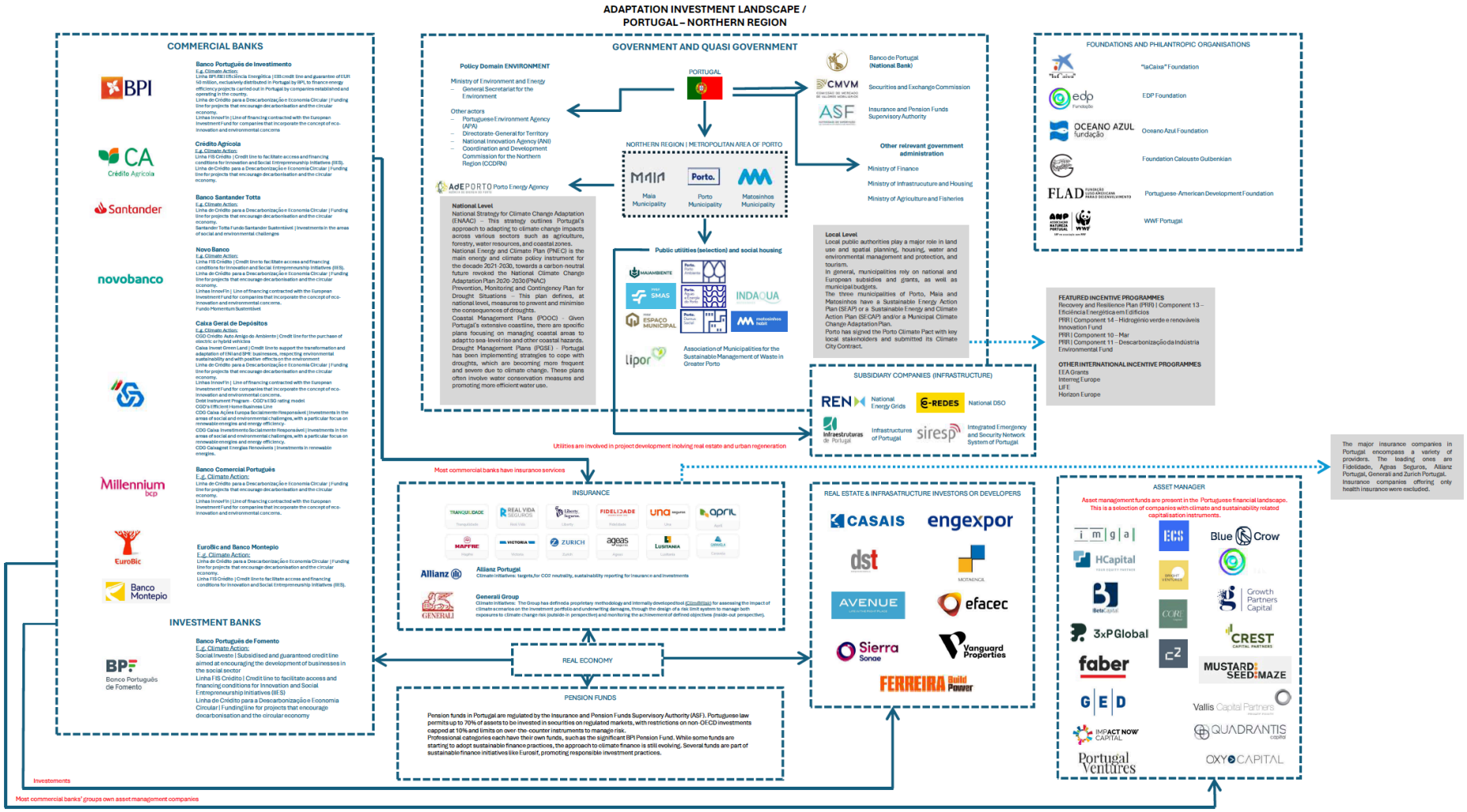


Figure 4.11. Investment landscape of Portugal. Source: AdEPorto

4.6.3. Interview results

Municipality of Porto (Planner)

Establishing Climate Change Risks as a Matter of Concern

In Porto, climate change is considered a high priority, with scores between 4 and 5 out of 5, depending on the specific department or municipal company (e.g. water, housing). Proactive measures are being taken in all sectors, reflecting a strong recognition of the importance of the issue due to its impact on economic sustainability and long-term concerns such as rising temperatures and sea level rise. Domus Social, the municipal social housing company, has a sustainability coordination unit that oversees climate adaptation efforts and works with various stakeholders to integrate sustainability objectives, but climate change is addressed at several levels of the municipal government. Porto has a dedicated environmental management division within the Department of Planning and Environmental Management responsible for climate adaptation, currently working on a Climate Action Plan that integrates mitigation and adaptation efforts

Challenges in establishing climate change risks and adaptation as critical issues include difficulties in putting climate risks on the long-term political agenda, raising awareness among residents, and efficiently managing community funds. Despite these challenges, the administration remains committed to sustainability and climate action (low priority, disproportionate burden). Climate change is rated as one of Porto's top three priorities, indicating its high importance.

Establishing Adaptation Funding Needs, Costs, and Benefits

Domus Social identifies funding needs, and potential funding sources are centralized in a specialized department of the PA. However, there are challenges in timely application of available information due to short timeframes or lack of staff allocation. The Division of Funding Sources identifies and distributes funding without conducting detailed analyses of funding needs, costs, and benefits, while specific departments prioritize measures based on specific criteria.

Challenges in identifying and mapping adaptation funding needs include a lack of detailed analysis and limited capacity to execute projects due to resource constraints, particularly in terms of human resources (HR) for project management. The authority lacks tools and support for pre-feasibility studies, cost-benefit analysis, attributing this gap to a lack of dedicated resources and expertise (inability to make the economic case). Despite potential tools available at the national or regional level, the authority may not be utilizing them due to resource limitations and a lack of expert know-how.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

There is significant competition for municipal budget allocations in Porto. Departments have a pipeline of projects waiting to be funded, and maintenance costs, often unfunded, rely heavily on municipal budgets (funding bias). This competition and bias make proving the fiscal standing of the Public Authority (PA) challenging.

Identifying and Accessing Adaptation Funding Sources

Domus Social primarily relies on public funding for adaptation, with no utilization of private financing. Challenges in accessing funding opportunities include short deadlines, notices not adapted to the country's reality, and disillusionment among staff (lack of capacity and staff constraints to apply to funding). Domus Social lacks sufficient human resources and training to effectively understand and apply to different types of available funds, particularly innovative financial mechanisms for adaptation (lack of knowledge about sources).

The main funding providers for adaptation are public, with funding primarily sourced from the municipal budget, the environmental fund from the Portuguese Environmental Agency, and EU funding mechanisms such as H2020, Horizon Europe, LIFE, and Urban Innovation Actions. Accessing adaptation funding opportunities from both governmental and non-governmental actors poses challenges despite active engagement. Competition and complexity hinder securing funding.

While the municipality has knowledge of innovative financial mechanisms through involvement in EUROCITIES network working groups and EU Missions, accessing different types of funding or financing remains challenging. Despite exploring various options, success in securing funding isn't always guaranteed, emphasizing the importance of remaining vigilant and open to new opportunities, including private investment and partnerships that have been partially disregarded as options.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

Domus Social lacks sufficient human resources dedicated to researching additional funding sources for adaptation (staff constraints). The municipality of Porto manages EU funds as the beneficiary, due to Domus Social's insufficient capacity for fund administration. Despite efforts to improve qualifications and eagerness to learn, Domus Social acknowledges the need for more training and simplification of bureaucratic processes to successfully administer funds (staff capacity to research funds).

The Public Authority acknowledges the importance of having dedicated Human Resources (HR) for researching additional funding sources for adaptation. They emphasize the need for expertise not only in eligibility criteria but also in negotiating with consortia, which requires a specific set of skills. Comparing themselves to other municipalities like Oslo or London, they recognize a lack of spearheads in Brussels where ideas are generated and developed, attributing the success of these municipalities to permanent international relations offices with technical expertise in adaptation and decarbonization.

While the Public Authority believes they have qualifications and some HR to administer funds successfully, they admit that their current HR are strained and insufficient, highlighting the need for additional resources to effectively manage extra adaptation funds (staff capacity to administer funds).

Maia Municipality (Strategist)

An interview was conducted concerning this PA, but we were asked to not share the results.

Matosinhos Municipality (Strategist)

Establishing *Establishing Climate Change Risks as a Matter of Concern*

In Matosinhos, climate change is considered a high priority, rated 4 out of 5 by the administration. This rating reflects a strong recognition of its significance due to impacts on economic sustainability and long-term concerns such as rising temperatures and sea-level rise. The administration has a dedicated climate unit within the Environmental Monitoring Division responsible for addressing climate change adaptation, with clearly defined roles. However, the responsibility for climate adaptation spans across all municipal services, emphasizing the cross-cutting nature of climate issues and the need for integrated governance (siloed governance).

While efforts to address climate change risks and adaptation have increased within the administration, challenges persist in coordinating these efforts across various departments. Limited engagement with national policymakers on climate adaptation has been reported, with criticism regarding the disconnect between municipal planning efforts and national policies. Despite having long-term climate adaptation plans at both national and regional levels, concerns remain about their effectiveness, particularly in addressing issues such as reforestation and land management in the face of climate change impacts. However, engagements with national policymakers on climate adaptation are evident, with local strategies aligning with the National Strategy for Adaptation to Climate Change, indicating a coordinated approach at both national and local levels.

Establishing Adaptation Funding Needs, Costs, and Benefits

Challenges in assessing funding needs and costs arise due to the lack of concrete appropriation of services for specific actions and insufficient political commitment to invest in climate initiatives (lack of champions, inability to make an economic case). The primary challenge in identifying and mapping adaptation funding needs is the absence of an integrated diagnostic (siloed governance). The authority lacks tools and support for pre-feasibility studies, cost-benefit analysis, and environmental and social impact assessments, highlighting the importance of a solid diagnosis for effective decision-making (inability to make the economic case).

The Public Authority has initiated steps toward assessing adaptation funding needs through its Municipal Climate Change Adaptation Plan, although a comprehensive plan is not yet in place. Funding measures are forecasted within the plan, with references to potential funding sources. Challenges remain in identifying and mapping adaptation funding needs, as well as in conducting cost-benefit analyses. The authority is currently reliant on its Municipal Climate Change Adaptation Plan and actively monitors funding opportunities (lack of knowledge about sources). The authority utilizes its Municipal Climate Change Adaptation Plan as the primary tool for pre-feasibility studies, cost-benefit analysis, and environmental and social impact assessments, indicating a reliance on internal resources for these assessments. There is no mention of utilizing external tools at national or regional levels.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

There is considerable competition for municipal budget allocations in Matosinhos. Departments have a pipeline of projects waiting to be funded, and maintenance costs, often unfunded, rely heavily on municipal budgets (funding bias). This competition and bias make proving the fiscal standing of the Public Authority (PA) challenging.

Identifying and Accessing Adaptation Funding Sources

The funding providers for adaptation in Matosinhos are predominantly public sources. The authority does not experience significant challenges in accessing or finding adaptation funding opportunities from governmental or non-governmental actors. There are no reported difficulties in understanding and applying to different types of available funds. Private financing or public-private partnerships for financing adaptation are rare, with cautious consideration given to potential future use (suspicion about private financing).

The funding sources for adaptation identified by the Public Authority are predominantly public, with occasional access to specific lines of funding from other sources, such as grants. Challenges in accessing adaptation

funding opportunities include difficulty in staying updated on available calls and limited resources for monitoring opportunities (lack of resources to apply). Technical complexity, especially related to more specialized funding programs like Life, necessitates reliance on external expertise. While the authority primarily utilizes public financing, it engages in contractual arrangements with external entities like academia and public regional and municipal companies. However, formal public-private partnerships are not common within the Environment Division. There's an acknowledgment of the need for support in identifying suitable funding opportunities, particularly for innovative financial mechanisms.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

Small municipalities, including Matosinhos, particularly lack expertise and resources to administer adaptation projects (lack of capacity). There is an overall gap in qualifications necessary to manage climate funds at the local government level. Addressing this gap is crucial for improving the municipality's adaptation efforts and securing necessary funding.

4.7. Belgium (Flanders)

4.7.1. Territory context

Table 4.7. The context of Belgium

BELGIUM			
	Flanders	**Genk**	**Details/Reference**
Demographic features			
Surface (km²)	13 625	340	
Population	7 000 000	67 030	
Climate features			
Main Climate Risks	Floods and droughts (low groundwater levels)		2021 floods (14 July, 2021)
Other climate risks	Sea level rise, urban heat islands	Urban heat islands	Excess mortality because of heat stress in the summer of 2022
Vulnerabilities	Infrastructure in flooded areas, dense and old population during heatwaves, agriculture		
Adaptation Landscape			
Adaptation strategies and plans	• Climate Strategy 2050 • Energy and Climate Plan 2021-2023 • Blue Deal • Flemish climate adaptation plan 2030	Climate plan 2030	
Public Actors for adaptation	• Flemish Government, including various agencies. For example, Nature and Forest Agency (ANB), Energy and Climate Agency (VEKA), Flanders Environment Agency (VMM), Flanders Land Agency (VLM) • Local governements (provinces, municipalities,…..)	• Local municipal government • Department of Environment and Sustainable Development (mitigation and adapation)	
Other Actors (NGOs, civil society, private)	Natuurpunt, Bond Beter Leefmilieu		
Funding and Financing			
Main Financers for adaptation plans and projects	Flemish Government Budget, EU	Municipality, Flanders, EU	
Type of Financing	Voted Budget, grants, taxation (public funding and investments from general taxes)	Local (voted) budget, grants	

Total budget available for adaptation	There is no structural budget. This is determined annually for specific plans or projects, or for multiple years at the start of a political term.		

Flanders is the northern, Dutch speaking part of Belgium, located in Western-Europe. As a state in Belgium, the Flemish government is the highest authority responsible for climate, environment, and spatial policies on its territory. Western Europe, including Flanders, will experience an increase in mean temperature, heatwave days, droughts, and heavy or extreme rainfalls. Droughts, heatwaves, and flooding are the three main climate risks for Flanders. The effects of climate change are amplified in Flanders because of its specific context. Lying at the North Sea, it has a **maritime climate** and is overall a **low-lying region**, making it sensitive to sea level rise. Flanders is a small but **densely populated and urbanised region**, with a high share of developed land and urban sprawl, and low shares of nature or forest areas compared to other EU countries. These conditions lead to high stormwater runoff, low infiltration, and high urban heat island effects, amplifying the effects of heatwaves, droughts, and flooding. Some facts illustrate this:

- Flanders has around **6.7 million inhabitants** and a population density of almost **500 people per km²**, which is the second highest population density in the EU on a country level.[22]
- **15% of Flanders is sealed by impermeable surface**, ranking 2nd in the EU together with the Netherlands, and behind Malta. Sealed surface means that it is covered with artificial materials that does not allow water infiltration.[23]
- **12% of Flanders is covered by forests**, compared to 35%-40% for the EU on average, ranking among the lowest regions and countries in the EU.[24]
- **90% of habitats** in are in bad shape, ranking worst in the EU.[25]
- **32.4% of land in Flanders is covered** for housing, industry, recreation, services, transportation, and energy infrastructure, ranking highest in Europe.[26]

The impacts of climate change are already visible in Flanders today.

- According to the World Resources Institute, Belgium ranks 18th in the world in terms of water stress. It is one of 25 countries in the world that faces extremely high water stress each year, regularly using up almost their entire available water supply.[27]
- The 2021 floods that struck Belgium and its neighbouring countries Germany, France, and the Netherlands, ranked 2nd in the world that year in terms of damage costs.[28]
- Current climate scenarios predict an average increase of heatwave days to 11 by 2030, 19 by 2050, and 50 by 2100 compared to 2000-2018. This number increases faster in urban areas.[29]

Droughts, heatwaves, and floods have cascading effects on multiple sectors, including public health and wellbeing, agriculture, the economy, urban and transportation infrastructure, etcetera.

The Flemish Government is aware of these climate risks and published a climate adaptation plan in 2022 with three goals: reducing heat stress in residential areas to stop the increase of excess mortality; reduce droughts and risks of water scarcity; and reduce flooding both inland and through coastline protection. The plan emphasizes the implementation of green-blue infrastructure and nature-based solutions. Flanders also has a climate strategy for 2050 and an energy and climate plan for 2030, with objectives for the reduction of greenhouse gas emissions. The Flemish spatial policy plan has a goal to reduce net land take to zero by 2040. The Blue Deal and its current 2023-2024 investment plan tackle droughts and water scarcity. Climate adaptation finance today in Flanders and its municipalities is mainly short term and relies heavily on public funding through grants and subsidies. Flanders does not have an investment strategy or investment plan to achieve long-term goals of these policy initiatives. For future financing, Flanders wants to diversify sources and instruments through innovative adaptation financing and funding solutions that combine public and private capital, which we aim to develop in CLIMATEFIT.

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[22] Statistiek Vlaanderen. (2023). *Vlaanderen in cijfers 2023*. Statistiek Vlaanderen (Vlaamse Overheid). PDF
[23] Departement Omgeving. (2024). *Verharding*. Departement Omgeving (Vlaamse Overheid). Last consulted on 6 June 2024. URL
[24] Rappé, M. (2024). *Meer bomen in Europa dan 100 jaar geleden, maar niet in Vlaanderen*: hoe kan dat? VRT NWS. Last consulted on 6 June 2024. URL
[25] Grietens, E. (2020). *België bungelt achteraan Europese natuurklas*. Bond Beter Leefmilieu. Last consulted on 6 June 2024, URL
[26] Departement Omgeving. (2024). *Ruimtebeslag*. Departement Omgeving (Vlaamse Overheid). Last consulted on 6 June 2024. URL
[27] Kuzma, S., Liz Saccoccia, L., and Chertock, M. (2023). *25 Countries, Housing One-quarter of the Population, Face Extremely High Water Stress*. World Resources Institute. Last consulted on 6 June 2024. URL
[28] Nieuwsblad. (2021). *Grootste tien natuurrampen van 2021 kostten 170 miljard dollar, overstromingen in België op tweede plaats*. Nieuwsblad. Last consulted on 6 June 2024. URL
[29] Vlaamse Milieumaatschappij. (nd). *Hitte*. Vlaamse Milieumaatschappij (Vlaamse Overheid). Last consulted on 6 June 2024. URL

The **City of Genk** is a local administration situated in the center of the province of Limburg, the easternmost province of Flanders. Together with the neighbouring municipalities Hasselt, Zonhoven, and Diepenbeek, Genk forms the urban heart of Limburg. Genk distinguishes itself through a mix of diverse systems and logics, strongly influenced by its infrastructure and industrial mining history. It is a grid city, a fusion of different entities. It is no longer about defining one center and orienting the entire city towards it, but rather about connecting the many grids and setting the city in motion as a well-oiled machine. The numerous centers form the main attraction points of the city, some of (inter)national importance, mainly economically and touristically, while others focus more on the surrounding region.

In Genk's urban fabric, the individual neighbourhoods are well recognisable. They each have their own morphological logic and differ significantly from each other demographically and visually. The garden neighbourhoods and social housing areas from the 1950s to 1970s are organised and planned interventions. In contrast, the intervening landscape is characterised by ribbon development and unstructured subdivisions. Various large industrial areas stand out due to the scale of their buildings. Climate change also affects Genk.

The main challenges are increasing periods of heat and drought, as well as intense rain showers with increased flood risks. Some relevant facts that illustrate Genk's geographical and climate context include:

- Genk is on the one hand the greenest central city of Flanders, but the land use is large.[30] The land use area (compared to total area) in Genk is 60.5%, resulting in an open space area (compared to total area) of 39.5% in 2022. The high degree of impervious surfaces and extensive road infrastructure pose a challenge in breaking fragmentation.
- In the current climate, the maximum flood depth in Genk is 31.7 cm, but this can increase to 38 cm by 2050. The number of potentially dangerously flooded buildings can rise from 4.3% to 6.9% of the buildings.[31] As a result, locations that currently do not experience water problems may encounter them in the future.
- Due to extreme drought and water scarcity, competition among water users will increase.[32] Additionally, cracks and subsidence may occur in some neighbourhoods due to the drying of the clay layer.
- In Genk, 13,331 people/families live below the European poverty line, which amounts to 20.2% of the population. The number of people aged 65 and older will increase from 12,469 in 2018 to 16,761 in 2030, an increase of 34%. The old-age dependency ratio, the proportion of people over 65 years old relative to the working population, increased from 22.4 in 2000 to 31.2 in 2017.[33] This is relevant for potential assistance with evacuation and cleanup after floods.

To address these challenges, Genk endorses the vision of the Paris Climate Agreement of 2015 and strives for a climate-neutral Genk with zero net CO2 emissions by 2050. Genk has committed through the Covenant of Mayors for Climate and Energy 2030 to reduce CO2 emissions by at least 40% by 2030 and to increase the city's resilience by adapting to climate change. Sustainability and climate are essential in Genk's multi-annual policy plan 2020-2025. Approximately one-third of investments in this period go towards climate actions. The Genk Climate Plan 2030 describes the 53 climate actions, divided into climate mitigation (reducing CO2 emissions) and climate adaptation (preparing for a changing climate).

Spatial solutions are also being sought for the challenges. The master plan "ecological connections" contains 62 possible ecological connections/stepping stones for Genk. Additionally, Genk is working on the plan 'Genk Expands', which describes the future vision for housing and open/green space in Genk. The polycentric structure of the grid city is further elaborated in this. For the housing issue, the suitability of residential areas for further development is being examined, with densification potential determined by multimodal accessibility and amenities. The vision on open space is supported by various perspectives such as climate resilience, ecological value, recreational value, and cultural-historical value, linked to area-specific strategies for implementing the vision.

4.7.2. Investment landscape

[30] Statistiek Vlaanderen. (n.d.). *Ruimtebeslag*. Vlaamse Overheid. Last consulted on 17 June 2024. URL
[31] Provinciebestuur Limburg. (n.d.). *Risico- en kwetsbaarheidsanalyse i.h.k.v. het klimaatbeleid Genk*. Provincie Limburg. PDF
[32] Provinciebestuur Limburg. (n.d.). *Risico- en kwetsbaarheidsanalyse i.h.k.v. het klimaatbeleid Genk*. Provincie Limburg. PDF
[33] Provinciebestuur Limburg. (n.d.). *Risico- en kwetsbaarheidsanalyse i.h.k.v. het klimaatbeleid Genk*. Provincie Limburg. PDF

Figure 4.12. AFFS in Belgium. Source: UA

The investment landscape for climate adaptation in Belgium involves various levels of government, public and private sectors, and international partners. Private sector sources are emerging but remain limited and focused on mitigation, and climate adaptation **relies mainly on public sources**, including financial contributions from the EU and regional governments. Belgian regional and local governments impose regulations and building codes on private actors that require climate-related design elements, further integrating climate adaptation into urban planning and development.

Public sources

Public funding dominates the climate adaptation landscape in Belgium, with municipalities heavily reliant on subsidies and grants from regional authorities and the EU. For example, in Genk, 20%-25% of climate adaptation investment costs in current projects are covered by the municipal budget, with the remaining 75%-80% funded by Flemish or European subsidies and grants. The main financial mechanisms are grants and subsidies, which are currently dispersed across various Flemish administrations and agencies, lacking an integrated adaptation fund. Belgium issued green bonds in 2018 and 2022, but these have been mainly used to refinance mitigation projects like clean transportation and renewable energy. Examples of initiatives mainly financed and funded through public sources in Flanders and Genk include:

- **Sigmaplan (Flanders):** Aims to protect against flooding from the Scheldt and its tributaries while enhancing riverine nature. It consists of multiple projects at different locations throughout Flanders. This project is funded by the Flemish Government. Latest numbers of 2020 estimated the total costs at €1.5 billion. Implementation started in 2005 and is still ongoing.
- **Blue Deal (Flanders):** Addresses water scarcity and drought through over 300 projects, including spatial investments, improved regulation, research and awareness campaigns. The Blue Deal is co-financed by the Flemish Government, provinces, and local municipalities. The main part of a project is usually financed by the Flemish Government. The Blue Deal was launched in the summer of 2020, and since then €343 million have been allocated to Blue Deal investments.
- **Fluvius Green Financing:** Fluvius is a government agency responsible for electricity, gas, and sewage infrastructure. Fluvius has issued green bonds totalling €240 million. Proceed allocations are used for investments in energy efficiency, water infrastructure, and heating networks, funded through green bonds.
- **Flemish Climate Adaptation Plan and Energy and Climate Plan:** Provide strategic frameworks for climate adaptation and mitigation.
- **Genk's Local Initiatives:** Include upgrading the Stiemer Valley, implementing sustainable water measures in Waterschei, and various other projects aimed at increasing resilience and reducing CO2 emissions. The Stiemer Valley program is one of the largest in Genk about climate adaptation, it has a current budget of €8 million but will require around €30-€40 million. This is a large budget for a municipality like Genk.
- **Local Energy and Climate pact (LEKP)**: The Flemish government, together with the Flemish cities and municipalities, is committed to realising the climate transition. The Flemish government supports local administrations in achieving their LEKP objectives through subsidies and monitoring. It also provides guidance, establishes partnerships, and implements projects that facilitate energy and climate actions. The focus is on climate mitigation, but some actions contribute to adaptation (for example, planting trees). the LEKP has seen an initial investment of €75 million, and this has been

supplemented by further funding from various sources, including the European Recovery and Resilience Facility, bringing the total investments to hundreds of millions of euros.

Private sources

Commercial banks are beginning to engage more actively in climate finance, primarily through green bonds and loans for climate-related investments.

- **KBC Green Bond:** Supports energy-efficient buildings, renewable energy, and clean transportation.
- **Triodos Regenerative Money Centre:** Focuses on restoring and regenerating nature and society.
- **BNP Paribas Fortis:** Engages in tree planting initiatives linked to sustainable investment products.
- **ING Fund for Sustainable Buildings:** Supports greening public building facades.
- **Crelan Foundation:** Partners with the Royal Belgian Forestry Society for reforestation projects.
- **VDK Bank:** Invests in local greening projects like birth forests and community tree planting.

Insurance companies like Ethias are also contributing to climate adaptation through initiatives such as purchasing land for conservation and establishing impact funds for societal and environmental benefits. **NGOs, foundations, and project developers** play a crucial role in the real economy's response to climate adaptation. Examples include:

- **Revive:** A sustainable project developer focusing on real estate projects.
- **Crowdfunding in Ghent:** The city supports urban greening through a dedicated crowdfunding platform.
- **Amazon's Right Now Climate Fund:** Invests in the Brabantse Wouden National Park to protect and restore nature.
- **Natuurpunt and Google Collaboration:** Focuses on wetland restoration in the Sint-Onolfspolder nature reserve.
- **King Baudouin Foundation:** Invests in climate, environment, and biodiversity initiatives, supporting the transition to a circular economy and environmental protection.

Conclusion

While the private sector's role is expanding, especially through green bonds and sustainable investment initiatives, there is still a need for greater coordination and development of centralized funding mechanisms specifically for climate adaptation. Initiatives across various levels—from national programs to local projects in cities like Genk—demonstrate a growing commitment to building resilience and addressing climate challenges but rely mainly on public sources which are insufficient to render Flanders fully climate resilient.

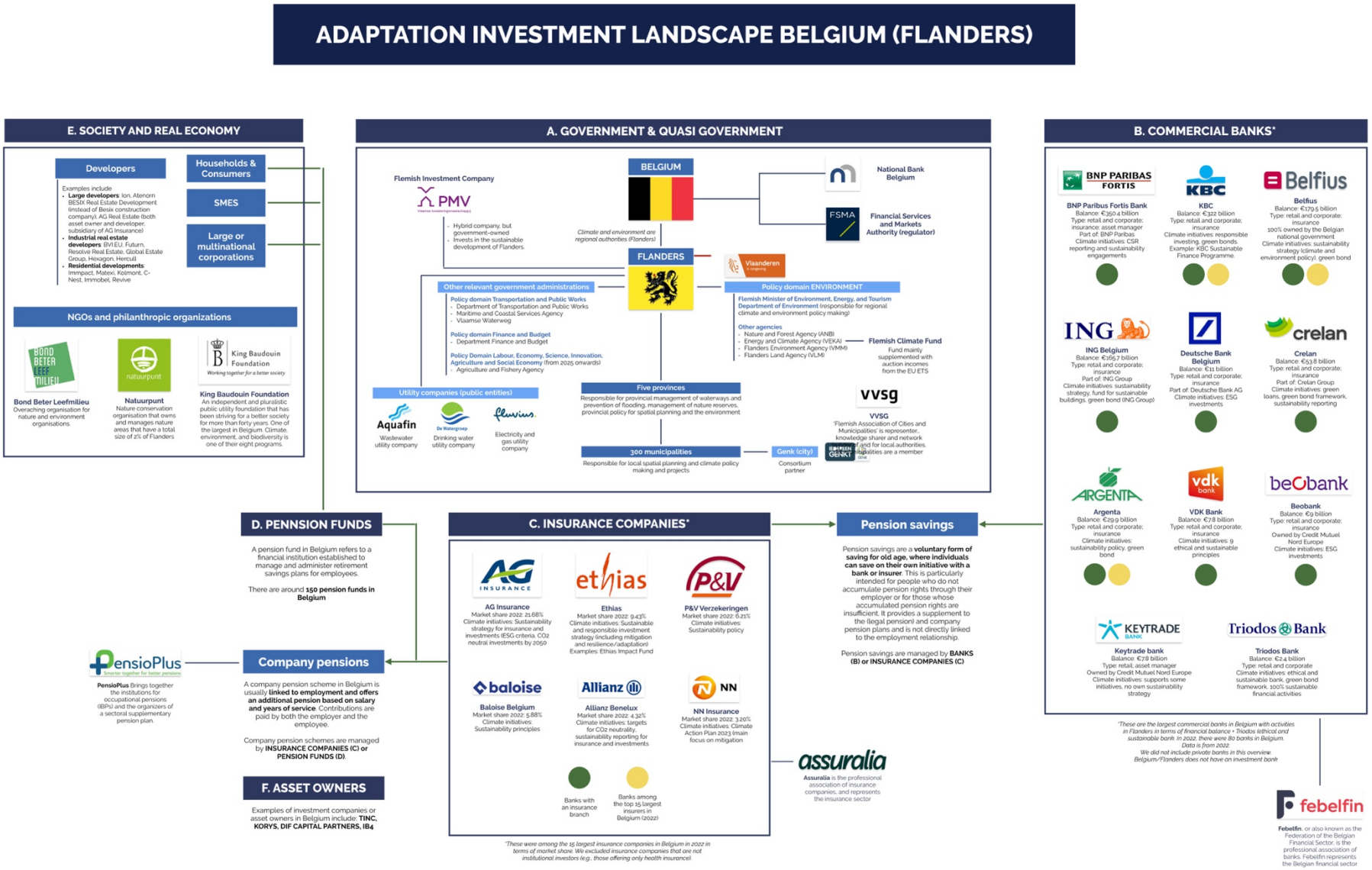

Figure 4.13. Investment landscape of Belgium. Source: UA

4.7.3. Interview results

Flanders (Leader)

Establishing climate change risks as a matter of concern. Since the increase of extreme weather events such as the 2021 floods, climate change has become a high priority for most governments, aside possibly from smaller municipalities. Most larger cities have a climate adaptation team or employee, which is less the case in smaller municipalities with fewer staff and less resources. There are currently few collaborations between local and Flemish governments about climate adaptation unless there is the opportunity for a municipality to obtain a subsidy or grant from the regional government Flanders (siloed governance). Local governments usually focus on objectives for their own municipality.

Establishing adaptation funding needs, costs and benefits. Municipalities often do not engage in feasibility studies because of the general complexity of estimating and quantifying funding needs, costs, and benefits (inability to make the economic case). A cost-benefit analysis (CBA) may be conducted, but there is a lack of direct implementation. Quantifying climate change related activities has become increasingly complex due to the high variability and uncertainty of climate change parameters. Guidance is increasingly available from Europe on how to conduct feasibility studies, and this could be exploited more instead of trying to strive for the perfect model.

Proving the fiscal standing of the PA (adaptation funding seeker). Priority is often given to what seems like the most pressing issue for the public opinion, redirecting funding to other sectors rather than climate adaptation. Also, most investment plans are short term plans (discontinuous funding).

Identifying and accessing adaptation funding sources. Climate adaptation is funded mainly with public money from taxes or via European subsidies or projects. Subsidy budgets from Flanders for municipalities are always entirely used, but the application procedure remains complex for mainly smaller municipalities (inappropriate funding scale). Applying for EU funds can be complex and requires a lot of time and staff (staff constraints). The Flemish Government has not used private financing yet for climate adaptation. Knowledge about innovative financial mechanisms is limited (lack of knowledge about sources)

Having or building capacity to research, use, and administer adaptation funds. Especially smaller municipalities lack resources and knowledge. There is an overall gap in qualifications necessary to manage climate funds at all government levels (lack of capacity to administer funds).

Genk City (Planner)

Establishing Climate Change Risks as a Matter of Concern

In Genk, climate change and climate adaptation are high priorities for the administration and policymakers, a focus that has significantly increased over the past ten years. The city has a sustainable development department that provides frameworks to other sectors but does not take on an executive role. Genk consults the Flemish climate adaptation plan to prepare its multi-year policy plans. A significant challenge in implementing climate adaptation projects is the limited personnel and resources, necessitating that projects be phased and split over different multi-year plans.

Establishing Adaptation Funding Needs, Costs, and Benefits

While the costs of individual projects are quantified, benefits are harder to quantify and are often communicated qualitatively as multiple values created by nature-based solutions. Overall, quantifying the benefits of adaptation projects remains a challenge. There is no comprehensive knowledge of the budget required to make Genk climate-resilient. The capacity to perform financial feasibility studies is limited, and while Genk is aware of some supporting tools (e.g., business model canvas), it lacks the knowledge to use these tools actively.

Proving the Fiscal Standing of the PA (Adaptation Funding Seeker)

The budget in Genk is allocated every six years, leading to harsh competition between departments for access to funds. This internal competition complicates the effective distribution of resources for climate adaptation projects.

Identifying and Accessing Adaptation Funding Sources

Public financing is the primary source for climate adaptation in Genk. While the city is aware of various funding opportunities and subsidies, applying for and managing these funds is labor-intensive due to a lack of staff. Respondents suggest establishing a centralized fund to which different agencies contribute, as opposed to relying on project-based subsidies that require individual applications each time. The current subsidy landscape is fragmented, lacking integrated funding opportunities for large investment projects. Furthermore, Genk lacks knowledge about innovative financial mechanisms.

Having or Building Capacity to Research, Use, and Administer Adaptation Funds

Interviewees emphasize the importance of a strong strategic narrative for successful funding applications and improved communication with citizens to create public awareness. There is currently a shortage of personnel resources to research additional financing sources or models. Genk is developing a green financing framework to differentiate between green and grey projects. Although the city does not yet have the qualifications to manage its own climate adaptation fund, it hopes to gain more knowledge through emerging collaborations with financial partners. Respondents stress the need for more structural financing rather than subsidy and call-based financing to accelerate and strengthen climate adaptation initiatives. They suggest that shifting towards more structural, long-term financing would enable the city to plan and invest more confidently and effectively in climate adaptation projects.

4.7.4. Maturity assessment Flanders

Flanders is the first territory who tested the MASC, through an incomplete version of the tool. They provided feedback on how to improve the self-assessment for the 3 other lead cases. The test was conducted with a limited number of colleagues, at short notice, and the draft version left a lot of room for subjectivity and interpretation. As such, the results must be taken into account with caution.

Flanders has a rather solid policy framework, with an **extensive regional adaptation plan**. However, on legal level, there is no specific instruments and legislations used to implement climate adaptation. PA staff is highly committed to adaptation, with a dedicated climate unit, that is very aware of national and European adaptation strategies. Different departments cooperate well on the matter, with the climate adaptation plan having been written by all the relevant departments in cooperation. The adaptation planning is holistic and cohesive. Vulnerability studies are conducted, and a number of detailed tools evaluating climate change effects are already in use. Flanders have a strong public funding structure, with a dedicated budget line for adaptation. However, the budget available is not annual, meaning it depends on political will. The ability to raise taxes and generate a **steady revenue stream** is high.

- There is no knowledge of the financing needs (adaptation finance gap), and very little knowledge of how to make the economic case for adaptation. For instance, Cost Benefit Analyses are not usually conducted. The PA has limited knowledge of innovative finance mechanisms and almost no use of private funds. Although the administration has the authority to conduct PPPs, the lack of knowledge and the lack of mainstreaming of good practices (knowledge is located in very specific areas) are major barriers. Due to the lack of knowledge about the financing needs, and about potentially relevant financing mechanisms, there is no available pipeline of fundable projects available. Budget needs are decided by the available government budgets. The existing Monitoring and Evaluation frameworks for adaptation are very singular and not generalized (for instance the degree of hardening, area of forest). A more systematic framework and methodology is desirable to evaluate the mainstreaming of adaptation in practices.

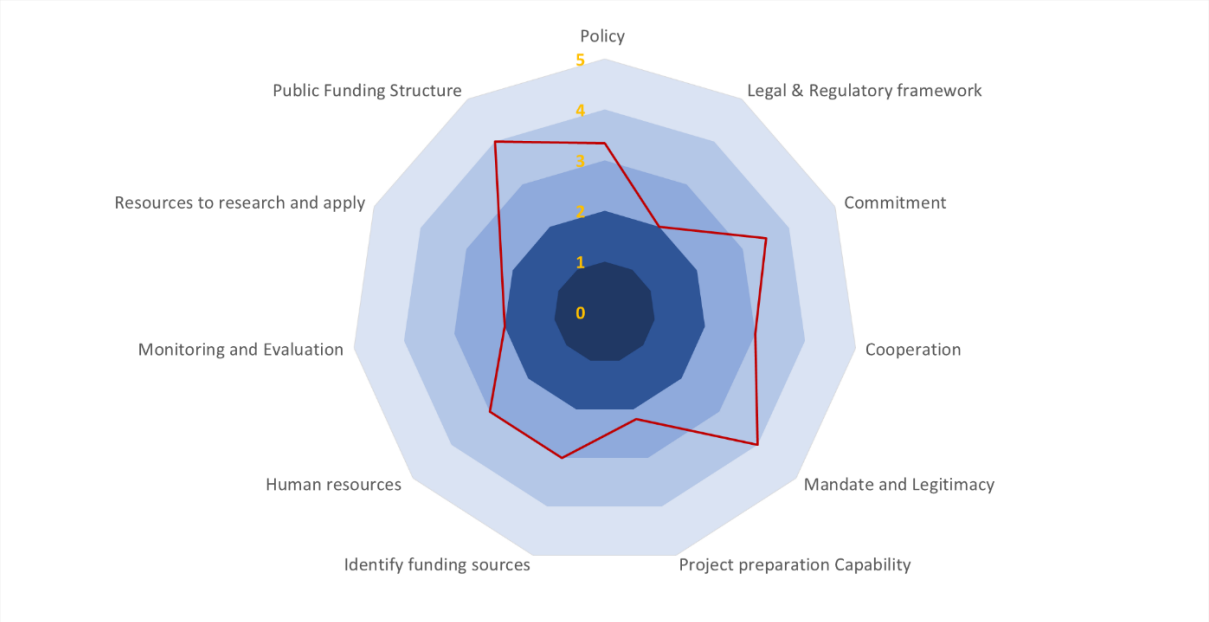

Figure 4.14. Flanders (Belgium). Maturity assessment results. Source: ACTIERRA

4.8. France

4.8.1. Territory context

Table 3.8. The context of France

FRANCE		
		
34		
35		
Territory	Strasbourg Eurometropolis	
Demographic features		
Surface (km^2)	340	
Population	510k	33 municipalities including Strasbourg city with 270K inh
Climate features		
Main Climate Risks	Floods, Landslides, heatwaves	Floods, Landslides: In late July and early September 2008, intense rainfall in the Strasbourg Urban Community, which typically receives 600-800 mm annually, led to severe flooding, with the northwest receiving 60-80 mm in 4-5 hours, prompting 9 communes to request disaster classification.
Other climate risks	Invasive species, shrinkage and swelling of clayey	Other climate risks
Vulnerabilities	Infrastructure in flooded areas, Old and dense population, agricultural land (30% of EMS surface)	Vulnerabilities
Adaptation Landscape		
Adaptation strategies and plans	• National Adaptation Plan (PNACC) • Regional strategy (SRADDET) + Adaptation Actions plan[36] • Local Climate Strategy (SECAPCAET)	

[34] Map : ©Wikimedia commons
[35] Map : ©Eurometropolis of Strasbourg

[36] URL

	• Water management strategy (GEMAPI)	
Public Actors for adaptation	Territorial State: • Agencies: ADEME, ANCT, CEREMA, ANAH, ANRU, Water Agency, ANSES, OFB, ONF • Department: Prefecture, DDT • Region: Prefecture, DAAF, DRAC, DREAL, ABS, DEAL, CRPF Local Authorities: Metropolis (EPCI), Municipalities (33); territorial Agents (7000), Elected Officials	
Other Actors (NGOs, civil society, private)	Civil Society: • Citizen/Militant Collectives: Pacte de la transition • Unions • Development Council NGOs Knowledge: • Think Tank: I4CE • Resource Centers: GRACC, CEREMA • Universities/Research Laboratories: ZAEU, ENGEES, Météo-France Engineering Agencies: • Consular Chambers (agriculture, commerce, crafts), Urban Planning Agency (ADEUS), Tourism Office, Eurometropolis of Strasbourg Climate Agency • Economic Actors	
Main Financers for adaptation plans and projects	Agence Eau Rhin-Meuse (water agency), Grand-Est Region, ADEME, DREAL, Agence Régionale de Santé (for the PACTE Urba), Port Autonome de Strasbourg	
Type of Financing	Grants	
Total budget available for adaptation	13M (2024-2025)	

Strasbourg Eurometropolis has more than 510,000 inhabitants who live in 33 cities. Strasbourg is an economic focal point in Alsace, the Grand Est region and with the borderer regions in Germany. The poverty rate is around 20% in 2019, which is slightly higher than the French average. 18 districts of the metropolis are targeted as priorities for public policies because of the higher socioeconomic difficulties of their inhabitants. These individuals are more likely to suffer from climate change.

The Eurometropolis of Strasbourg's adaptation strategy, updated and strengthened in 2024, focuses on mitigating the impacts of global warming, particularly intense heat episodes and flooding. The strategy includes measures to reduce vulnerability to floods and mudslides, relying heavily on nature-based solutions for both public and private spaces. This involves supporting co-ownerships in removing impermeable surfaces, planting trees, promoting rainwater infiltration, and implementing zero net artificial development. The city aims to make public and private spaces cooler and more permeable, with a strong emphasis on the Canopy Plan, which targets planting 1,000 trees annually and increasing the canopy index from 26% to 30% by 2050.

To implement these actions, the city and the Eurometropolis of Strasbourg has dedicated an investment budget of around €13 million for the next two years. This budget is allocated to concrete climate adaptation initiatives such as greening the city, improving water management and demineralization. These efforts are carried out collaboratively by the local authority, the Climate Agency, and local stakeholders, ensuring a coordinated approach to enhancing the region's resilience to climate change.

Looking ahead, Strasbourg applied to receive technical support from CEREMA from mid-2024 to 2026 to organize co-construction workshops and engage stakeholders in climate adaptation challenges. Participation in the European CLIMATEFIT project until 2026 will support the development of an investment plan for adaptation projects and establishing a Local Resilience Taskforce (LRT). These efforts will contribute to a comprehensive, long-term adaptation strategy that addresses a +4°C trajectory and ensures sustainable, resilient development.

4.8.2. Investment landscape

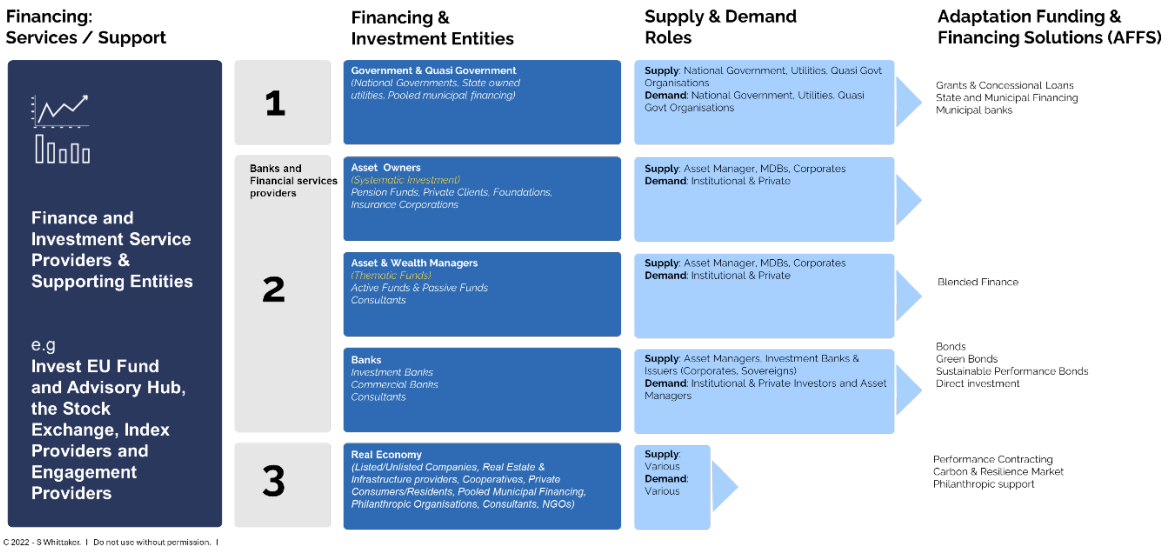

Figure 4.15. AFFS in France. Source: ACS

The investment landscape for climate adaptation in Strasbourg, France, involves mainly public funding, with a light private sector involvement, and a growing number of financial instruments aimed at supporting climate resilience and adaptation projects.

Public Funding Sources

Public sources are the primary financiers of adaptation projects in Strasbourg, involving several mechanisms and instruments:

- **Grants and Concessional Loans:**
  - **State and Municipal Financing:** Public aid accessible through dedicated subsidies for territorial communities for energy renovation projects. Key programs include DSIL (Dotation de Soutien à l'Investissement Local) and DETR (Dotation d'Équipement des Territoires Ruraux).
  - **Fonds Vert:** Established in 2023 to support local authorities in financing ecological transitions, focusing on flood prevention, forest and vegetation fire risk prevention, coastal adaptation, and urban renaturation.
- **State Investment Bank Green Investment: Banque des Territoires:** Offers concessional loans targeting climate adaptation in priority areas such as coastal regions, overseas territories, and mountainous areas. They are developing a dedicated offer for adaptation projects in vulnerable areas/municipal areas
- **Climate Resilience Bonds / Municipal Bonds:** Various bonds are issued to fund adaptation projects, including those focused on climate resilience and infrastructure improvements.
- **Enhanced Sovereign & Sovereign Bonds (F&C):** Bonds issued by the state to support large-scale adaptation projects.
- **Subsidies:** Significant public subsidies are available for climate adaptation, particularly through national programs and EU funding mechanisms.

Private sector

- **Banks and Financial Service Providers.** The financial sector plays an active role in supporting climate adaptation through various products and services:
  - **Blended Finance: Bocage d'Avenir Fund:** An association gathering funds from local businesses to support farmers in planting hedges.
- **Bonds: Climate Bonds:** For financing low-carbon economy projects. For example, Crédit Agricole and BNP Paribas have been involved in issuing such bonds.
- **Direct Investment:**
- Public Financial institutions like the Caisse des Dépôts invest in ecological and biodiversity-related projects.
- **Thematic Specialist Funds:** Example: **MAIF Fund for Life** directs ecological dividends from insurance towards sustainable projects.
- **Pension Funds:** Engage in long-term investments that include climate resilience projects. In Strasbourg, these funds might support infrastructure projects that enhance the city's resilience to climate impacts.

- **Insurance Companies:** Provide specialized products and grants to support climate adaptation projects. For instance,AXA offer green insurance products and grants for sustainable initiatives. **Foundations:**
    - **MAIF Fund for Life:** Allocates funds to projects that enhance biodiversity and resilience against climate change.
    - **Crédit Mutuel Foundation:** Invests in projects with significant environmental and societal impacts, potentially including adaptation projects in Strasbourg
- **Municipal Banks: Agence France Locale:** Provides medium to long-term loans for local authority projects, including those related to ecological transition.
- **Real Economy.** The real economy, including companies, cooperatives, and NGOs, contributes to adaptation through various initiatives:
    - **Philanthropic support: Nature 2050 Fund:** created by CDC Biodiversité, a private non-financial company, is financing nature-based solutions through donations from private companies.
    - **Implementation and Advocacy:** NGOs as Reclaim Finance, Réseau Action Climat and France Nature Environnement are involved in implementing adaptation projects and in lobbying for investment in adaptation projects.
    - **Carbon & Resilience Market: Low Carbon Label:** France's national certification for projects aimed at reducing emissions and sequestering carbon. At local level a dedicated one-stop-shop has been created to facilitate carbon sequestration project financing using this national carbon certification scheme

Specific Initiatives in Strasbourg

Strasbourg, part of the Grand Est region, benefits from various regional and national adaptation initiatives:

- **Regional Projects:** Investment of €114.6 million in 2023 for transition projects in the Grand Est.
- **Rhin-Meuse Water Agency:** Budget of 1 billion euros (2019-2024) with 40% dedicated to adaptation projects. In partnership with the Eurometropolis of Strasbourg, the Rhin-Meuse Water Agency is funding the Water and Climate Territorial Contract (cost: €30 million for 2021-2023) and the Payments for Environmental Services (total cost: €2 million for 2023-2027).

Carbon office: The Carbon Office, built by the Climate Agency in cooperation with the Eurometropole de Strasbourg, is a financing tool open to any entity wishing to support local carbon sequestration and greenhouse gas emission reduction projects, in order to offset residual emissions linked to its activities. This scheme uses the mechanism of voluntary carbon credits and more specifically the national certification standard: the Label Bas-carbone, to certify the volume of reduced or avoided emissions.

EIB loan: A €95 million loan to the city to improve the school offer, with the renovation of more than twenty schools and the creation of two new school groups. Investments with a strong energy performance component and adaptation to climate change. Support for the energy renovation of the 1,700 public buildings in the Strasbourg Eurometropole through the ELENA programme, dedicated to local energy efficiency projects including adaptation solutions. Projects will be implemented between 2023-2028.

The territorial pact for recovery and ecological transition (TPRET) provides a cross-sectional overview of the metropolis's development strategy, projects and associated contractual arrangements among public financers, while making it easier to identify existing sources of funding reference framework for the partnership-based implementation of public policies of shared interest, the PTRTE is both a financial engineering and a unique coordination tool, shared with all the partners. The project observatory brings together all local authority projects and their sources of funding Europe, State, Region, CEA and some private partners.

- The 2021-2026 projects identified at the end of 2023 represent €2.05m. via more than 50 agreements.
- 395 Eurometropole projects have been identified, representing 1.132m of investment,
- 213 City of Strasbourg projects representing €505m of investment
- 453 municipalities projects representing €411m of investment.

The adaptation investment landscape in Strasbourg is characterized by strong public sector involvement, with significant funding from EU and national programs. The private sector, including banks and asset owners, is increasingly engaged through various financial products like, blended finance, and thematic funds, still mainly oriented towards mitigation. There is also a growing involvement of NGOs and philanthropic organizations in supporting climate adaptation projects, reflecting a broad and collaborative approach to building resilience in Strasbourg and the wider region.

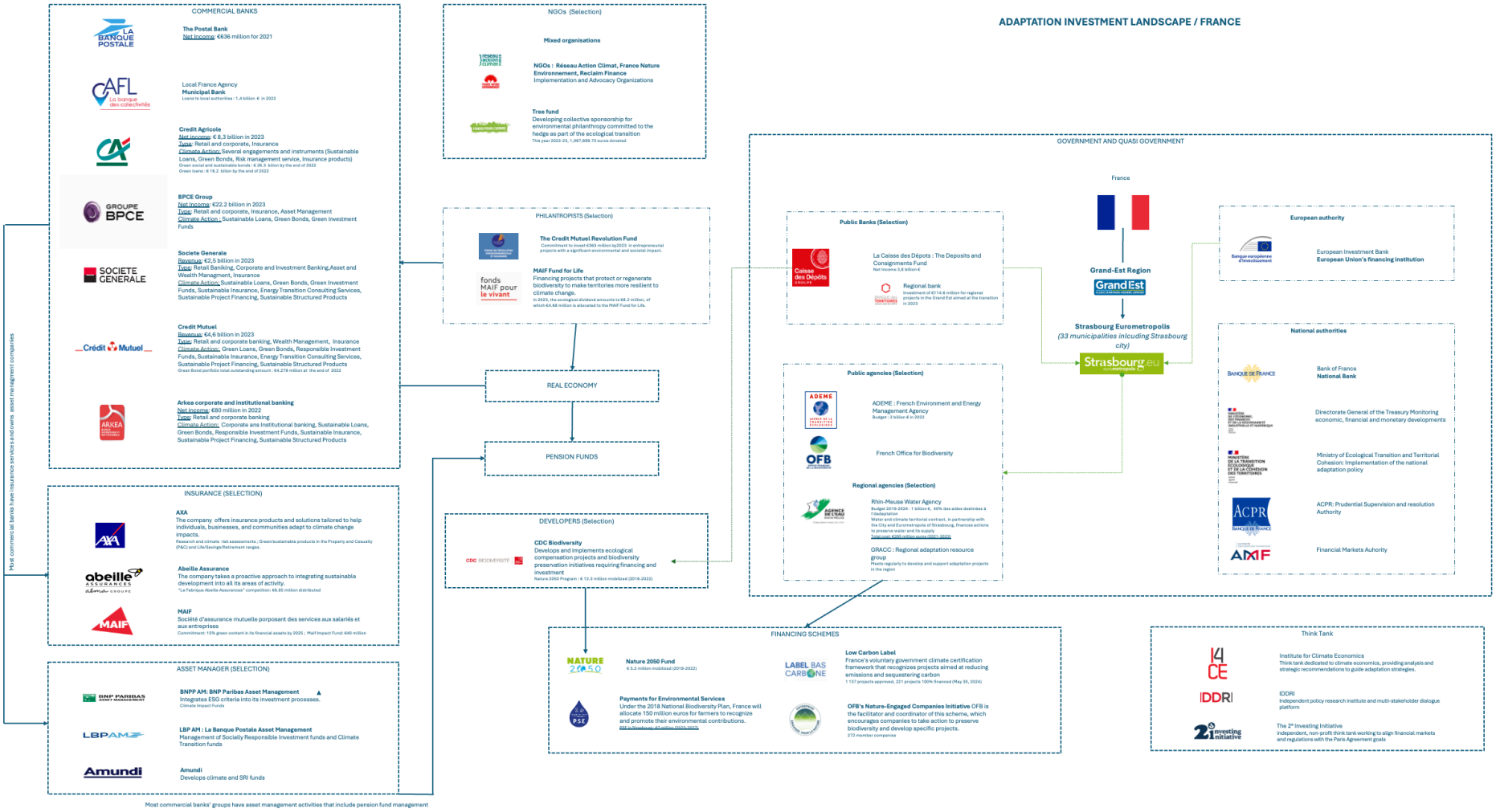

Figure 4.16. Investment landscape of France. Source: ACS

4.8.3. Interview results

Strasbourg (Leader)

Establishing climate change risks as a matter of concern

Adaptation is a key priority for the Eurometropolis of Strasbourg. A strong commitment has been made in 2023 to have a specific focus on adaptation to climate change in the SECAP, taking greater account of theses stakes and thus increasing planned future investments.

In line with national and regional adaptation strategies, the Strasbourg Eurometropolis strategy is addressed through cross-cutting policies (innovation, planning, greening) and thematic departments. The latter are actively studying the risks of flooding and urban heat islands, with an emphasis on explaining adaptation concepts and adopting specific adaptation plans. Indeed, this is a specific issue that needs to be explained in certain departments and to certain elected representatives of the Eurometropolis of Strasbourg **(lack of knowledge).** Risk mapping, vulnerability assessments and detailed analyses are therefore an integral part of the climate plan and must precede any adaptation process.

Establishing adaptation funding needs, costs and benefits

Adaptation costs are currently being estimated, with the emphasis on improving methods for identifying adaptation funding requirements.

The Strasbourg's Eurometropole Multi-Year Investment Plan was reviewed using the I4CE method to estimate the allocation toward climate actions (30% of the MYIP – € 320.3M in 2024). It estimated that Adaptation actions represent 8% of climate investments and are increasing (1M€ in 2020, 7M€ in 2027).

Financial analysis and technical assessment are needed to determine the full financing needs, costs and benefits of adaptation measures. The Strasbourg Eurometropole lacks a detailed understanding of the financing requirements for adaptation **(inability to make an economic case)** and has difficulty in generating a regular source of funding **(discontinuous funding).**

Regarding pre-feasibility studies for adaptation projects, Strasbourg Eurometropole has commissioned impact studies. The public authority does not currently use benchmarking tools such as the Swiss Resilience Compass but will use Cerema tools as part of an upcoming 18-month partnership on the +4˚ trajectory.

Identifying and accessing adaptation funding sources

The Strasbourg Eurometropole primarily relies on public funding for adaptation, with significant contributions from the State, Water Agency, and the Region (Climaxion / FEDER). The local authority has a positive image in the marketplace, enjoy competition advantages, and generally borrow at below-market rates. Most financing solutions, including understanding and applying to different types of available funds, are identified and not seen as major challenges.

However, smaller communities face more difficulties, and lenders assess the ability to implement investments and manage crises. There is a lack of knowledge about funding opportunities from other actors, although there is some collaboration with sponsors, which is becoming increasingly important. Accessing governmental funds is challenging for small municipalities due to a lack of engineering support.

Innovative solutions such as intracting[37] are regularly explored for specific projects in the Strasbourg Eurometropolis. There is some exploration of participatory finance, although it is not considered as a competitive source. Arkea Low Carbon Impact Loans are also mentioned as part of the knowledge on innovative financial mechanisms to finance adaptation. Finally, the Strasbourg Eurometropole, together with the Strasbourg Climate Agency, has developed a financing tool using the voluntary carbon credit mechanism and the national carbon certification scheme (Label Bas Carbone) to finance local carbon sequestration and reduction projects through private funders.

Having or building capacity to research, use, and administer adaptation funds

The human resources available to the Strasbourg Eurometropolis for research are insufficient, and technical directions have language barriers **(staff constraints to research funds).** Regarding the qualifications of public authorities, small communities find it difficult to manage and monitor funds **(lack of staff capacity to administer funds)**. Regarding human resources for administration, the goal is to have staff dedicated to adaptation and to strengthen resources.

[37] Intracting is a financing model where investments in energy efficiency and sustainability projects are financed internally within an organization. The term is derived from "internal contracting." This model involves using cost savings from reduced energy consumption or other operational efficiencies to repay the investment costs. The savings generated from the implemented projects fund further investments, creating a self-sustaining cycle of improvements.

4.8.4. Maturity assessment Strasbourg

Strasbourg has a rather **strong legal a regulatory framework.** There is a national adaptation plan, that is further specified for the regional level. However, the adaptation of certain sectors is less taken into account in the existing planning. **with a good mainstreaming of adaptation planning among sectors**. Adaptation is priority in project conception, and a robust legal framework exists. The PA staff is overall strongly committed to climate adaptation, with good cooperation between departments. There is a **local adaptation strategy, with a clear mandate and legitimacy** given to the PA. Like Brescia, Strasbourg has inequal knowledge in project preparation. The PA has the tools to conduct vulnerability studies but is limited to conduct detailed sectoral studies and communicate on them by human resources constraints. There is a regulatory framework for environmental impact studies. The Eurometropolis has also the ability to write high quality technical project documents. There is a strong monitoring and evaluation framework. Strasbourg as a better capacity to generate revenue, although it is not optimal. A standardized Monitoring and Evaluation framework exists but could be improved for adaptation indicators.

Similarly to Brescia and Flanders, Strasbourg does not usually conduct Cost Benefit Analyses. Making the economic case is a challenge. There is little knowledge about private financing solutions, and the PA relies mostly of traditional loans and subsidies. There is a lack of sufficiently numbered qualified staff, due to lack of financial resources, both to apply to funding and administer funds. Strasbourg has a good credit rating. Although the PA has the capacity to raise taxes, it remains an uneasy and political lever. The PA has good relations with the private sector and is able to conduct PPPs.

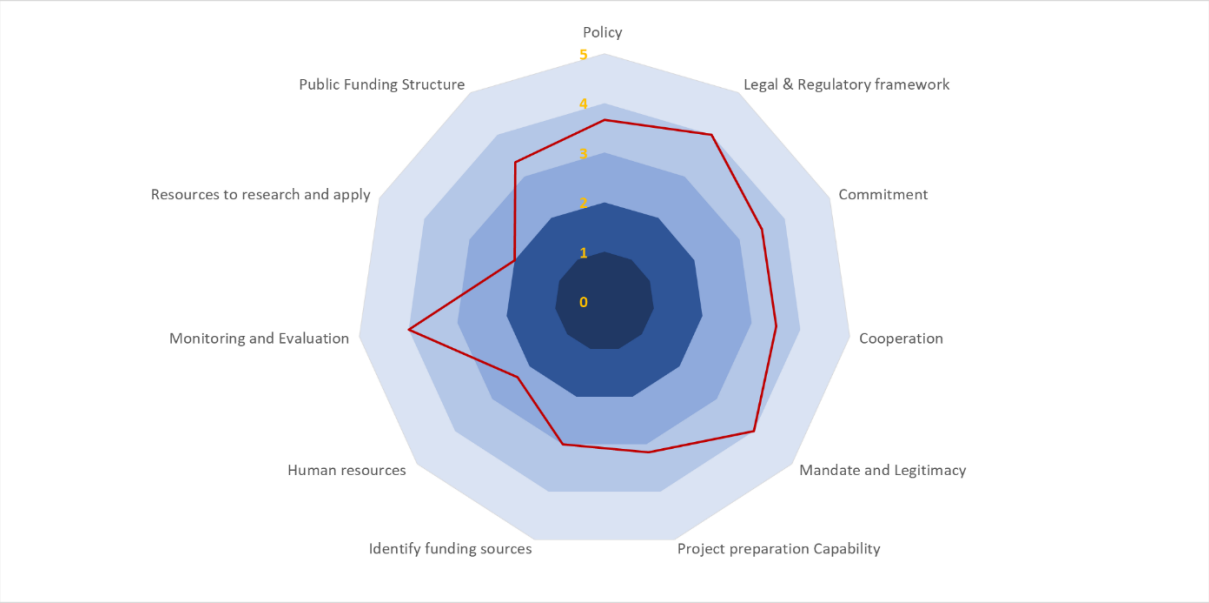

Figure 3.17. Strasbourg (France). Maturity assessment results. Source: ACTIERRA

4.9. Barriers, drivers, challenges, and opportunities for adaptation finance in the territories

This section presents the research results of interviews conducted with public authorities and some other private actors in the CLIMATEFIT territories. The interviews aimed to gain insight into barriers, drivers, challenges, and opportunities for adaptation finance in the territories. We first describe the results for each territory, after which we compare the empirical results with barriers identified during the literature review. Additionally, we give an overview of recurring barriers across all territories, including a synthesis of our findings about barriers, drivers, challenges and opportunities for adaptation finance in the CLIMATEFIT territories from a PA perspective.

4.9.1. Overview of barriers identified during interviews

Barriers and drivers to adaptation financing are **highly context specific**. Indeed, the interviews conducted in 20 territories only gave us few overarching common barriers to all PAs. Barriers and drivers depend on the size of the PA, its traditional financing means for public planning (which are very different from one territory to another) and the political priority given to adaptation. Interviews were conducted with a various number of stakeholders, as such, the results aim to be a snapshot of the perceived barriers for the PA at the moment of the interview.

Table 4.9. Overview of barriers identified during the interview process

		RO	SI	CZ	IT	ES*	PT	BEL	FR
Archetypal Barriers (Moser, 2019)	Lack of capacity and staff constraints to apply to fundings	X	X	X	X	X	X	X	X
	Lack of knowledge about sources	X	X	X	X	X	X	X	X
	Inability to make economic case	X	X	X	X		X	X	X
	Chronic underfunding	X	X	X	X	X	X	X	
	Low priority	X	X	X		X	X	X	X
	Discontinuous funding	X	X	X	X		X	X	X
	Conflict of interest	X	X	X	X		X	X	
	Siloed governance	X	X	X	X		X	X	
	Inappropriate funding scale		X	X	X		X	X	X
	Aversion to innovation	X	X	X	X		X	X	
	Lack of champions, leadership	X	X	X	X		X	X	
	Lack of capacity to administer funds		X	X	X		X	X	X
	Disproportionate burden	X	X		X			X	
	Funding biases	X	X		X		X		
	Restrictions, conditions, eligibility criteria	X	X	X			X		
Other barriers identified in interviews	Dichotomy between the perceived level of priority, the priority awareness and the means aligned	X			X	X			
	Regulatory framework discouraging private funding and/or public-private-partnership						X		
	Operational costs funding			X			X		
	Competition between sectors for policy priorities	X						X	
	Confusion between mitigation and adaptation	X		X					

*Due to the limited availability of PAs in some territories [Diputacion Avila (ES), Barco Avila (ES), Navaluenga (ES), Maia Municipality (ES), Lovrenc na Pohororju (SI)], this table provides an overview of the **perceived level of readiness** but are based on a limited sample of respondant and results have to be used with caution.

Table 4.9 offers a comprehensive overview of the analysis of the interviews conducted with the PAs, and highlights the barriers identified for each countries' territories. However, the results presented are only indicative due to certain limitations. the number of interviews conducted in each territory is not the same. For instance, only one interview was conducted for Diputacion Avila (ES), Barco Avila (ES), Navaluenga (ES), Maia Municipality (ES), Lovrenc na Pohororju (SI). This limitation is also attributed to the small size of certain territories, which provided only limited opportunities to conduct interviews with a PA. In this context, if Spain seems to face fewer barriers it is rather due to a lack of information collected than to a superior level of readiness to attract financing for adaptation. If a cross (X) means that the barrier has been identified in a territory from a PA perspective**,** the absence of a cross does not necessarily mean that the barrier does not exist in that territory. As such the table offers indicative results that must be used with caution, and do not have a scientific ambition.

We clearly see that the barriers identified by Moser et al. (2019) are relevant to the context of CLIMATEFIT territories. All archetypical barriers are raised as a challenge in at least four of the eight countries. Six barriers appeared in at least seven countries.

The **lack of capacity and staff constraints** is the most prominent barrier for PAs. Many PAs need training on adaptation to improve their knowledge and the quality of their proposals. All PAs face shortages of staff and time to seek funding. Additionally, operational costs are often not accounted for when securing finance. One issue identified is whether PAs have the resources necessary to carry out maintenance and operational costs. Funding is often granted to launch projects but does not take maintenance into account, which needs to be included in future projects to ensure sustainability.

All PAs report a lack of knowledge about funding sources. Creating an easily navigable portal and providing training are simple solutions. The lack of capacity to administer funds is particularly acute in smaller territories with less specialized teams. Other barriers are context-specific, confirming the hypothesis that adaptation barriers are highly situational (Moser & Ekstrom, 2010).

The challenges faced by Public Authorities (PAs) in addressing climate change adaptation are multifaceted and complex. A significant barrier is the **conflict of interest** arising from the fact that climate change does not offer near-term benefits. This issue often leads to a lack of political engagement and leadership from decision-makers, with Strasbourg Eurometropolis (FR) being a notable exception due to its particularly engaged government.

Moreover, there is a noticeable dich**otomy between the perceived level of priority, the awareness of this priority, and the means allocated to act on it**. Many interviewees perceived that climate change and adaptation are taken seriously by their PAs and recognized as priorities. However, this does not translate into

adequate resources being allocated. Climate change and adaptation are often discussed as important political issues, but the necessary resources are not aligned to the level of priority that is discussed.

A generalized **lack of knowledge and interest in climate adaptation** from local governments further compounds the problem, making it a low priority. Internal training and awareness-raising on adaptation issues are necessary steps to address this. Additionally, the confusion between mitigation and adaptation actions persists, with many PAs viewing all climate actions as a whole without distinguishing between the two. Siloed governance structures also pose a challenge for most territories. However, this barrier could easily become a driver with integrated planning and proper mainstreaming of adaptation.

PAs also **struggle to make a compelling economic case for adaptation** due to several reasons. There is a lack of technical knowledge within the PAs, leading to the externalization of assessment studies. The overwhelming majority of PAs rely on public funding, which often does not demand a robust economic justification. Although research on the economic benefits of adaptation is developing, it still faces serious challenges, and consensus on the benefits has not been sufficient to trigger action. Building an economic case also requires selecting a time horizon and a climate scenario, which are not straightforward tasks.

Furthermore, the **regulatory framework** in several countries discourages private funding and public-private partnerships to avoid corruption and malpractices. Even if regulations become more flexible, PAs lack the necessary tools and guidelines to effectively utilize such funding sources.

The **competition between sectors for policy priorities** is another significant barrier, specific to PAs dependent on external funding. When municipal budgets are constricted, adaptation operations compete with other sectors for funding. In Alba Iulia for instance, a first-come-first-serve principle creates competition among adaptation and climate change projects willing to apply to EU fundings, which does not necessarily bring forward the most relevant projects. The type of funding available is also problematic because it is finite, while the needs to tackle climate change are ongoing. Whilst such negative effects can arise, Alba Iulia possesses a better knowledge of EU grant writing methodologies than most PAs.

Establishing climate change risks and adaptation as a matter of concern is crucial. Climate change is rated as a central concern in almost all territories, although mitigation often takes precedence over adaptation. Significant differences exist between PAs regarding the political importance given to climate risks. Other pressing vulnerabilities, the long-term nature of climate change, and the relatively new political theme of adaptation are the main causes of its low prioritization. There is also a notable discrepancy in knowledge about adaptation, with some PAs confusing it with mitigation. However, a growing number of extreme weather events tend to elevate the political priority of adaptation. Enhancing public knowledge about climate risks is often identified as a key driver of financing adaptation. Depending on the size of the PA, a climate unit may exist, but it is usually focused on mitigation.

Establishing adaptation funding needs, costs, and benefits reveals major discrepancies between PAs in adaptation planning. **While most countries have national adaptation plans, local adaptation planning is much more unequal**. Cost-benefit analyses, vulnerability or feasibility studies, and impact assessments, when conducted, are usually outsourced by PAs. Most PAs are affected by discontinuous funding, with projects set in time and not addressing the long-term financing needs of climate adaptation. Adaptation is still seen as a cost rather than a benefit, contributing to reluctance in financing it. In many cases, operational costs are overlooked in funding opportunities, adding a burden to municipal budgets.

The **fiscal standing of PAs varies significantly**. Some territories are highly dependent on EU funding and suffer from chronic underfunding, while others can finance adaptation with robust municipal budgets. Most PAs suffer from siloed governance; the cross-cutting nature of climate adaptation means resilience activities are conducted by several departments without centralized knowledge sharing. This challenge can quickly become a driver if knowledge-sharing platforms are created. In some cases, dependence on external funding can create internal competition for resources. Smaller municipalities often lack the capacity to apply for funding.

There are **significant discrepancies in knowledge about public funding solutions and little to no knowledge about innovative financing solutions**. Almost all PAs lack personnel to research adaptation funds and qualified staff to administer and report on adaptation projects.

Our research on barriers and drivers to climate change adaptation financing has found that most barriers are shared by a large part of the PAs, without visible geographical discrimination. However, a few points can be raised regarding **geographical differences and territory size**.

- The **eastern cluster** (Romania, Slovenia, Czech Republic) seems to suffer more of chronic underfunding. The specialization of Alba Iulia in European grants for instance can be explained by the lack of funding from the municipal, regional and national scale, but they remain an exception in Romania. Furthermore, Romania and Czech Republic seem to suffer from other pressing vulnerabilities, creating a disproportionate burden. The case is different in Slovenia, where the extreme weather events that happened this summer have put climate adaptation higher on the political agenda, but there is still a long way to go acquire sufficient financial resources.

- The **northern cluster** (France and Belgium) enjoy a stronger public funding structure to fund adaptation. However, their reliance on national and regional public funding means they tend to lack staff and capacity to apply to funding (more than Alba Iulia for example) and do not have an extensive knowledge of funding sources, especially private ones.
- The **southern cluster** (Italy, Spain, Portugal) is quite unequal, with little resemblance between PAs. Spanish and Portuguese PAs are heavily reliant on public funding, while the Italian PAs get funding from a private foundation. The common barriers met are the lack of capacity to research funding and administer funding.

The **size of the PA appears as a big factor in the determination of the barriers**. Indeed, smaller PAs (under 10k inhabitants) suffer even more of staff constraints and lack of capacity. Smaller teams mean less specialization and less resources for specific sectors. Bigger territories (over 50k inhabitants) suffer much more from siloed governance, with a lack of centralized project management for adaptation. Sometimes even departments can end up competing against one another. However, this barrier could easily be overcome by centralizing certain processes.

Finally, there is clear **difference in levels of readiness between leader territories and planner territories**, revealing disparities in how climate change adaptation and funding is managed. Lead cases like Alba Iulia and Strasbourg exhibit a more structured and proactive approach, with dedicated teams, clear strategies, and significant experience in securing EU funding. Lead territories also all have an adaptation action plan they refer to, unlike all the planners. For example, Alba Iulia has a large team specifically dedicated to applying for EU funds, and Strasbourg has integrated its national adaptation strategy into its climate plan. In contrast, planners like Maribor and Liberec struggle with a lack of qualified staff, siloed governance, and insufficient funding and resources. These planners often lack dedicated climate change departments and have fragmented adaptation efforts, which leads to a less coherent approach to climate risks. Additionally, planners typically have limited experience and knowledge about diverse funding sources and innovative financial mechanisms, further hindering their ability to effectively address climate adaptation. The disparities in readiness highlight the need for increased capacity building, better coordination, and more comprehensive funding strategies. Thus, planner PAs such as Genk or Bergamo, who benefit from the same adaptation plans as the leads, seem to be more prepared on the topic of adaptation, although knowledge about funding mechanisms and the capacity to apply to funding can remain limited.

4.9.2. Recurrence of barriers throughout the study

Figure 4.18 illustrates the occurrence of the identified archetypical barriers. Among the barriers, the 4 following are the most recurring:

- The most encountered barrier is the **lack of capacity and staff constraints** that all PAs (see Figure 2) are facing. The barrier was mentioned at least twice as many times as in other interviews. The staff constraints barrier can be linked to research by Ducastel et al. (2023), who explain that although there are increasing resources for investment in the green transition, there are less and less resources to disburse it (**investment paradox)**. Weakened territorial administrations seem indeed to have a structural funding gap (**bureaucratic weakness)** making applying and planning difficult.
- The lack of staff capacity can easily be linked to the second most persistent barrier: the lack of knowledge about sources. If one of the reasons for that is the **lack of easily navigable portal for funding solutions,** the **lack of staff to** research them is certainly another part of the problem.
- This is closely linked with the third barrier on **siloed governance**. Adaptation projects are **cross-sector** and address a **multiplicity of expertise and skills**, but they are often distributed across several units within PA administrations. Without a strong leadership, it is difficult for such organization to break habits and start working together on integrated projects, often constrained by administrative and budget regulations.
- Although climate change is rated as a high priority in most territories, work remains in making climate change adaptation **a priority for decision-makers**. The second biggest challenges after the staff constraints come from **establishing the fund needs** and the financial standing of the funding seeker. Making the economic case is a huge challenge for PAs. This barrier can most likely be linked to the **public funding-based models that are very dominant in Europe** (see the adaptation financing landscape section). Public grants and budget do not require most of the time to build an economic case. Furthermore, the **budget allocation is a political battle** that does not necessarily take the funding needs into account.

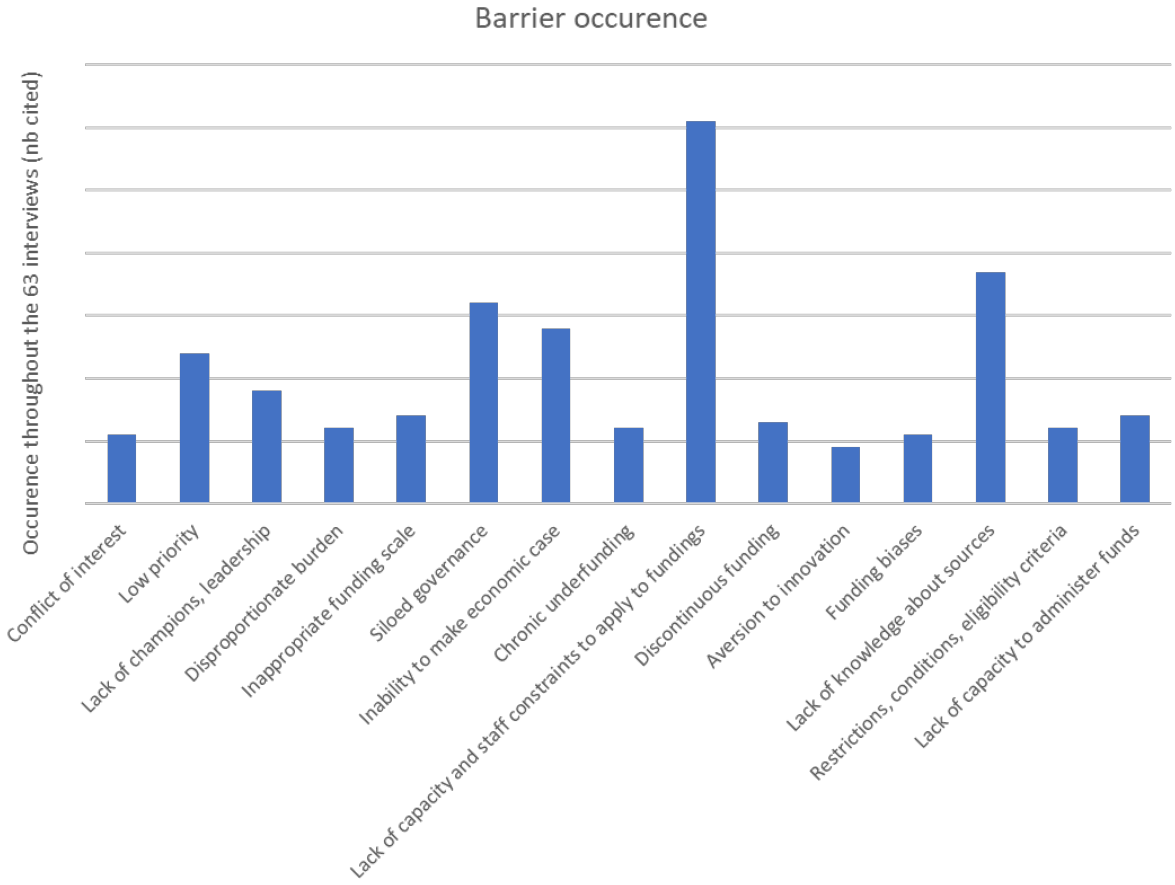

Figure 4.18. Archetypical Barriers occurrence during CFIT territories interviews. Source: ACTIERRA.

This chart reinforces the point that staff capacity, knowledge about funding sources, and administrative hurdles are significant barriers across all stages of funding adaptation projects. It also underscores the importance of addressing funding biases, encouraging innovation, and ensuring consistent and appropriately scaled funding.

Therefore, the two most pressing issues seem to be the **lack of qualified staff to apply to fundings**, and the **lack of capacity to establish the funding need**. These barriers require more research on **adaptation costs and benefits, the development of metrics to assess success and performance, and staff training.** Overall, staff constraints seem to be the most challenging barrier as the capacity to identify new sources of funding requires staff availability and knowledge, including in foreign languages. Staff must also be provided with the **resources to experiment and develop new process**, which is difficult since administrations are often reluctant towards innovation.

If a PA has the capacity to mobilize staff, then the difficulty is to prove its financial capacity to carry out adaptation projects. Adaptation projects usually require cooperation between several siloed activities within PA administrations (water and sewage, green spaces, energy, transportation for example). Furthermore, funding is also constraint by standard levels than can be discouraging, especially for small-scale projects. It seems necessary today to **make building a good economic case easier for the staff**: local networks would allow for a pooling of resources and knowledge, for example.

4.9.3. Recommendations

To overcome these barriers, the following steps could be considered:

- **Capacity Building:** Enhance staff training and capacity to identify, apply for, and administer funds, including language skills where necessary.
- **Knowledge Sharing:** Develop and disseminate comprehensive resources on available financing and funding sources and instruments, and successful case studies of AFFS.
- **Streamlining Processes:** Simplify and standardize application and reporting processes to reduce administrative burdens.

- **Promoting Innovation:** Encourage and support innovative approaches through flexible funding mechanisms and pilot projects.
- **Consistent Funding:** Advocate for more reliable and long-term funding commitments to ensure continuous support for adaptation projects.

Overall, addressing these barriers requires a coordinated effort to improve knowledge, capacity, and funding mechanisms to support effective adaptation to climate change.

Chapter 5: Climate adaptation finance from the perspective of FIEs

This chapter is a shortened version of a full FIE report that is being produced from T1.2 research activities as an internal resource for CLIMATEFIT use. The methodology of these research activities is explained in Chapter 3.2. This chapter includes a general background, investor research results (including suggested interventions), ideas on FIE mobilisation, and finally adaptation finance opportunities. Key resources for further reading are provided in Annex 1. We analyse the barriers and opportunities to adaptation finance from survey and interview results, and then measure the capacity and maturity of the interviewed FIEs. We use an original FIE Maturity Assessment Model (MAM) developed specifically for the CLIMATEFIT project (MS1). All this research forms the building blocks for our findings on FIE engagement and capacity building recommendation in the draft FIE Engagement Strategy.

A separate succinct peer-reviewed public report will be issued on FIE opinions, biases, maturity, main barriers, drivers and current practices. Interviewees will be asked to provide a peer review of this report, with their comments incorporated into the final published report. Our FIE research included questions to FIEs on the One Stop Shop (OSS) and the knowledge products and networks they use. This provides input to the OSS Scoping Report (D1.2), the relevant findings from this report on engaging FIEs are included in the draft FIE Engagement Strategy. The results will also inform the development of the content of the draft and final Policy Brief (WP6 and D6.1 & D6.2).

5.1. Background and context

WHAT INVESTORS TOLD US ABOUT FINANCING ADAPTATION:

"A **stable climate policy** is the most important thing. Adaptation policy [….] I think you can work out how you're going to adapt once you understand what the long-term policy is.. Stability is the most important thing because if you're looking to invest or you're looking to insure or whatever, you need to know that you've got a long term." (INS01)

*"Question is how big the challenge is and **what is the link to the state investment banks' core tasks in terms of financial stability**." (REG01)*

*"Defining specific investment areas on the topic of adaptation is difficult because until now **adaptation has been interpreted as everything related to Nature-Based Solutions**." (IT04_B)*

*"It's a difficult one because often you're in the **grey zone of adaptation and mitigation**. We have a clear focus on mitigation and not on adaptation because we say within the carbon budget, there's no room left, so you have to tackle the carbon emissions first and that's really important." (BEL02_B)*

*"Things aren't coming together to have the catalytic or exponential growth that we need to get to the investment levels to meet the goals of the Paris Agreement or to hit the national climate targets. So, I think there's **lots of pent-up demand** and I think **a pent-up investor appetite** as well. We haven't solved at scale the roadblocks between the project developer and the investor so that they can come together with bankable projects and terms that work for the project developers to have investments at the scale of the need." (LON06_O)*

Adapting to climate change involves various solutions, including infrastructure upgrades like green streets, coastal defences, and property retrofits (Fankhauser et al. 2023; Lloyds 2018). Our research outlines finance options, as illustrated in Figure 5.1 with future funding needs varying across municipal areas, sectors, and project types (Mullan & Ranger 2022). Large-scale infrastructure projects are however anticipated, each requiring different funding sources and private sector participation. For instance, nature-based solutions such as coastal protection could utilise mechanisms like land value capture, while climate-proofing critical infrastructure might involve banks and asset managers through climate resilience or green bonds (Den Heijer & Coppens, 2023). Nature-based solutions play an important role in climate adaptation, with green spaces, mangrove restoration projects or specific forestry management practices supporting adaptation goals of protecting people and their environments from climate change impacts. It is estimated that 30% of nature investment also contributes to adaptation goals (UNFCCC, 2023).

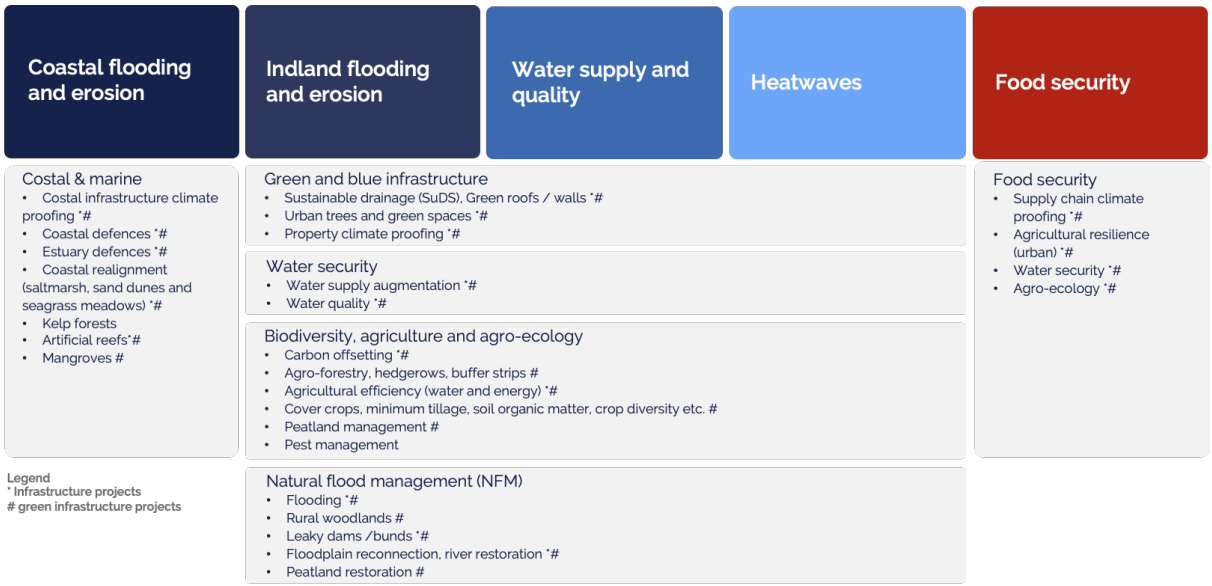

Figure 5.1. Examples of adaptation finance opportunities within CLIMATEFIT research scope (infrastructure and green infrastructure distinguished). Adapted from CCFLA (2022).

Adapting the work of Cochu et al. (2019) in Figure 5.2 we find that the private sector can fulfil at least four key roles in adaptation efforts. FIEs and the private sector may adopt one or more of these roles, collectively contributing to the establishment of a climate-resilient economy and society and a functional market for adaptation goods and services. For example, insurance companies can not only contribute to vulnerability reduction and social protection but also need to adapt their own (investment) operations to climate impacts.

1. **Adapting** to climate change. when an FIE adapts to climate change it is safeguarding it assets, protecting revenues, or reducing costs. Governments and regulators can encourage FIEs in such investments through awareness campaigns, regulations, including financial incentives such as subsidies. The growth of activity in this area (adapting) creates a track record in adaptation solutions which can in turn stimulate wider market activity.
2. Promoting economic activity that '**Does no significant harm**' (DNSH) to the adaptation effort of others. Under the EU Taxonomy economic activity is deemed aligned with the EU Taxonomy (classification system) if it meets the technical criteria for a specific environmental goal, while not doing significant harm to any other goal.
3. **Financing adaptation** for others (in both public and private sectors). FIEs can finance the adaptation for others by providing financing for their adaptation efforts (Brown et al. 2015). This can include integrating considerations of climate risk into general lending activities or offering new and specialised adaptation finance products and services. There is growing evidence that investments in adaptation solutions are likely to yield positive returns over time (Ranger et al. 2023).
4. Fostering the development of new **products and services** for adaptation. FIEs can offer adaptation products and services. There are a numerous opportunities to develop new products and services in response to emerging business prospects, such as in agriculture, education, water, health, infrastructure, transport and urban resilience Independent analytics firms indicate that this sector is poised for significant growth in Europe

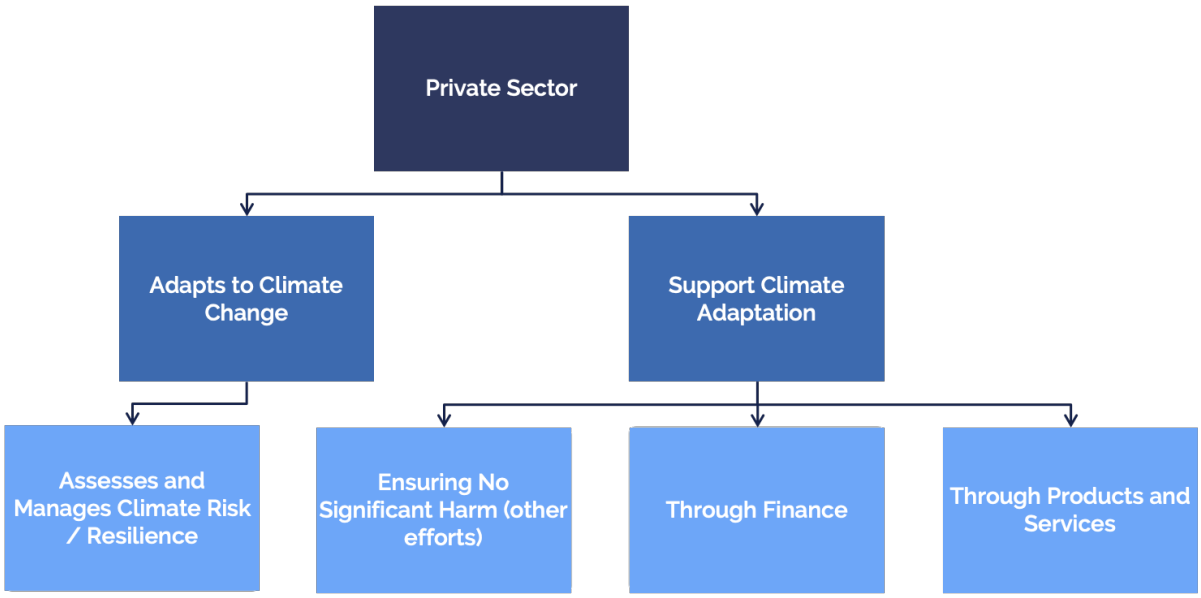

Figure 5.2. Private sector engagement in adaptation. Source: Adapted from Cochu et al. (2019) and WEF (2022)

WEF (2023) proposes a grouping of the types of FIEs from the private sector in adaptation across a returns spectrum from market-based returns to quasi or blended returns and then to below market rate returns. Corporations, banks and institutional investors all require market rate returns whilst government, philanthropic organisations and NGOs will invest with below market returns. Pensions for (2023) also proposes a spectrum of capital and environmental themed decision making by investors which follows a similar logic and progression from traditional to responsible, then to sustainable, then to impact, and then finally to philanthropic investors. Their model complements the WEF model and illustrates the non-financial goals that investors may seek for lower risk adjusted returns. These goals include impact-positive outcomes for shareholders, positive change for people or the planet and environmental goals such as biodiversity gains.

Understanding why different types of investors may select to invest in adaptation and other sustainability areas is a crucial first step in analysing and understanding the investment landscape in Europe as a whole and for our 20 CLIMATEFIT territories from the perspective of FIEs.

FIEs can access a myriad of finance instruments (e.g., taxation, debt, equity, grants, fees and user charges). Pathways2Resilience (P2R) have produced a tailored Excel catalogue of sources, instruments and best practices (P2R, nd). CLIMATEFIT will use this catalogue and will promote its use among PAs and FIEs. The catalogue amalgamates funding and financing sources, instruments and finance strategies into a comprehensive typology suitable for application in European regions. The catalogue includes:

- 57 adaptation sources, comprising 16 from the public sector, 35 from the private sector, and 4 from the third sector.
- 78 instruments comprising taxation, blended finance, debt, equity, risk mitigation, results-based financing, grants, fees and user charges and land value capture.
- 64 business models for finance
- 169 case studies of financing adaptation.
- 6 strategies, comprising (1) leveraging debt and equity, (2) generating revenues (3) crowding in incentives (4) risk transfer by FIEs (5) de-risking (6) connecting to communities.

5.2. Investor willingness, capacity, and maturity to invest

In the following sections we cover the results from our interviews with FIEs (survey and interviews). Interviewees gave us their perspectives in section 5.2.1 – 5.2.3 on adaptation finance activity, barriers, enablers and interventions. Each quotation from the interviewees is anonymised and therefore given a code showing the country and type of FIE of the respondent. In section 5.2.4 we also provide the results of applying the MAM to our interviewees from our lead territories. In section 5.3 we delve into FIE mobilisation through recruitment of FIE Champions and evaluation of flagship climate finance initiatives. Finally, we combine all this information to make recommendations on ways to engage FIEs in CLIMATEFIT. In section 5.4 we synthesis from all the insights gained the most-ready adaptation financing opportunities.

5.2.1. Adaptation activity amongst FIEs

45% of the FIEs interviewed conduct climate risk screening. However, few could give specific details of how this is carried out and for a few this could be no more than a question in an investment interview. It was also not possible to discern how the screening affects investment decisions. We noticed a different approach between banks, asset managers and insurance companies versus institutional investors.

More than 55% of the FIEs interviewed are involved in some kind of adaptation and /or nature finance activity. For most this represented only a small number or scale of projects. Our sample included several potentials FIE Champions and so was a biased sample, which is likely not to be representative of most investors. The adaptation investment being undertaken covered adaptation projects in water, real estate and agriculture. There was little mention of climate proofing of infrastructure. Nature finance was more prominent than adaptation finance amongst the interviewees. Unfortunately, it was too small a sample to break the activities according to types of investors.

In our sample we found investor activity in adaptation small in value and number and not replicable or scalable. There is surprisingly limited direct investment and there is scant evidence leveraging state-of-the-art pooled or blended financing mechanisms. Adaptation evidently does not rank as a top priority for some actors, adaptation finance currently falls below climate mitigation finance and investment in other areas such as nature solutions, in their hierarchy of priorities. The stability of traditional funding areas and practices, coupled with the preference for traditional and 'tried and tested' approaches to infrastructure planning and financing, work together to discourage investment in new areas such as adaptation, which require new approaches and new ways of planning and financing. As we show below interviewees emphasised the importance of valuing adaptation outcomes, with all actors highlighting the deficiency in current efforts to assess the value of adaptation. In this context, a handful of our informants pointed to a few innovative adaptation finance mechanisms observed in other countries, where adaptation is valued and integrated through climate risk pricing, climate risk-linked bonds and climate resilience bonds a etc. Interviewees also mentioned the need for financing products, fostering public-private partnerships, establishing financial incentives for adaptation, and reforming financial regulations. All these interventions would bolster the social acceptance and legitimacy of adaptation projects. These suggestions are discussed in more detail below.

5.2.2. Barriers cited by FIE interviewees

The top four barriers identified by respondents are: (i) lack of knowledge or advice, (ii) (adaptation) policy instability, (iii) lack of (bankable) projects and (iv) non-standardised data (Figure 5.3). These results are in line with the most frequently cited barriers in the literature (See Chapter 2, Table 2.1).

Lack of knowledge or advice

There is a notable lack of expertise and knowledge among investors when it comes to adaptation, hindering their ability to assess potential investments and make informed decisions regarding investment opportunities. Lack of knowledge emerged as the most cited barrier by all parties involved (Figure 5.3). Knowledge barriers primarily revolve around understanding and quantifying the impacts of climate change, best practices and identifying technical solutions.

"As far as the challenges are concerned, we need to be able to alert our in-house teams to this issue, to understand it and to know about it. There is a lot of confusion on this subject. The second will be to identify what is being done within the Group that can already be adapted. Finally, I don't yet see how these investments can be profitable for the financial players, including the banks. For the moment, adaptation is only seen as a cost, unlike other low-carbon investments, some of which are beginning to be more or less profitable. Adaptation is often seen as a public rather than a private matter." (LON08_II)

'I think we are already making investments that meet the criteria for adaptation to climate change. But for the moment we haven't identified them as such. My aim internally is to map out the different actions that can be taken to adapt to climate change'. (FR02_B)

'We currently have an informational need regarding potential markets, potential business models, and potential counterparts. We are an operator that doesn't work on large volumes of deals; we tend to focus on a few deals tailored to specific needs, bringing together all the requirements. We also have internal expertise in PPPs and concessions, so engaging with institutions is part of our daily routine. However, at this moment, we are not capturing the demand and potential market'. (CHAM_IT_01_B)

'Not in Romania, I'm afraid, but typically we would screen every project against a risk filter that considers all the major hazards with just data from an external provider. So completely all flood, river flooding, heat waves, mean temperature increases, droughts, water stress, storms, winds, cold' (RO02_O)

'I think that if you really want to move the area, what really makes a decision being taken in the financial sector is that you can see some good examples. The best one are the ones with a little bit of a track record because everything can look good on paper' (EU01_O).

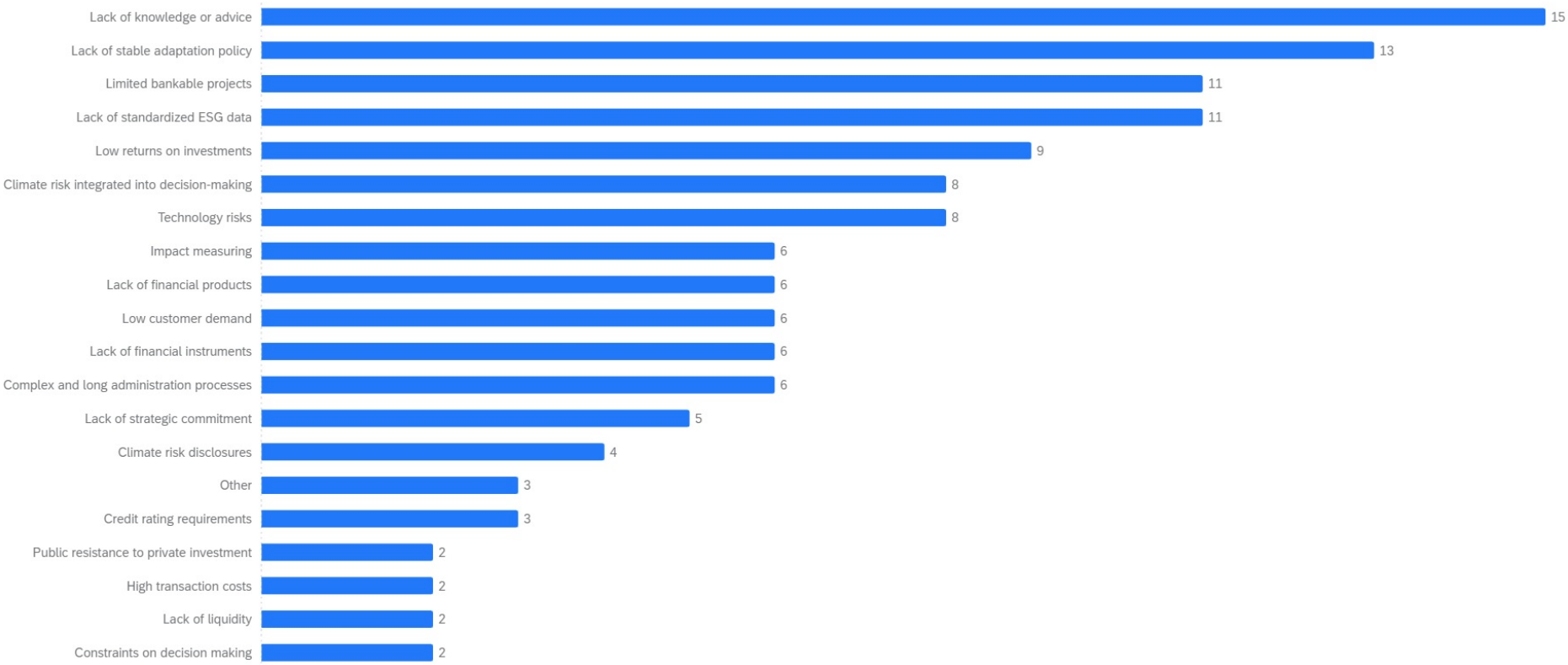

Figure 5.3. Barriers to adaptation finance (FIE survey/interviewee responses)

Unstable policy

All participants emphasised that regulation poses a significant barrier to accessing finance for adaptation. Specifically, they highlighted the lack of an overarching stable policy framework covering all types of climate hazards. Criticisms of the government were also frequently voiced for its failure to provide a comprehensive vision of adaptation. Views emerged among interviewees regarding regulatory stability, with investors expressing concerns about the current rate and extent of flux in climate policy in general. Many attributed this to the changes in climate commitments. Many also mentioned the significant work imposed by the changes in recent years in regulations on sustainable finance, disclosure, and climate risk.

> *"It's that mixture between, consistency and proper policy, proper consistency of approach and like a carrot and stick – needs to be enough carrot to get people to do it. Because if it's just all stick, then it just becomes a big thing. […] So, unless it's all linked together in a consistent and credible way, then things collapse. And then it would, just be individual groups or companies working separately. And then there's no systemic change. It's not replicable/scalable. It can't be replicated. And that's the thing we need – we constantly get hit. Is it scalable? Is it replicable? If it's not scalable the people, then corporates wouldn't be interested because they're not going to make any money. It's not going to grow, it's not worth doing and it's not replicable […]. And currently we're not there yet. Currently we have replicable things which aren't scalable and scalable things which aren't replicable. So that's where we get stuck."* (INS01)

> *"We've talked about potential regulatory changes to allow investment into the illiquid. There is also the relaxation within that would be the relaxation of what is meant by fiduciary duty or what people understand to be fiduciary duty or what might be seen as non-financial elements, but ultimately, they are financial. If you extend the time horizon sufficiently […]. It's how are you going to get a cash flow from an adaptation investment? And this is where governments can use investment in a very different way than a financial institution. And yes, there will be social returns. But that doesn't help me to provide a pension return for our customers."* (LON09_O)

> *"Would it be fair to say you could go through the mechanisms that are being applied to carbon that basically incentivise this and look at the disincentives and you could almost find a mirror or a similar thing that you would need to happen in adaptation. So, it's the building standards, building regulations. Consider what are some of the policy things that you've seen as being effective for carbon."* (LON12_O)

> *"I think stable climate policy is the most important thing. Adaptation policy […] you can work out how you're going to adapt once you understand what the long-term policy is. I'm just talking from my own understanding -stability is the most important thing. Because if you're looking to invest or you're looking to insure or whatever, you need to know that you've got long term stability, Things are chopping and changing all the time. It becomes very difficult for any organisation to make any kind of move on that piece. So, if you know everything's net zero in 2030, does it make sense? Probably not. But it gives stability because you've got a target to aim at. If that target suddenly moves five years forward or five years back, it becomes very challenging for any organisation to react because your investment suddenly becomes worthless – difficult stuff."* (INS01)

Limited projects

When making investment decisions, the consideration of an acceptable risk-adjusted return is widely acknowledged as paramount. However, adaptation ventures frequently present elevated risks coupled with lower rates of return, resulting in hesitancy to invest. As delineated in barriers analysis from the review of literature (Chapter 2, Table 2.1), investors commonly cite significant hurdles in identifying viable and financially feasible adaptation initiatives, notably the absence of reliable cash flows and revenue streams. Despite various avenues for investing in adaptation, such as debt financing, equity investments, impact investing, and insurance, these options often fail to attract interest. Many interviewees, despite this freedom in financing sources, struggle to provide examples of their involvement in financing adaptation. Moreover, such projects face stiff competition and bias toward low-carbon and mitigation endeavours like renewable energy, which boast a proven investment track record and a favourable risk-return profile (Abadie et al., 2013). There were some discrepancies among our interviewees regarding the accessibility of finance and funding for adaptation. While investors claimed that the supply of finance was ample, they highlighted a demand-side issue: a scarcity of viable projects to invest in. Despite an abundance of available finance-seeking investment opportunities, investors are often hesitant or, in many cases, unable to provide funding below commercial thresholds for return/risk ratios. A crucial consideration in the development of new financing models is the presence of suitable institutional frameworks to facilitate pooled finance at the necessary scale and risk-return ratio.

> *"At the moment, analysing the return on investment and identifying these investment opportunities is a bit challenging."* (IT04_INS).

> *"For our business model, we have little flexibility; we need to generate risk-adjusted returns. Therefore, it is precisely from this perspective that the framework we are developing for evaluating investments in*

adaptation is focused on the dimension of financial materiality. It is important for us to understand the risk that a company may have to suspend production in the face of drought or that the company's suppliers may fail to deliver essential production inputs, leading to production suspension." (IT01_AM).

"We're not going to technological solutions at this moment. We try to do it the natural way. What we already did financing of some peatlands or wetlands in Scandinavia. In the UK, we financed some estates and their proceeds come from carbon certificates." (BEL02_B)

Some of the investors, in particular those driven by societal impact and value creation, expressed interest in investments using new business models (incorporating climate risks). Such investors are willing to accept slightly lower returns or even incur losses to support the development of these projects or to establish a track record. This inclination depends on the investor's motivation, hence matching projects with the appropriate investors is crucial.

"[The Hub] gives a possibility to do a certain volume and lending at reduced return and higher risk appetite. Also, providing resources like people working on this. We have a working group that works across all branches. […] We call that an impact hub. If you have interesting new business models, we can present them, we can discuss them. There's plenty of room to do that." (BEL02_B).

"Track record means that there are a lot of example, and you know what the return on that has been and that it's been secured, it's been as predicted. It's really important. Especially as a bank in the lending activity, investment is something different, you have a different risk appetite with higher returns, but on lending activity, you're looking for certainty. Reliable business models with a good track record are essential. That's what is making this difficult at this moment. I think they [adaptation investments] don't exist. We don't have examples." (BEL02_B)

"In 2023, 70% of thematic investments were in climate and nature-related themes, which is a significant portion. This 70% is classified into macro-categories, including energy efficiency linked to mitigation, as well as sustainable mobility. There is also a part related to sustainable forest management, which could be more attributable to adaptation. Another category that could be linked to adaptation is investments in the water network system." (IT04_INS)

"Focusing just on adaptation I would say at the moment, and it is purely about fiduciary duties of companies. […..] being able to demonstrate that you are doing actions that are in the best interest of the company. It links into returns, it links into performance, to shareholders value creation. I think that's the main motivation at the moment, and I think that is what is sort of pushing them to think quite short term as well. So, you know, there's not many companies that I've seen that are really thinking seriously about longer term climate change and actually making decisions. So, there's a lot of analysis done, but actually, you know, changing their decisions based on that, I've not seen that. That's what I think is today. I think that that's going to change., quite soon." (LON_10_O)

Investors have clear criteria regarding the size of projects they find acceptable and are willing to invest in, often deeming many adaptation projects too small for investment. This reluctance among investors is closely tied to transaction costs, which can be prohibitively high for smaller projects.

Lack data standardisation for resilience

There were several knowledge and data gaps regarding adaptation cited by all investor types. While information and advice were readily available on established low carbon technologies and innovations, the same was not true for adaptation. Traditionally, investors would acquire tacit knowledge through co-investment activities, which are not widespread for adaptation. Respondents passionately advocated for knowledge interventions capable of reshaping financial sector perspectives and methods to monetise adaptation projects. Information on adaptation technologies was also lacking.

"The lack of data is certainly the first barrier. The second is the business model, i.e., what is the model for making investments for a private operator in infrastructure or investments oriented towards adaptation. In the third place, I would put a whole series of considerations typical of our investments, primarily bankability, then counterparts, coverage, market, return, etc. As already mentioned, we are flexible on this because we reason about the size, but there are still the characteristic risks of an investment, among which I would place bankability in the first position." (ITCHAM01_B)

Additionally, the absence of methods to measure and monetise potential environmental and social benefits makes accurate return calculations and informed adaptation investments very challenging. Most investors were unable to cite best practices in adaptation, either in their country or elsewhere, indicating a significant obstruction to knowledge, awareness, and data and then subsequently the flow of finance.

Low returns

There is a prevalent perception amongst investors that adaptation is a public good rather than a source of commercial returns or a valuable part of investment portfolios. They believe investors do not bear responsibility for adaptation and that private investments in adaptation are too challenging to monetise and therefore do not invest.

"I have a really hard time seeing how you get any kind of significant private investment in adaptation without using blended finance. In general, I think adaptation is largely a public good." (LON06_O)

"I would say adaptation is low on the equity side because it's very project specific and tends to be government funded." (LON04_AM)

"Something totally different than deciding on taking an equity participation in an entity where you end up being a shareholder of, and where you have to manage your portfolio of entities where you have shareholders, because there is no portfolio management available in government departments, so they cannot cope with it I guess." (BEL01_B)

"Speaking of investments for adaptation, the challenge is how to reconcile the need to ensure constant and stable returns for our shareholders and partners over time with assets that are subject to a climate that will evidently not be the same in the next 5-10 years and beyond. Therefore, the approach we have adopted, even with a certain meticulousness, is a quantitative one. ……The goal is to incorporate this approach into the financial models we use to create our business plans and stress test them to understand if investments remain viable even under significant climate stress conditions…….. Our de-risking logic is implemented in this way: we estimate the worst-case scenario, with all the limitations of this approach since the methodologies are not standardised at the moment." (ITCHAM01_B)

"We are generally/typically quite hesitant to push the boundaries on that side. And being rather risk averse as well. If it goes against us, then that's a huge potentially a huge liability." (LON09_II)

"How do you even start […] what is that public pipeline? The ticket size can be too small." (LON_A01)

"And because a lot of climate related projects are newer technology, they're more innovative, they don't have a long track record, Technology risk is definitely one of the [barriers]. But I think the like the overarching one is there's a mismatch and a lack of capacity on the project developer side to speak the language of that investors are. And then there are very few investors that are willing to try to figure out the language of the cities are speaking and like where the cities are able to get to. I think the point l the lack of knowledge, technical advice on green infrastructure investment.[…] I work on the Project Preparation Action Group, so I'm hearing about those challenges. But really that there's a gap between the technical capacity and the language and the way that cities think about and understand projects and then the way that investors do. Where, a city is going to start looking for outside financing much earlier on in the project cycle. And it won't be at the stage where you can go to a bank or go to an asset manager and present a compelling investment case. And whether that's because they don't have the internal capacity to put staff time into it to do the pre-feasibility studies they need to for budget reasons, or technical reasons, because their projects are too small, and the ticket sizes aren't big enough. But there's, there's definitely this disconnect.. Knowing what they need to present something to an investor that will actually help them to access that financing. I think that's some of that is probably is definitely coming from the perception that returns are low and they require high capital investment." (LON06_O).

"So, you'll have less equity opportunities [due to the public focus]. That's where bond investing can come along. You see it in the meetings with the municipal market in the United States. You see it in the green bond markets in Europe, a little bit and in sovereigns and for some sovereign carbons in your bank and so forth." (LON04_AM)

"Things aren't coming together to have the catalytic or exponential growth that we need to get to the investment levels to meet the goals of the Paris Agreement or to hit the national climate targets. So, I think it's really a sense of there's lots of pent-up demand and I think a pent-up investor appetite as well. But. We haven't solved at scale the roadblocks between the project developer and the investor so that they can come together with bankable projects and terms that work for the project developers to have investments at the scale of the need. But I think the overarching one is there's a mismatch and a lack of capacity on the project developer side to speak the language of investors.. And then there are very few investors that are willing to try to figure out the language cities are speaking and like where the cities are able to get to." (LON06_O)

Technological uncertainty

Adaptation technology uncertainty was stressed as a major barrier. Adaptation technologies strive to advance beyond the demonstration phase to commercialisation and diffusion (Nemet et al., 2017). Investments are seen to have an increased technology risk as they are not yet financially mature, and there is no track record for

these approaches. Overcoming technology biases and lock-ins, along with the constraints of underused structures, demands significant institutional adjustments for investors.

> *"And because a lot of climate related projects are newer technology, they're more innovative, they don't have a long track record, technology risk is definitely one of the [barriers]."* (LON06_O)

Difficulties in impact measurement

Comprehensive understanding, encompassing both explicit and tacit knowledge amongst investors, is vital in domains such as climate risk assessment, impact measurement, performance evaluation of adaptation projects, investment models, and disclosure criteria. FIE mentioned that standardised tools and illiquid for evaluating and communicating climate risks and investment advantages are lacking, adding to forecasting and monetising complexity.

> *"We actually went through when we placed bonds what the eligible categories are and actually tried to quantify that. It's definitely a much more difficult because it is nuanced that we've aired on the side of conservatism. I think it's just people haven't focused enough on it. I'm spending a fair amount of time also looking at the government, at the sovereigns, and what is the risk that they run? And what impact physical risks is going to have on their on their financing in the future Impact. So, for example, we will work with an entity such as our Netherlands branch, where their financing, not all of it [adaptation]. 30% is actually the amount of financing of the dikes in the Netherlands. And that obviously is a direct adaptation. [..] I think until we get some of the standardisation in place and the impact metrics, the market doesn't react, you kind of need to feed the market."* (LON05_B)

Several of the interviews are however making advances in understanding impacts:

> *"However, from a process perspective, we are a bit more equipped because, with the logic of climate risk management, we have developed proprietary methodologies for assessing climate risks that can impact our portfolio assets. We collaborate [...] to determine the potential impact of acute and chronic climate events on our assets for different scenarios. This work was site-specific to examine how these events could specifically impact the economic variables of our assets, such as asset value and expected revenues. We are applying this methodology not only to the existing portfolio but also to new investments we evaluate. So, we are conducting assessments of resilience and any necessary adaptation measures for all investments."* (CHAM01_B).

> *"Within the Global Impact Investing Network, we have noticed an increasing attention to the need for developing taxonomies on adaptation - discussions on this topic are starting to emerge."* (IT01_AM)

Lack of products/instruments

Many respondents mentioned the lack of financing mechanisms or instruments dedicated to adaptation. Most heavily favour incumbent technologies and financing approaches. They predominantly use traditional financing mechanisms for established technologies such as renewable energy. A couple of investors mentioned there is a need to develop mechanisms to encourage investors to allocate resources specifically for climate adaptation projects, thus valuing adaptation as a critical component of the market (e.g., adaptation bonds, resilience-linked securities, climate-adaptation credit rating agencies).

> *"So we don't have a market, we don't have a culture for this kind of instruments and we are currently testing with a hypothetical products that our customers are willing to buy or are they interested such a product and if there is such an interest then we could start the process to make those products legal and possible for us to sell them."* (INS03)

> *"We coordinated a [project] on the theme of adaptation with the aim of helping Italian SMEs adapt to climate change. One element of the project was to identify innovative financial mechanisms to finance adaptation since it was a public-private partnership project. However, we struggled to identify financing mechanisms for adaptation."* (IT04_B)

> *"On bonds I believe that they will become fundamental financial instruments, especially for climate change adaptation. Today, they are not, and there are still significant knowledge barriers in the market. In the absence of data, we are developing climate-tech applications aimed at building an informational base that can be used operationally in investment decision-making processes."* (IT01_AM)

Blended finance was seen as a solution by some of the commercial banks interviewed and especially by those in France. They are keen to increase this type of financing to have more diverse financing options for adaptation. Above all it is seen to solve the profitability problem or de-risk certain adaptation projects.

'They (banks) have begun to think globally about how to link the public and private sectors, even if blended finance is not their priority. In particular, they are focusing on where private investment is of interest. As a

reminder: there is no point in private investment if the projects to be financed are not profitable. This is not the criterion that interests Caisse des Dépôts in the first place, as it does not have the same vocation as the other financial players on the French market. And it is not looking for profitability'. (FR05_B)

Limited investment experience in analogous sectors

Our findings suggest that investors associate climate adaptation with a level of risk that perhaps does not exist for investing in other sustainability investment areas, such as nature-based solutions, green infrastructure, or biodiversity conservation. While some progress has been made in obtaining finance for these areas, their adoption in the realm of adaptation has been notably limited. Adopting and amalgamating effective finance business models, instruments, and incentives from analogous sectors could markedly improve funding for adaptation, yielding numerous beneficial outcomes.

> *"It's a difficult one because often you're in the grey zone of adaptation and mitigation. We have a clear focus on mitigation and not on adaptation because we say the carbon budget, there's no room left, so you have to tackle the carbon emissions first and that's really important. We still believe that 1.5 degrees or two degrees are still achievable if you act now. [….] Nature-based solutions are a priority." (BEL02_B).*

> *"The aim of our program is to finance several nature-based solutions in France through private finance. They are looking for local projects with biodiversity and climate adaptation criteria in France which can benefit local populations." (FR01_O)*

> *"Defining specific investment areas on the topic of adaptation is difficult because until now adaptation has been interpreted as everything related to Nature-Based Solutions." (IT04_B)*

> *"So, while we are generally open to these types of investments, we do not currently see significant opportunities. The reason we participated in this project is also to understand if there is something we might be missing and if new perspectives can open up." (CHAM01_B)*

Some FIEs finance adaptation projects as a secondary driver, it is a project that they are financing anyway for other reasons, but it has adaptation elements. There can be multiple drivers for adaptation finance.

Complex investment processes

Respondents stress the complexity, uncertainty, and sometimes politically controversial nature of investing in adaptation. It can involve political decisions, and these equate to delays and increased transaction costs for many investors. There is an acknowledgement of complexity in identifying what constitutes adaptation because of its unclear taxonomy. The definition of adaptation and its tracking pose significant difficulties for investors (Boston Consulting Group, 2022). Our findings point to an overwhelming complexity of adaptation finance, which is powering investment hesitancy.

> *"But adaptation is just a lot more complex to communicate. In addition to the financial impact of the project, what's the climate impacts? I mean, in a lot of cases you can't say. We know it's going to save this many lives and this much avoided damage [----]. And returns compared with another threshold level. Is this a business model for the project? So, it seems like there's sort of a dual filter." (LON06_O)*

> *"At the moment, analysing the return on investment and identifying these investment opportunities is a bit challenging." (IT04_INS).*

All these barriers indicate limited potential for increasing financing without systemic changes. Understanding these dynamics is crucial because the investment response will profoundly influence the pace and nature of adaptation efforts. Overall, this research has uncovered two major concerns related to barriers: (i) a notable lack of investor buy-in for adaptation finance and (ii) policy/regulatory gaps. For instance, there was limited evidence that investors are interested in enhancing adaptation investment attractiveness and acceptability through de-risking measures, co-financing, and scale aggregation, all of which can facilitate 'learning by doing' and 'trust signalling' amongst investors over time. Of particular concern is the absence of and limited acceptance of public-private partnerships as well as blended finance to support adaptation projects. Interviewees mentioned blended finance instruments being used in markets in the Global South for adaptation projects and noted their absence in European markets.

5.2.3. Required changes to enable finance

When asked about what needs to change almost all respondents cited the regulatory framework (Figure 4.4). This was then followed by better impact measurement, more disclosure, higher returns, changes to project size, more liquidity, better advice and finally changes to liability arrangements. Furthermore, several interviewees highlighted the need for project de-risking, co-financing and scale transformation, as well as more education/learning and industry collaboration. Two crucial additional interventions identified are:

establishing a sense of urgency and vesting a value in adaptation. These key changes are described in priority order given by the respondents (I) to (V) below. Further interview data on the required changes has been analysed, sorted into an accessible and searchable Excel and Word formats (Annex 8)

(1) Regulatory change

Respondents echoed the literature in suggesting ways to incentivise urban adaptation programs such as insurance, mortgages and loans, tax incentives and credits, grants, regulations, and enhanced building codes (M. Olazabal et al., 2019). As discussed in the literature review diverse forms of regulation (industrial, fiscal, financial, market and monetary) can bolster adaptation finance efforts (Jagt et al., 2019; Mees, 2017; Mees & Driessen, 2019). Interviewees stated that far reaching changes in legislation and regulations are needed to solve the myriad of obstacles to adaptation finance. According to our interviewees, investing in adaptation needs support throughout the finance system, in legislation, regulations, and policy objectives, and also in guiding principles, governing structures, processes, networks, heuristics, and relationships. The respondents also specifically mentioned the need for a stable policy framework. There was an evidently strong desire for governments to act as a co-player in adaptation efforts. Moreover, regulation is necessary to address complex property rights issues, such as monetising avoided costs or property value gains resulting from adaptation activities.

> *"Regarding the green bonds we are leaning towards the European regulation. We currently evaluate the climate resilience of our target investments in terms of expected ability to perform under adverse climate conditions. Such evaluations are performed analysing climate risks associated with each investment in the due diligence phase. If significant risks emerge, an adaptation plan is proposed and related costs are evaluated."* (CHAM_O1_B)

It was somewhat surprising that investors, though concerned about the significant recent changes in financial regulations related to sustainable finance and climate risk disclosure, were all supportive of further and more stringent regulation of all types (fiscal, financial and industry). This is positive news because any regulatory change would need to gain acceptance from influential actors in the finance sector capable of driving these changes to policies like environmental regulations or fiscal measures to incentivise investments in adaptation solutions. Finance bodies such as SIBs are pivotal institutions in establishing, promoting, and sustaining an adaptation market. SIBs were said to be starting to work on adaptation in two of the lead territories (France and Italy) but declined requests to be interviewed. Nevertheless, we interviewed the National Bank of the Netherlands (NbN) who provided useful information on potential roles for State Investment Banks (SIB) in our territories.

> *"The central banks and the regulators are also becoming more interested and we'd be very interested in ideas on replicating this approach [a standard for property climate risk assessment] in other territories, now that there's been a proof of concept in the Netherlands, It would be very useful to talk to about the regulation and their role."* (INS04)

> *"The Network on Greening Financial Institutions - we've done some work on blended finance. We produced a technical note which was with National Bank of the Netherlands (NbN) and MAS -the Monetary Authority of Singapore. It covered: What is it? Why is it important? Why is it not being scaled sufficiently? Is there something in regulation that should be done about it? What can SIBs do? What can MDBs do? At the moment, it's more a multinational development bank focused, but we can use the experience of that in the Netherlands - this initiative could lead to more climate adaptation."* (REG01)

(2) Monetary valuation and incentives

Securing finance for adaptation necessitates implementing interventions that internalise market externalities. These interventions include financial incentives, such as preferential rates of debt for early-stage technology and innovation, and financial insurance incentives for flood risk. Demand signals, like tax exemptions, and the institutionalisation of adaptation value and pricing resilience, such as through a bilateral exchange similar to carbon trading markets, are also important. In such an approach, resilience or adaptation credits rather than carbon credits would be exchanged or traded. The US municipal bond market successfully supports municipal large adaptation projects, partly due to tax exemptions applicable to such financing (Buhr, 2022).

> *"And a lot of the actions that need to be taken is about helping us understand that you know, on a national level, as I mentioned earlier, what are the valuations? What how do you value, what is the adaptation value at risk?."* (LON11_O)

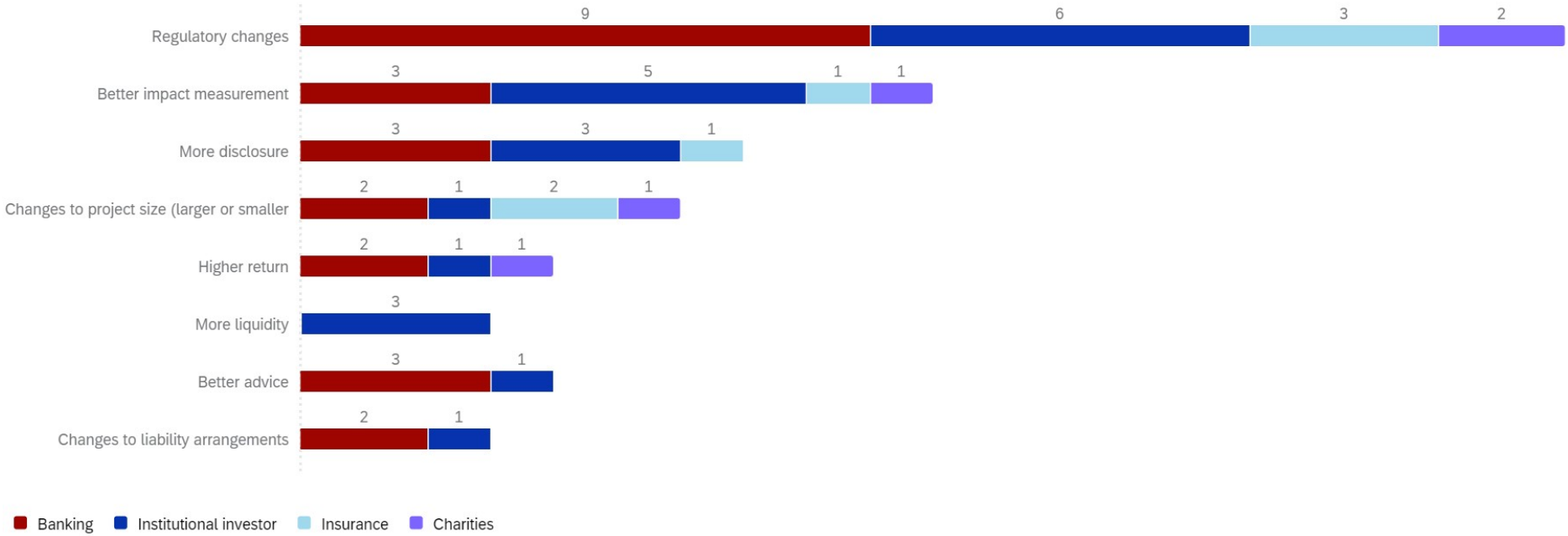

Figure 5.4. What would need to change to make adaptation to enable investment (survey/interviewee responses)?

(3) More standardised corporate disclosure

Interviewees called for more climate risk and adaptation aligned investment disclosure. There was support for stringent financial regulations and standards that require all businesses to disclose and assess their climate risks and impacts, fostering transparency and accountability in climate-related investments (e.g., mandatory climate disclosures, adaptation finance standards, fiduciary duty changes, regulatory oversight).

> *"And it's knowledge building […] the common language, common standard building and disclosure standards around that. Which are really, really important but have been missing."* (LON13_O)

> *"It's a necessary prerequisite. To drive disclosures and to, again, to make sure the TCFD has to move. To see if there's a big focus on obviously transition dimensions. Obviously it talks about physical risk, but people have not really started to look at that. People focus a lot more on emissions, but this is going to be a really important mechanism of disclosure to make it happen'. It [the EU Taxonomy] also should be important. It's necessary."* (LON13_O)

(4) Investable projects (bankability size, returns etc.)

A challenge cited by investors is identifying investable and bankable adaptation projects, and the related lack of cash flow and income stream. Interviewees are aware there are a number of possible routes to invest in adaptation (public provisioning, debt, equity, novel financing vehicles and insurance) but at present these are not deemed attractive. Efforts to improve the bankability of projects, identify income streams, and increase transaction size are all needed. The literature has long stressed the need for bankable adaptation projects to be developed based on identified income streams, project markets, historical performance data, project preparation, and end-user demand (ADB, 2021).

> *"The business model, i.e., what is the model for making investments for a private operator in infrastructure or investments oriented towards adaptation. I would then put primarily bankability, then, coverage, market, return, etc. [….] there are still the characteristic risks of an investment, among which I would place bankability in the first position."* (ITCHAM01_B)

Interviewees are experimenting with some novel financing approaches.

> *"Recently, we interacted with the insurance companies in which we invest to assist them in drafting the materiality matrix for the SFDR, and adaptation strategies are at the top in terms of financial materiality. We believe that the development of products that allow for de-risking could come from them to a significant extent, at least on a sectoral scale. Currently, there are no such tools, and we do not see any on the horizon. Risk transfer products could involve parametric products, which we emphasise when talking to insurance companies, but at present, we do not see a flourishing market in this regard. In fact, we see that insurance companies may be stepping back from catastrophic risks that, due to their new frequency and intensity, are becoming uninsurable."* (IT01_B)

> *"The bank entered the market at the end of November with a green and sustainable bond issue, coordinated internationally."* (ROM01_B)

> *"We are on the forefront of moving these projects ahead and working with the companies to identify the best solutions that fit them. And of course, technology is one of them."* (ROM02_O)

> *"We are working on projects that are sometimes innovative [in adaptation], such as a fire-resistant plant project in New Caledonia."* (FR01_O)

> *'We would also like to highlight the MAIF[38] fund "Nature pour le vivant" (ecological dividend). This is an innovative solution for financing projects that have strong co-benefits for biodiversity and can meet the needs of climate change adaptation. MAIF and its subsidiaries devote part of their profits to the protection of biodiversity and climate solidarity via the ecological dividend. In 2023, this will amount to €8.2m, of which €4.68m will be allocated to the MAIF Fund for the Living World. The remainder will mainly be allocated to solidarity actions for members most exposed to the risk of flooding. 10% of MAIF's annual income is devoted to the ecological dividend'. (FR01_B)*

(5) Other

Investors' perspectives on the responsibility for adaptation projects and who should assume the associated burden represent another significant aspect. For instance, respondents asserted that the onus for adaptation

[38] The French International Cooperative and Mutual Insurance Federation (CMIF) member MAIF has announced in January 2023 that from now on, 10% of its annual profits will be allocated to climate solidarity and biodiversity regeneration projects.

investments rests solely with the public sector rather than private entities, a sentiment echoed by many respondents.

Less than 15% of the FIEs interviewed stated they were engaged or committed to PPPs in adaptation and very few could give concrete examples. Partnering practises in low carbon (renewables), nature, and green infrastructure are more prevalent but not being translated into adaptation projects.

> *"I really believe in blended finance. But there is so far hardly any blended finance available in Belgium at least. I see some blended finance structures as it comes to developing countries and projects in developing countries. I think it's something Europe should reflect upon. Instead of giving subsidies to certain projects, I think it could make much more sense to contribute from a government perspective that same amount of money in equity form."* (BEL01_B)

> *"For our business model, we have little flexibility; we need to generate risk-adjusted returns. Therefore, it is precisely from this perspective that the framework we are developing for evaluating investments in adaptation is focused on the dimension of financial materiality. It is important for us to understand the risk that a company may have to suspend production in the face of drought or that the company's suppliers may fail to deliver essential production inputs, leading to production suspension. "* (IT01_AM).

Our findings accord with the literature, and we conclude that mobilising new partnerships to finance adaptation projects is crucial but depends on first resolving the complex governance and economic issues related to responsibility for funding, trade-offs, equity, and the accrual of benefits at the urban level (Bisaro, de Bel, Hinkel, Kok, Stojanovic, et al., 2020). Although public investment can be highly effective in mobilising and de-risking private investment, our study shows that de-risking approaches are not yet being considered for most of our interviewees.

For established technologies like low-carbon initiatives, investors benefit from well-established industry networks that encourage, support and facilitate investor financing for projects. These networks play a crucial role in fostering trust, collaboration, and knowledge-sharing, thereby instilling confidence in innovations and increasing the willingness of investors. Conversely, no similar industry networks exist among investors for adaptation, although robust inter-municipal networks have been established for this purpose. Participants underscored the importance of cooperation and collaboration for adaptation – supply and demand side. Interviewees investing in adaptation detailed the intricate interagency process involved in designing and implementing adaptation projects, which entails the involvement of numerous actors and their perception that this means finance complexity and increased transaction costs.

State Investment Banks (SIBs) are seen as critical players able to coordinate and encourage investment activity in new areas such as adaptation. Some SIBs in Europe are active in adaptation: the Dutch National Bank has a sustainable finance initiative and an Adaptation Working Group who have published an adaptation policy paper in 2023 (de Nederlandsche Bank, 2023). Despite its acknowledged importance, there is a lack of leadership in adaptation finance from these and other key finance think-tanks and thought leaders within key financial organisations. Moreover, climate strategies of these institutions are yet to extend into adaptation.

> *"Question is how big the challenge is and what is the link to the state investment banks core tasks in terms of financial stability. And this links to also the stress testing work that we've been involved in and working with financial entities [….] We need further research and new analysis,- for the first time we will use different adaptation pathways. This would be a first for us - different adaptation pathways using new analysis on floods and its impact on financial stability."* (REG01)

> *"You have one to say we're going to do it [adaptation], but it needs to be everyone, because otherwise it just gets stuck. So, you know we can say we're going to do this and we can do it - we may be a very large company, but it's still tiny compared to the rest of the world. Everyone has to do it. Or at least 50% or 60% of entities have to come in and say, right, we're going to do all this [adaptation] , this is the direction we're going. But at the moment it's just there's not mandated. I guess they think they just don't need it. They have the investment, they have cash. It's up to government to do it and they don't."* (INS03)

> *"So, there is a good enabling environment in [our country] . The central bank has just done a report on climate risk, [It involves large banks and insurance companies in our country]. They're one of the most proactive FIEs. [….],It is a repository now for data on the real estate sector and for use by asset owners and managers of property in the country. And there's a high percentage use of across the sector now with a good percentage that are using it - 90% are using this platform to do their assessments. They do it in very different ways and to very different levels of detail. But there is that one level playing field and the climate proofing is accelerating now across the sector. And we've seen this change in the last 3 to 4 years [here]. There's an increase in those who are becoming very interested in climate proofing their properties. The central banks and the regulators are also becoming more interested, and we'd be very interested in ideas on replicating this approach in other territories now that there's been a proof of concept [here]."* (INS04)

Table 5.1. Investor views on the future of adaptation finance in the EU

1. Investable projects	2. Collaboration and partnerships	3. Policy and regulation	4. Financial incentives	5. Investment opportunities	6. Changing the market
*'I would like to stress that we currently have no experience with pure climate adaptation finance (i.e. projects aimed at improving climate resilience of a territory/community), as we are only dealing with the **resilience assessment of our target investments** (which involve renewable projects, mobility infrastructure, and so on)'. (CHAM01_B) '* *'I would say in adaptation on the equity side it is as it is because it's very project specific and tends to be government funded. So you'll have less equity opportunities. That's where **bond investing** can come along. You see it in the meetings with the municipal market in the United States. You see it in the green bond markets in Europe, a little bit - in **sovereigns** and for some sovereign carbons in your bank and so forth'. (LON04_AM)* *''It's a difficult one because often you're in the grey zone of adaptation and mitigation. We have a **clear focus on mitigation and not on adaptation** because we say the carbon budget, there's no room left, so you have to tackle the carbon emissions first and*	*'Maybe I know. I think from a political perspective, it's easier to give money away [to a **nature investment**] as subsidy than to be a structural shareholder of a certain company or investment vehicle. If you give it away, ok, it's all gone. (BEL01_B)* *'The **Network on Greening Financial Institutions -here we've done some work on blended finance.** We produced a technical note which was with NBN and MAS -the Monetary Authority of Singapore. It covered: What is it? Why is it important? Why is it not being scaled sufficiently? Is there something in regulation that should be done about it? What can SIBs do? What can MDBs do? - we can use the experience of that in the Netherlands it also leads into the Working group on climate adaptation. It's been a very interesting exercise'. (REG01)* *'Within the Global Impact Investing Network, we have noticed an increasing attention to the*	*'I think **regulation plays a very big part** because that sets the conditions for the wider market. Investors could be obliged to address the physical risks of climate change in certain ways'(LON07_B)* *'On the **fiduciary duty recent changes have come through for pension funds in the UK** - finally we're happy now to invest in sustainable responsible investment'. (LON08_II)* *'**Stronger requirements on investing in infrastructure** has to meet a variety of adaptation related standards' (LON_A01)* *''we've had a few generations of **climate adaptation finance tracking**, and we work with the other multilateral development banks to align on how we'll be tracking it (ROM02_O)* *'We're working on stuff on the **building sector (disclosure regulation]***	*'Once someone can crack the problem of how to develop a **financial product that monetises the value creation potential** that creates a stable revenue stream, then the market will unlock innovation - requires state innovation or support'.(LON11_AM)* *'Adaptation is a strategic priority.. Work is underway with ADEME and CEREMA to consider organising a "public adaptation service" for public and private players, following the recommendations of I4CE' [FR04_O)* *'We **already finance some peatlands or wetlands in Scandinavia .& In the UK,** - proceeds comes from carbon certificates. We also have the a 'Regenerative Money Centre'. It's a kind of a playground - It's a separate entity for experimental financing. It is small..' (BEL02_B)* *''We're working on stuff on the **building sector (disclosure regulation] specifically**, - private investment in low carbon and resilient buildings? You can make it easy to get risk information, information on*	*''**Many of our projects meet climate change adaptation criteria**. ….. The aim of our program is to finance several nature-based solutions in France through private finance. They are looking for local projects with biodiversity and climate adaptation which can benefit local populations using (FR01_O)'* *'There is also an issue with private access. Other types of investments are not on our radar; [….] In this sector, concessionary approaches are not visible at the moment. So, while we are generally open to these types of investments, we do not currently see significant opportunities. The reason we participated in this project is also to understand if there is **something we might be missing and if new perspectives can open up'** (CHAM01_B* *''For a pension fund]the primary driver because they have the fiduciary duty to do that. But once they have considered that, yeah, then it's*	*'The question is how big the challenge is and what is the link to the state investment banks core tasks in terms of financial stability. And this links to also the **stress testing** work that we've been involved in and working with financial entities in the Netherlands. We need further research and new analysis,- for the first time we will use different adaptation pathways. This would be a first for us - different adaptation pathways using new analysis on floods and its **impact on financial.** (REG01)* *'Yes it is. We, we put out a paper on this and that looked at **supply and demand side aggregation, - a bond** is essentially a way to aggregated smaller investors. If you can't get a single investor for a project size but also things there's a network of Argentinean municipalitie and they have a fund that each municipality pays into and they do joint procurements'.(LON06_O)*

that's really important'. (BEL02_B) *'It [*investment *] is still very, very nascent because it has all been about immediate mitigation. It's easier to see and invest in something that is mitigation versus adaptation. The conversation is around a* ***just transition*** *that does lend itself much more to the resiliency side,. And so, there is still a gap, but I do see it closing as well.'.(LON09_II)*	*need for* ***developing taxonomies on adaptation.*** *- discussions on this topic are starting to emerge'.(IT01_x)* *"I have a really hard time seeing how you get any kind of significant private investment in adaptation without using blended finance'.(* LON06_O) *'We're starting to see a lot more* ***enlightening, positive conversations bringing people together****.?'* (LON13_O)	***specifically,*** *- private investment in low carbon and resilient buildings? You can make it easy to get risk information, information on how to build resilient buildings. You can require like risk disclosure labelling, but the strongest thing you could do is you have building codes that make it mandatory to do certain things. But that's the way to get a*	*resilient buildings. Then require like* ***risk disclosure labelling****, but the strongest thing is to have building codes that make it mandatory to do certain things. Then you get a systemic shift'. (LON06_O)* *'You need a set of financial terms that meet financial return hurdles. It's not financial regulation, it's broader policy to* ***incentivise companies to make these investments*** *and ensure that there's an adequate return'* (LON04_AM) *''Maybe* ***a technology*** *would be very effective, but the institutional investor does not want to take the risk'. (LON07_II)*	*around the* ***diversification*** *benefits, perhaps the income generation opportunity from the investment inflation protection and then the alignment of that investment to their investment beliefs around ESG'. (LON_10_II)* *'Not* really investing in adaptation*] as part of the Green Investment Group business****. We have to look at the resilience characteristics of the investmen****ts. As I we said its one of the things that we're currently looking at is a nature-based solutions'. (LON11_AM)*	

5.2.4. FIE Maturity Assessment Model

FIE draft MAM Results

Data from the interviews with the FIEs in the lead territories (n=17) was used to trial the draft MAM (methodology explained in Chapter 2.3). The methodology for the draft MAM is included in Chapter 3.2.2. The MAM uses conditions found across all the reviewed maturity models detailed in Chapter 3.2.2 such as exposure, commitment, policy/strategy, disclosures, institutions, knowledge, technology (see Box x). Just as the other methods and approaches exist for evaluating the maturity or readiness of investors to finance climate activities, this assessment tool aims to facilitate and inform discussions on how investors implement adaptation or resilience-aligned investments. The interview script was tailored to the MAM criteria (refer to Annex 8). The trialling of the draft MAM on participating FIEs showed a wide divergence in FIE maturity across the engaged FIEs. The full results are included in the separate FIE report. As with the interview data analysis all the FIE input and analysis has been anonymised.

Six conditions enabling FIE adaptation investment maturity (MAM):

- **Industry**: Investor interest, investor readiness (credit rating criteria/ CR assessment), commitment, leadership, plans to scale investment, networks, sense urgency, vision/pathway
- **Policy**: Regulation/policy context, disclosure, TCFD, TNFD, PRI, CDP, Transition (Just transition)
- **Market**: Access to capital, access to securitisation vehicles, state of investment landscape in themes, % portfolio invested in related themes, barriers, opportunities, vehicles in use, typical size of investment, trends in blended financing, challenges and opportunities in emerging financing structures, sectors, capital aggregation, de-risking, transaction history, transaction costs
- **Technology**: Awareness best practice, knowledge of technologies
- **Knowledge**: Education, knowledge, awareness, learning by co-investing
- **Culture**: Media laws and preferences, symbolic meanings of technologies, cultural value of innovation, etc.

All FIE Champions (recruited and potential) consistently demonstrated capabilities and activities across more than 70% of the maturity assessment criteria (See Chapter 5.3.1 for further information on CLIMATEFIT FIE Champions). They were active in industry networks, policy, adaptation markets and knowledgeable on adaptation. Their activities included investment climate risk screening, organisation level climate risk exposure assessments, investment in some way in adaptation and/or nature and having dedicated teams and resources for climate risk and adaptation. All were disclosing climate risks; however, it is worth noting that most European banks are required to disclose under SFDR, and banks comprised more than a third of our total sample. Almost all the FIE Champions were engaged in the maturity criteria relating to adaptation finance, such as finance for nature solutions with some adaptation benefit, resilience mortgages, concessional finance to municipalities, insurance products or property level climate risk assessment and associated adaptation activities.

In contrast, other FIEs had a much lower level of activity across the maturity criteria, most only had activity in less than 40% of the criteria. These FIE were less informed about adaptation, could not cite best practice examples, lacked any history in adaptation finance, were not using any novel investment approaches, and were not disclosing climate risks. This points to a need to provide information and awareness raising activities on adaptation finance for these FIEs. Figure 5.5 shows the results for two FIEs with contrasting adaptation finance maturity, including a high performing CLIMATEFIT FIE Champion (blue) and a less advanced FIE (orange). In the chart, the areas of mature activity are portrayed on the outside of the radar graph, and those where the activity was largely absent are portrayed in the middle, whilst those not able to be determined are plotted in the centre. This mapping in the MAM clearly demonstrates the areas of maturity and areas for development for both FIEs.

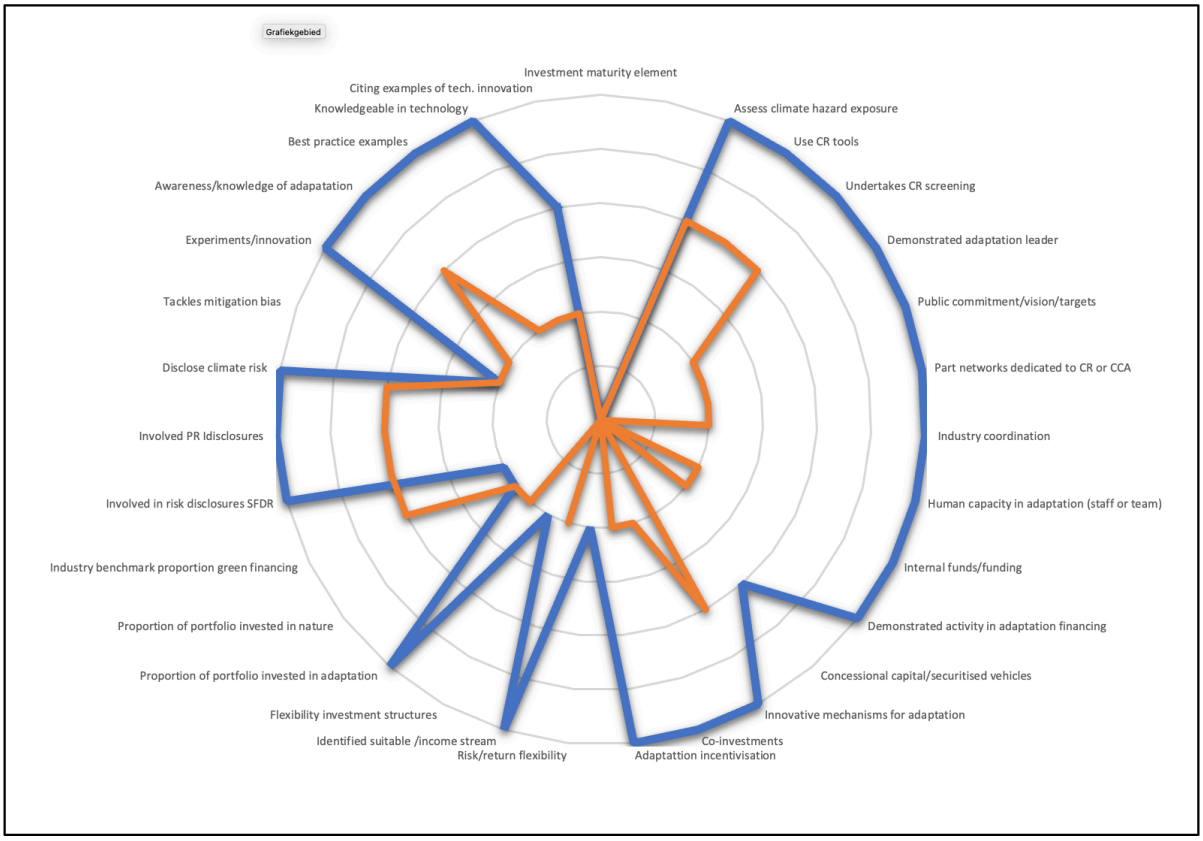

Figure 5.5. MAM results for two FIEs with contrasting adaptation finance maturity. Blue is an FIE Champion, orange is a less advanced FIE.

All three insurance companies interviewed rated very highly in the MAM indicating a high level of maturity and activity across many areas of the model. Two banks and one asset management company also rated highly, along with two other types of finance organisation: a foundation and an MDB. These are only indicative findings, as unfortunately, the sample was too small to break the assessment according to types of investors.

There was poor performance in relation to a number (15 of the total 30 or >50%) of criteria across all interviewees including co-investment and PPPs, vision/target setting, concessional finance, flexibility of risk/return hurdles, experimentation, familiarity with adaptation technology and use of innovative finance instruments/approaches (i.e., AFFSs). This further points to the need to provide information and awareness raising activities on adaptation finance for all FIEs. Best practice examples demonstrating the different finance sources, instruments and actors used in each would be very useful (refer to Deliverable D1.1 for best practice examples). Training on methods for climate risk screening, tagging and tracking adaptation aligned investment, monetising adaptation and impact assessment would also be very valuable to raise general awareness and competencies in these critical areas.

Application of the MAM

If FIEs lack maturity in critical aspects of adaptation finance, it will be difficult to grow overall finance activity. The findings on maturity will be very useful in developing the CLIMATEFIT training and capacity building for FIEs across the enabling conditions in WP2.3. The five enabling conditions are those aligned with the strategic niche management (SNM) theoretical framework we are using in all parts of our research in WP1.2 (Smith & Raven, 2012). Across the five conditions in our model, the highest maturity across all tested FIEs was in exposure conditions, followed by commitment, finance and knowledge and the lowest was both technology and policy.

MAM improvements

There were a small number of criteria that we removed from the first version of the MAM relating to insurance and liability, policy stability, and trust signalling. It was difficult for FIEs to provide answers to these questions in the time available for the interview. We also found that the assessment would have been improved by allowing multiple iterations of the assessment to be produced and discussed with each FIE. In this research we only allowed for desktop research, a pre-interview survey, and a one-hour interview to complete the assessment. The analysis was done of the survey, desktop and interview data by 2 researchers and then

checked by the interviewer. We did not have time in WP1 to discuss the results with the FIE individually, but we will do this later in the project in WP2 and WP3.

The MAM was found to be both useful and practical, so it will be further developed by the CLIMATEFIT team and applied to further participating FIEs. It is intended that version 2 of the MAM will be used in future tasks in CLIMATEFIT for other FIEs (WP2, WP3 and WP4), and we will assess these 17 participating FIEs at mid-term and at the end of the project. It will be a tool to assess both their progress in adaptation finance and the impact of the project. In this way, the results from the early stages of the project can be compared with the results from the FIEs at the end of the project, providing a means of assessing the effectiveness of CLIMATEFIT in building the commitment of the participating FIEs.

There are a number of criteria also missing from the MAM, such as a unit in the finance entity leading the adaptation/climate risk work. The MAM uses six enabling conditions found across all of the reviewed maturity models detailed in Chapter 3.2.2, such as exposure, commitment, policy/strategy, disclosures, institutions, knowledge, technology etc. Risk management and board conditions, as well as cost benefit and evaluation were excluded in this first version. These could be added in a later version.

The FIE Maturity Assessment is a CLIMATEFIT resource suitable for PAs to identify and understand the FIEs in their territory - their adaptation finance capabilities and appetite - and also for the CLIMATEFIT Consortium to better understand the maturity of the FIEs involved in CLIMATEFIT. Further consideration will be given to the development of an academic paper on growing FIE maturity, and the CLIMATEFIT team will discuss the MAM with our Advisory Board members to consider its further development into a potential industry endorsed standard for climate adaptation aligned investment. For this, it would be important to get the endorsement of one of the key global climate finance networks. Ultimately, the MAM will evolve and become suitable for FIE maturity assessment beyond the lifetime of CLIMATEFIT. There is also potential for it to be adopted by market-led initiatives fostering climate (adaptation) finance. The usefulness of the MAM for FIEs is detailed below.

Just as the other methods and approaches for evaluating the maturity or readiness of investors to finance climate activities, this assessment tool aims to facilitate and inform discussions on how investors implement adaptation or resilience-aligned investments. The results can be used by the participating FIEs to assist in strategising, tracking, disclosing, positioning, and creating opportunities for adaptation investment in their organisation and operations. It can be used in conjunction with the PRI's Expectations Ladder in developing a Comprehensive Climate Action Plan (CCAP), assisting investors in self-assessment and transition planning. This is particularly important as most climate action plans or transition plans do not yet adequately cover adaptation if they cover it at all. We find similar conditions in the MAM as in the Index Assessment Framework of IFC which examines conditions that enable investor and private sector engagement in adaptation actions. These include climate data availability, institutional arrangements, policies, economic incentives, and familiarity with relevant technologies.

5.2.5. Recommendations

Overcoming barriers and boosting maturity

To enable/incentivise and/or remove barriers to climate change adaptation in the private sector, IFC conducted a review of drivers and barriers to climate change adaptation based on existing literature and field observations of the private sector (Stenek & Amado, 2013). An index framework was developed with a set of sixteen indicators and measures. This analysis showed that, in short, there is no single 'silver bullet', but that five areas need to be considered in an integrated manner to successfully promote private sector adaptation.

> *"Contrary to beliefs that there is too much uncertainty to know whether it is financially-sound to adapt, this report includes many examples that demonstrate positive returns on investment, for instance of actions to improve climate and hydrological projections, create institutions or forums to do adaptation research or exchange best practices, or incorporate adaptation considerations in public infrastructure design." (Stenek & Amado, 2013)*

Data and information, institutional arrangements, policies, economic incentives, and communication, technology and knowledge are all highlighted as key measures for adaptation.

There are several options available for investors to start addressing asset risks, portfolio risks and systemic risks, in line with fiduciary duties (refer to Figure 5.6). We introduce several key opportunities and action frameworks from the literature.

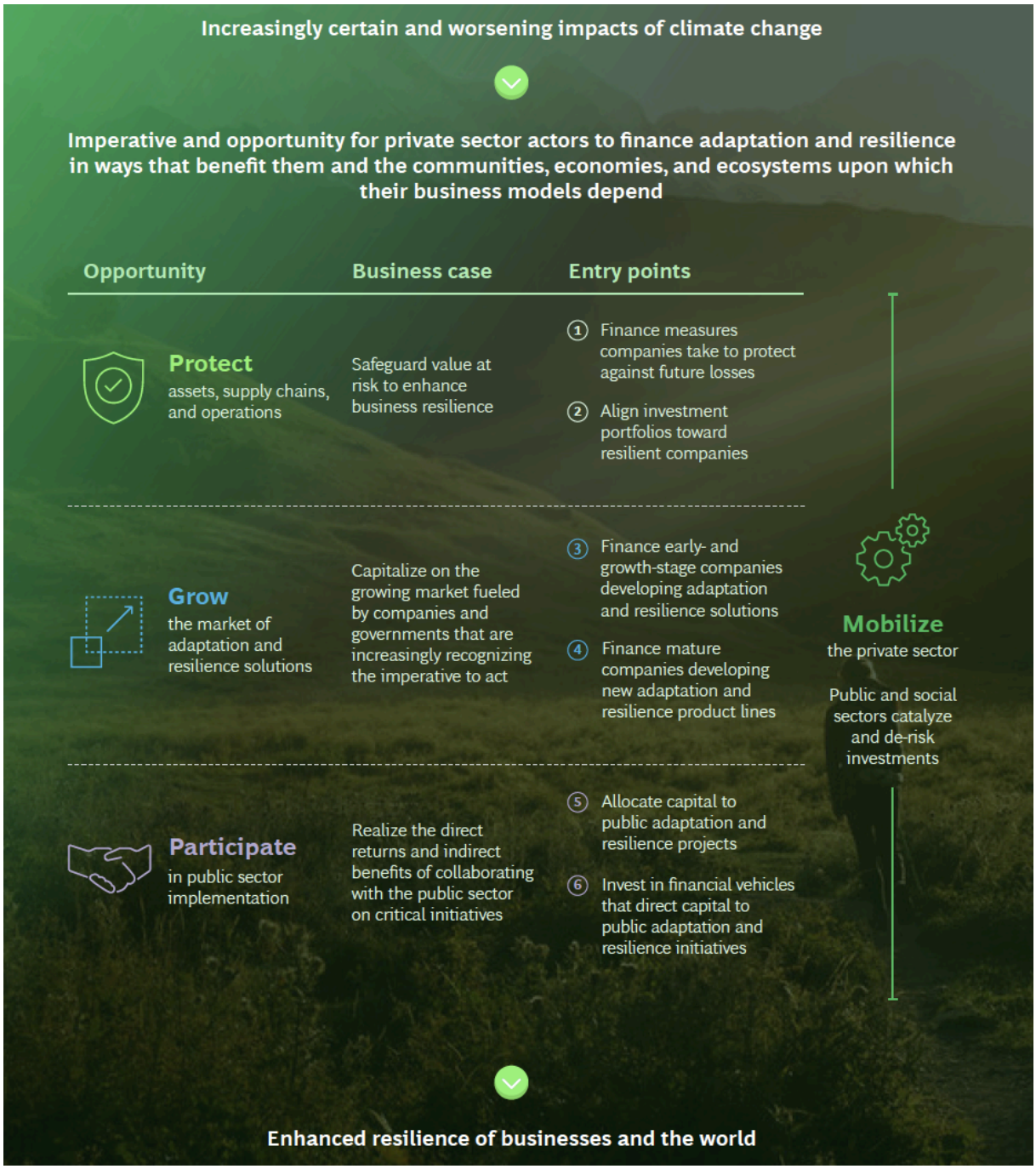

Figure 5.6. Adaptation and resilience opportunities framework. Source: Chau et al. (2023)

The (IIGCC, 2022) in addressing the two areas of climate risk propose six levers of action in a climate resilience investment framework comprising (1) Integration of physical risk and opportunities into investment processes (2) Asset allocation and portfolio construction (3) Asset alignment, engagement, and stewardship, (4) Investment in adaptation solutions, (5) Policy advocacy and (6) Disclosure.

The World Business Council for Sustainable Development (2023) has also suggested a similar five-point framework for the private sector action on climate resilience: understanding physical climate risk, integrating resilience, alignment of internal financial decision-making, assessment of business opportunities and finally understanding and acting on short- and long-term physical climate risks.

Lessons learnt from Financing Facilities

The Natural Capital Financing Facility, established in 2015 by the European Commission and the European Investment Bank (EIB), aimed to tackle the financing challenges commonly faced by projects addressing biodiversity and ecosystem service loss. This pilot financing instrument, which operated for seven years until its mandate expired in 2022, was designed to address the insufficient financing available to achieve the EU's

biodiversity and climate change adaptation policy objectives. The facility aimed to demonstrate how both biodiversity and climate adaptation projects could attract financing through innovative and sustainable market-based mechanisms, supplementing existing largely public and grant-based financing.

Managed by the EIB, the facility operated based on the EIB's standard market-based principles for risk assessment and pricing. While it followed the EIB's typical risk assessment approach, a guarantee from the European Commission allowed it to consider operations beyond its usual risk tolerance. The overarching goal was to establish a pipeline of replicable interventions, showcasing the viability of investing in natural capital. By demonstrating the attractiveness of such investments, the facility aimed to address the perceived lack of investment in this area by leveraging private and other forms of finance. The facility offered a variety of financial products, including direct loans, loan intermediaries, and indirect equity (through equity funds).

The operations of the NCFF pilot have been evaluated by the EIB. The findings of this evaluation are very pertinent to CLIMATEFIT, which also seeks to pave the way for increased private investment in climate adaptation efforts. We mapped the findings broadly in relation to our five (5) enabling conditions (industry, markets / finance, knowledge, regulation /policy, technology). The findings emphasise the need for a spectrum of innovative financing mechanisms, mainstreaming, large projects for scalability and replicability, flexible grant and funding eligibility criteria, diverse business models, a project development facility, innovative risk sharing, a role for utilities and coordinated efforts to scale up adaptation and nature-based solutions effectively (refer to the NCFF Box below).

The key findings from the NCFF evaluation are strongly consistent with the barriers detailed earlier (Figure 5.3 and Table 2.1) and the interviewee perspectives set out in section 5.2. Both nature and adaptation solutions face similar project scoping and financing barriers. The literature on nature and adaptation highlights comparable barriers and suggests similar financial and other responses. Similarly, our empirical research with FIEs identifies comparable barriers and responses for both government and industry. CLIMATEFIT will face similar challenges to the NCFF in achieving its project objectives, so it is crucial to focus on these findings and recommended actions. Our research on knowledge platforms suggests that FIEs would generally benefit from access to business cases; clear project definitions and their fit to investment instruments; as well as information on sustainability disclosure requirements. Each of these responses requires the active involvement of different financial actors, as outlined in NCFF Box. This task involves FIEs, financial regulators and governments and this is one of the reasons why our FIE Champions include a wide range of stakeholders. Table 5.2 sets out the intervention recommendations combining all our research streams.

Evaluation of the NCCF aligned to CLIMATEFIT barriers research

MARKET

Industry structure and scalable market: Future market-based instruments similar to the Natural Capital Financing Facility may have limited impact without a scalable market. A broader set of instruments, coordinated with grants and regulation, offering stronger support for early project stages, may be more effective. (EIB, SIBs, government, finance regulators)

FINANCIAL

Projects:

- Developing projects is a challenge despite a strong push for nature-based solutions in 2022, developing projects appealing to external investors seeking returns remains challenging. (FIEs , PAs)
- Few nature-based projects attracted private investment. Most rely on philanthropy rather than financial returns. (FIEs , PAs)

Transaction Costs: Scoping and delivering a project is time consuming: The facility took time to understand the market landscape and innovate financial structuring for nature-based investments. (EIB, FIEs , PAs)

Replicable Approaches: Suitably large and continuous sites are crucial for project development but acquiring them faces local opposition and high costs. The technical, legal, and social skill sets required for biodiversity projects could serve a range of nature-positive actions. (EIB, FIEs , PAs)

Scalability and Innovation: Innovative approaches are needed to secure large sites for restoration, potentially through partnerships with corporate sponsors or carbon credit buyers. Emphasising outcomes-based subsidies and grants could attract financing for biodiversity projects. (FIEs, PAs, EIB, SIBs, government, finance regulators)

Business Models: Combined business models integrating technology innovation and financial support could drive project development and scalability. (FIEs, PAs, EIB, SIBs, government, finance regulators)

Partnerships: There is an important role of public sector: The public sector plays a significant role in nature financing, emphasising the need for new approaches and partnerships. Challenges exist in developing

investable projects generating public good outcomes despite societal willingness to pay. (PAs, EIB, Government)

Instruments (Risk Sharing):

- There's a need for instruments and strategies to facilitate innovative cooperation where regulatory boundaries need negotiation or liability issues are at stake. Risk-sharing mechanisms and insurance approaches could facilitate new cooperation, but political will and regulatory backing are essential (FIEs, Government)
- There's a need for a broader and more complete range and spectrum of financing solutions for nature-based projects, catering to different stages of development and risk levels. A more flexible and tailored approach is necessary to support emerging intermediaries and innovative projects. (FIEs, PAs, SIBs, government)

REGULATION

Utility Regulation Paradigm:

- Similar approaches to utility regulation such as in the water sector could be considered, focusing on cost and specific implementation responsibilities within regulatory cycles. Sufficiency principles could be applied to estimate and charge additional costs required for ecosystem management to provide desired services. (PAs, EIB, Government)
- Utilities play a significant role in landscape management and nature financing due to their large spatial footprints and long-term planning horizon. They can rationalise investment decisions for nature-based solutions and mobilise resources for partnership projects. (PAs, EIB, Government)

KNOWLEDGE

Project Development Facilitation: Facilitating contact between solution providers and project developers could nurture project development and innovation. (EIB, Government)

Development Support Solutions:

- Enhanced assistance is needed, including seed grants, financial structuring assistance (especially for carbon finance), capacity building for financial institutions, and long-term monitoring. (EIB, Government)
- Need for Coordination with grants, evolving regulation, and risk-sharing mechanisms is essential for generating deal flow and scaling projects to enable more efficient deal flow. Eligibility criteria need to allow for multiple benefit streams and consideration of ecosystem outcomes (EIB, Government)

OTHER

Mainstreaming of Solutions: Nature-based solutions should be integrated into larger programmes, leveraging the planning and implementation capacity of strong promoters. Mainstreaming should involve both the public and corporate sectors, supported by technical assistance and targeted financial incentives. (All)"

Land for projects: Space and connectivity are vital for projects, but fragmented land ownership complicates development. Conservation easements and financial incentives are underutilised, with agricultural subsidy schemes dominating land use. Acquiring land for restoration often involves high costs and complex legal processes, particularly in populated areas. Restoration strategies require significant initial investments and long lead times due to land acquisition challenges. (PAs, FIEs, Government).

Source: Adapted from Hudson et al. (2023)

Interventions

We have identified from both the literature and interviewee input a wide range of interventions to address barriers to adaptation finance, covering a range of internal and external activities and involving multiple stakeholders. CLIMATEFIT will incorporate these strategies and actors as it progresses through its work packages. The conceptual framework of interventions in Table 5.2 highlights the complexity of adaptation finance, which is perhaps to be expected for an area such that is severely hampered by commercialisation challenges. We outline a complex network of interrelated conditions and interventions involving different stakeholders. Many strategies aim to address the market externalities and inefficiencies discussed earlier. Addressing these challenges requires multiple interventions, including those that promote adaptation and internalise market externalities (den Heijer & Coppens, 2023; Naidoo, 2020; Pauw et al., 2022). These can include, as discussed earlier, financial incentives, tax exemptions, and institutionalising the value of adaptation and resilience pricing (e.g. through bilateral exchanges similar to carbon trading markets).

Smith and Raven (2012) argue that fostering innovation starts with engaging government policy and moving from research-focused interventions to industry and market-focused policies. Achieving this requires significant disruptions to the current status quo, requiring profound changes in technology, business models, policy frameworks, infrastructure development, user behaviour, cultural perspectives and markets.

Financial incentives for renewable energy and the introduction of carbon pricing have been crucial in moving towards a low-carbon economy. While much work remains to be done in the mitigation and low-carbon sectors, the adoption of similar strategies for adaptation is essential for a comprehensive and effective response to the climate crisis, particularly given the urgent need to adapt.

Soft interventions typically involve specific actions, initiatives, or programs which focus on the behaviours – education, networks, and advice. Hard interventions involve structural changes to the system, organisations, policies, or frameworks that underpin the finance system. These interventions often aim to reshape the fundamental conditions or rules within which activities take place. These are typically policies, laws, taxes, and incentives.

"Soft policies typically include 'moral suasion' and educational campaigns, and more recently behavioural public policy approaches like nudges. Hard policy instruments, such as laws and taxes, restrict choices and alter financial incentives." (Banerjee et al., 2021, p. 1)

Table 5.2. Interventions to address barriers to adaptation finance. Adapted from (Whittaker et al., 2024)

Enabling conditions	Interventions	Description (actor roles denoted in grey)	Interviewees	Sample practitioner reference
Hard				
Industry structure	Industry leadership	Encouraging finance sector leaders to drive climate adaptation initiatives by taking a proactive role (e.g., Research and analysis, investor and client education, support, advocacy for policy support) (SIBs, financial regulators, finance sector think-tanks, FIEs, finance though leaders, State Governments), EU	(LON11_AM) (REG01) (LON05_B) (LON06_O)	GFS (2023); Chau et al. (2023); EIB (2022); IIGCC (2022); WEF (2022), GARWG (2022)
Policy and regulation	Financial regulations and standards	Implementing stringent financial regulations and standards that require businesses to disclose and assess their climate risks and impacts, fostering transparency and accountability in climate-related investments (e.g., mandatory climate disclosures, adaptation finance standards, fiduciary duty changes, regulatory oversight) (SIBs, financial regulators, finance sector think-tanks, finance though leaders, State Governments, EU)	(IT_CHAM01_B) (ROM02_O) (LON12_O) (LON05_B) (LON10_II)	CBI (2022); Mullan & Ranger (2022); KPMG (2023); EIB (2022); UNEP (2022); IIGCC (2022); Race to Resilience (2022); WWF (2022); GCA (2023); WEF (2022); GARWG (2022)
	Legal/policy framework to recognise/ protect property rights related to climate-adaptation activities	Developing mechanisms that recognise and protect property rights ensuring that ownership and usage rights support adaptation endeavours, which in turn can attract investment (e.g., legal property rights frameworks, Regulatory bodies or agencies responsible, legal structures for compensation, protection of ownership and trading rights) (SIBs, financial regulators, finance sector think-tanks, finance though leaders, State Governments, EU)	(FR05_B) (BEL02_B) (LON08_II) (INS04)	EIB (2022); Race to Resilience (2022); WWF (2022)
	Dedicated financial instruments that vest value in adaptation	Establishing dedicated financial instruments to encourage investors to allocate resources specifically for climate adaptation projects, thus valuing adaptation as a critical component of the market (e.g., adaptation bonds, resilience-linked securities, climate-adaptation credit rating agencies) . Sovereign green and	(LON12_O) (INS01) (BEL03_B) (INS03) (LON06_O) (FR02_B) (IT01_AM) (ROM02_B) (ITCHAMP01_B)	CBI (2022); EIB (2022); UNEP (2022); GCA (2023); GARWG (2022)

		sustainability bonds. (SIBs, financial regulators, FIEs, finance sector think-tanks, finance though leaders, State Governments), EU		
Markets and finance	Financial incentives	Offering financial incentives, such as tax exemptions or reductions, grants, low-interest loans, or subsidies, to incentivising companies to invest in adaptation activities (e.g., resilient tax breaks, resilient tax breaks, risk-reduction insurance premium reductions) (SIBs, financial regulators, finance sector think-tanks, finance though leaders, State Governments, EU)	(LON12_O) (INS01) (LON04_AM) (IT04_INS) (LONA01)	KPMG (2023); NbN (2023); EIB (2022); UNFCCC (2022); GCA (2023),
	Specialised financial instruments	Creating specialised financial instruments or investment vehicles tailored for climate adaptation projects, making it easier for investors to allocate capital to initiatives aimed at addressing adaptation (e.g., innovative in financial structuring, catalytic initiatives to accelerate business model, targeted investment vehicles, impact assessment and monetisation methods, labs/accelerators, crowdfunding, debt for swap, parametric insurance, weather-linked instruments, insurance linked infrastructure financing) (SIBs, financial regulators, finance sector think-tanks, finance though leaders, State Governments, EU)	(LON12_O) (INS01) (BEL03_B) (INS03) (LON06_O) (FR02_B) (IT01_AM) (ROM02_B) (ITCHAMP01_B)	GFS (2023); KPMG (2023); NbN (2023); GCA (2019); EIB (2022); UNEP (2022); Chau et al. (2023); World Bank (2022); UNFCCC (2022); GARWG (2022)
	Redefined risk and return expectations	Redefining and communicating risk and return expectations for climate adaptation/resilience investments (e.g., recognise resilience as an asset class, climate risk integration) (SIBs, FIEs, financial regulators, finance sector think-tanks, finance though leaders, State Governments, EU)	(LON04_AM) (LON09_II) (IT01_AM) (BEL02_B) (LON13_O) (LON07_B) (EU01_O) (LON06_O) (FR02_B) (LON05_B) (LON08_II) (LON_A01)	NbN (2023)
Knowledge	Centralised platform for trading/exchange climate resilience credits	Developing a centralised platform for trading carbon credits, enabling companies to buy and sell for instance resilience offsets while fostering investment in climate-resilient technologies and projects (e.g., resilience credit market, resilience credit trading rules, transparency, and verification mechanisms) (SIBs, FIEs, financial regulators, finance sector think-tanks, finance though leaders, State Governments), EU	(BEL01_B) (LON06_O) (INS01) (LON12_O)	GARWG (2022)
Soft				
Industry structure	Industry co-ordination	Encouraging industry coordination to drive climate adaptation investment and initiatives by taking a proactive role (e.g., learning by co-investment) (SIBs, FIEs, financial regulators, finance sector think-tanks, finance though leaders)	(LON06_O) (IT04_B) (LON11_AM) (LON05_B) (BEL02_B) (ROM02_B) (BEL03_B) (IT04_INS) (LON09_II)	GFS (2023); EIB (2022); GARWG (2022)
	Governance of finance entities	Work on a conducive environment for investment in adaptation. Facilitate improved internal structures, processes and maturity in financial institutions to improve accountability/transparency etc. (e.g.; supervisory practices, board	(FR05_B) (ROM03_B) (BEL01_B) (FR02_B) (LON08_II)	WWF (2022)

		supervision of climate risk etc., transition plans include climate risk and adaptation, integrate adaptation/nature into micro prudential policy, embed/integrate adaptation/nature in the organisation, penalties/fines, adopt precautionary principle). Embed resilience in investment due diligence. Emphasise dual benefits of net zero and resilience in property and infrastructure investment. Promote green infrastructure and property. (SIBs, financial regulators, finance sector think-tanks, finance though leaders, State Governments)		
Market and finance	Structured project pipeline	Establishing a structured project pipeline that identifies and prioritises climate adaptation initiatives, making it easier for investors to find viable projects and allocate funds effectively (e.g., project identification, project packaging) (FIEs, PAs, finance sector think-tanks, finance though leaders, State Governments)	(LON_A01) (LON11_AM) (LON04_AM)	EIB (2022); World Bank (2022); WEF (2022)
	De-risking capital provision	Implementing risk-sharing mechanisms, such as government guarantees or insurance, to reduce the perceived risk of investing in climate projects, thereby attracting more capital to these ventures (e.g., climate risk assessment, loan guarantees, contingency funds) (SIBs, financial regulators, finance sector think-tanks, finance though leaders, PAs, FIEs, State Governments)	(LON06_O) (EUR01_O) (ITCHAM01_B) (LON06_O)	Chau et al. (2023); EIB (2022); Chau et al. (2023);
	Size conversion and capital aggregation	Facilitating the aggregation of small-scale climate projects into larger, more attractive investment opportunities, making it feasible for institutional investors to participate and allocate substantial capital (e.g., project bundling, strategic investment portfolios) (SIBs, FIEs, PAs, financial regulators, finance sector think-tanks, finance though leaders, State Governments)	(INS01) (LON06_O) (LON09_II) (LON01_B) (BEL01_B. (LON_A01) (LON08_II). (EU01_O) (ITCHAM01_B) (LON04_AM)	EIB (2022); GARWG (2022)
Knowledge	Education/knowledge /advice	Knowledge, advice, and education to empower investors, individuals, organisations, and communities with the information and skills they need to make informed decisions and make effective adaptation investment (e.g., training programs, educational campaigns, peer-to-peer learning, advisory services, research and knowledge generation, climate literacy, share good practice). Emphasise dual benefits of net zero and resilience in property and infrastructure investment. Promote green infrastructure and property. (SIBs, financial regulators, finance sector think-tanks, finance though leaders, State Governments, EU, FIEs, Enabling organisations)	(BEL01_B) (LON06_O) (ITCHAMP01_B) (FR02_B) (LON10_B)	EIB (2022); KPMG (2022); Race to Resilience (2022); WWF (2022); WEF (2022); GARWG (2022)

5.3. FIE engagement in CLIMATEFIT

This section presents evidence of successful FIE engagement in WP1 CLIMATEFIT research activities It also includes analysis from research and interviews with other climate, nature and adaptation finance initiatives involving FIEs. The lessons gleamed by our researchers from these initiatives will guide the general approach to engagement of FIEs throughout CLIMATEFIT. In addition, the EIB has undertaken a recent assessment of its experience in implementing the Natural Capital Financing Facility (NCFF) pilot financing instrument, which is

also examined in this chapter Hudson et al. (2023). Together this analysis points to ways to successfully engage FIEs.

5.3.1. CLIMATEFIT FIE Champions

The CLIMATEFIT FIE Champions are identified organisations that are providing different types of funding and financing and /or products and services for climate resilience. They have excellent knowledge of key innovative Adaptation Funding and Financing Solutions (AFFS). Engagement with FIE Champions will be undertaken to leverage their expertise and resources to achieve CLIMATEFIT objectives. A set of ten criteria for selecting Champions has been developed (see below). In return for their participation, our FIE Champions will have various opportunities available to them throughout the project to showcase their expertise and share best practices with a wider audience. The Champions are also invited to join CLIMATEFIT's Local Resilience Taskforces (LRTs) to directly interact with the 20 territories involved in the project. Their role in the LRTs is vital to facilitate collaboration and knowledge exchange between FIEs and local stakeholders. It is envisaged that the Champions will support tailoring AFFS to the specific needs of territories and the FIEs. FIE Champions are involved throughout the project and particularly in tasks T1.2, T2.3, T2.4, T3.1, T3.2, T4.1 and T4.3. It is envisaged that the FIE Champions can work with the project team to increase the level of trust and legitimacy in each PA's investment strategy and plan, using co-design modes of engagement such as learning labs, dialogues, and exchanges based on experience consolidated in other EU projects and initiatives. As banks, insurance companies, investment funds, and private foundations, they will be able to offer first-hand experience of how private investments in resilience could be more efficiently mobilised in selected territories.

To be called a '**Champion'** in the context of the Project, **an organisation should meet simultaneously at least 3/4 of the following criteria**:

- Implementing a robust framework to support climate adaptation (climate strategy, climate risk assessment, action plan, targets, KPIs, reports) (This criterion is MANDATORY).
- Adhering to associations/initiatives on climate, sustainable investments, biodiversity protection or other typologies (e.g., being a member of a Sustainable Investment Forum – SIF/Subscribers of PRI).
- Following the recommendation of the Task Force on Climate-related Financial Disclosure (TCFD)/International Sustainability Standards Board (ISSB).
- Implement climate stress test (Banks).
- Investing in activities eligible for Climate Change adaptation according to the EU Taxonomy
- Investing in Nature-Based Solutions (NBS).
- Finance for Biodiversity Pledge Signatory.
- Adaptation Plan in place or planned in the next three years (follow an annual plan that integrates criteria focused on climate change adaptation and resilience to address climate-related challenges).
- Actively aiming for the goal of climate neutrality within investment activities (net-zero objective).
- Investing in SDGs aligned activities (e.g., SDGs 9; 11; 13; 14; 15) and/or signatories of Principles for Responsible Investments (PRI)

Table 5.3 lists potential FIE Champions with exemplary adaptation services or products, internal procedures, debt or equity financing, specialised fund, a foundation, philanthropic giving, corporate giving, or another financing approach such as payment for ecosystem services or a developer levy. More than 20 FIEs are being approached to become engaged as a Champion FIE. At the time of publishing this report 5 FIE Champions had been recruited. It is envisaged that further FIE Champions will be recruited throughout the project. Inspirational stories have been collected from our FIE Champions for inclusion in this report. Potential Champions were initially identified and contacted in the four leader territories' countries. FIEs in other European countries than the eight territory countries involved in CLIMATEFIT were approached via the network of the technical partners. Potential Champions were also identified from the database with international examples of innovative AFFS data was developed in T1.3. These were approached by UA and led to the recruitment of at least two Champions: The Nature Conservancy (European Office) and Alterfin. If the database is supplemented with extra examples throughout CLIMATEFIT, it offers a valuable resource to further identify and contact Champions.

Interviews with the FIE Champions have provided inspirational stories of best practices which will inform the project's approach to FIE capacity building

Table 5.3. Recruited and potential CLIMATEFIT FIE Champions (grey shading indicated recruited in June 2024)

Champion category	Exemplary practice	Description of an example adaptation/climate risk/resilience activity (*denotes a success story is provided)
Service or product	Asset climate risk assessments for asset managers*	Climate Adaptation Services* (The Netherlands) The Climate Adaptation Services Group* manages an open access website which provide climate change modelling and information to the property sector, in the Netherlands, to municipalities in the Netherlands and also finance entities. It is supported and endorsed by the National Bank of the Netherlands (NbN) and the Dutch Government. (Champion 1)

	Insurance products	Global insurance company providing a range of consulting services to the agri-food, industrial, financial and public sectors to help them successfully adapt to climate change and biodiversity loss,
	Resilience mortgages	A bank with a section focused on mortgages with a mortgage for people that want to buy a house who want to upscale and adapt their house, if the mortgagee incorporates adaptive and sustainable living activities within their home, they are given up fount finance to make the adaptations to their houses...
Internal procedures	Internal processes and commitment to adaptation	Bank with a strong commitment to adaptation the second pillar of its climate strategy is to manage climate risks. The bank undertakes a comprehensive climate risk assessment and allocates resources for adaptation measures to manage the risks.
		An international financial services company is developing biodiversity strategies and targets which includes adaptation measures within their insurance products. It has a Climate Action Plan including four main objectives, one of which is increasing investments in climate solutions by several 6 billion Euros by 2030. These climate solutions encompass both adaptation and mitigation investments, for instance, through green bonds.
		Public financial institution and has a comprehensive advisory and financing program on adaptation for municipalities, companies and communities. Its strategy on adaptation includes (1) advice, (2) financing, (3) securing and (4) operating. It has new investment tools for nature as well as financing for water, buildings, soil and biodiversity.
Debt solution	Green Bond	Entity financing sustainable/resilient agriculture by developing a green bond framework.
	Deep Green Bond	Global bank purchasing deep green bonds issued in NL for dykes and SLR protection.
	Climate Bond	Several banks and other entities party to the City of Paris created the climate bond to finance climate and energy projects. The total size of the bond is €300 million, with a running time until May 2031, and an interest rate of 1.75%.
	Blue Bond	A national investment bank who issued a USD 200 million blue bond at the beginning of 2019 to protect and rehabilitate the Baltic Sea. The proceeds provide lending to wastewater treatment and water pollution prevention projects, stormwater systems and flood protection, protection of water resources, protection and restoration of water and marine ecosystems, and related biodiversity.
	Digital green bond	The first bank to register a digital green bond on the public blockchain. The proceeds of the transaction are used to (re-) finance green assets.
	Hydrobond	An innovative financing structure which comprises mini-bonds pooled by water utilities and used as collateral for an asset-backed securitisation for water services/initiatives.
	Green Bond	City municipality issuing green bonds since 2013. The city uses the proceeds for environmental projects such as green housing, green transport, tree planting and water treatment.
	Concessional loans	A Bank offering concessional loans on adapting territories/municipalities to climate change. The offer targets priority regions: coastal & overseas, mountain regions & cities. The offer includes engineering tasks to support decision-making, project structuring and territorial data innovation on adaptation issues, Subsidised loans and equity investments for adaptation are offered. (
Impact investing	Impact investing*	IMPact SGR (Italy) is an asset management company specialising in listed impact investing. The firm merges financial performance with impact measurement by focusing on investments intended to generate measurable positive environmental and social impacts alongside financial returns. Their offerings span Climate Adaptation Intelligence products and services, which encompass identification and assessment of companies' and investment strategies' exposure to physical risks such as climate-related hazards and extreme weather events. (Champion 2)
	Social investing	Alterfin is a Belgian social cooperative providing investment opportunities aimed at creating a beneficial social and environmental impact. Alterfin focuses on low— and middle-income countries in Africa, Latin America, and Asia, investing in places where it can make a significant difference and where access to finance remains limited. Today, Alterfin has 70.5 million euros in capital and comprises 6,000 co-op members, both private individuals and businesses. (Champion 3)
Equity	Wetland Fund	A Wetlands Fund that is a non-profit fund financed by socially responsible companies and individuals. The fund's mission is to work to reduce the emission of greenhouse gases through the restoration of wetlands, in cooperation with landowners, the state, municipalities, companies, non-profit organisations and individuals.

Specialised Fund	Innovation fund*	A Bank has a finance innovation hub which is financing experimentation. Financed peatlands / wetlands in Nordics, and forest estate in carbon credits. Focused on NbS.
Philanthropic	Donations	A philanthropic organisation providing funds for climate adaptation projects. Project can be large and complex climate adaptation projects with many project partners committed to working together.
Corporate/ philanthropic support	Nature fund*	An FIE operates a nature program, comprising private finance from corporations for NbS which Includes adaptation projects and adaptation benefits in nature projects.
		Nature Conservancy (Global) The Nature Conservancy (TNC) is a global non-profit and one of the most effective and wide-reaching environmental organizations in the world. TNC has direct or indirect conservation activities in 79 countries and territories, including in Europe. Aside from their experience with conservation, and climate mitigation and adaption, (Champion 4)
National Bank	National Bank advocacy*	National bank of the Netherlands (NbN) (The Netherlands) and other key stakeholders convene a working group on adaptation under the Sustainable Finance Platform. Achmea one of Holland's largest insurance companies is a key participant. (Champion 5
MDB financing	Adaptation financing	A Multilateral Development Bank (MDB) who carries out systematic screening of climate risk, managing risks and financing of adaptation projects (globally). The financing is tracked and disclosed annually.
Other	Cooperative	A financial cooperative funds towards sustainable agricultural value chains (for working capital as well as long-term financing purposes) primarily through funding rural microfinance.
	Developer fund/levy	A program facilitated by setting up a designated nature and landscape conservation fund at the municipality, funds come from additional land taxes earmarked for upgrading existing nature.
	Business Improvement District /Developer contributions	A Business Improvement District taking annual development contributions to fund services and projects benefiting businesses and employees in the area. The BID's projects include greening actions, such as the maintenance of street trees, creation of pocket parks and urban gardens.
	Crowd funding	A crowdfunding platform that connects investors with sustainable projects for economic, social, and environmental impact, including nature projects.
	Payment for Ecosystem Services	A Catchment Market which is an environmental services market that aims to accelerate the delivery of nature-based projects such as the creation of new woodlands and wetlands.

5.3.2. Inspirational stories

Several inspirational stories have been compiled with the input of our Champion FIEs permission was received to publish the following three inspirational stories. The stories cover adaptation services/products, impact investing and nature funds. These are the ones that have been our first CLIMATEFIT FIE Champions at the time of publication. We will continue to recruit further FIE Champions to reflect the full range of potential financing instruments and approaches that our territories could deploy for their adaptation projects.

Champion 1: Climate Adaptation Services (The Netherlands) - Champion in asset climate risk assessment

The Climate Adaptation Services Foundation manages an open access Climate Impact Atlas website which provides spatial information about climate change impacts (www.klimaateffectatlas.nl/en). The data layers are widely used by municipalities for stress testing, but increasingly also by the property sector and finance entities in the Netherlands. It is supported and endorsed by the Dutch Government, and the climate impact data layers are provided by a wide network of research institutes. It is a one stop shop which allows the asset owners and managers of the Dutch major banks and institutional investors to basically screen their products for climate risk. The climate information is based upon climate scenarios that are provided by the meteorological society in the Netherlands (KNMI). Together with the Dutch Green Building Council, CAS developed a standard methodology for assessing climate risk at the building level, working in a broad alliance of financial institutions, knowledge institutes, consultants, and governments on a 'Framework for Climate Adaptive Buildings', which provides a standardised method using free and open climate data for determining physical climate risks at the building level. The framework can be used by other service providers who are producing products in the climate modelling and assessment, The building level climate risk assessment standard has been developed and agreed by the participating parties specifically for finance entities that would be for a standard risk assessment. The climate atlas portal provides data on the climate hazards and then the Framework for Climate Adaptive Buildings provides the guidance on how to use the data in a risk assessment for real estate asset portfolios. There is a high percentage use of the assessment standard across the sector now with a good percentage of Dutch banks and pension funds using it - 90% of assets under their management in the

Netherlands are using this platform to do their property level climate risk assessments. There is an enabling environment in the Netherlands, with the NBN convene a Working Group on Climate Adaptation. Their recent report on financing and accelerating action on adaptation in the finance sector in the Netherlands can be found at: https://www.dnb.nl/media/1lres2sk/accelerating-climate-adaptation-report.pdf.

Champion 2: ImpACT SGR (Italy) - Champion in impact investing

IMPact SGR is an asset management company specialising in listed impact investing. The firm merges financial performance with impact measurement by focusing on investments intended to generate measurable positive environmental and social impacts alongside financial returns. IMPact's core focus lies in SFDR's Article 9 products, with a concurrent emphasis on Article 8, representing the highest level of sustainability ambition under this framework. Their offerings span climate adaptation intelligence products and services, which encompass the identification and assessment of companies' and investment strategies' exposure to physical risks such as climate-related hazards and extreme weather events. Examples include early warning systems and sophisticated climate risk mapping. IMPact's dedicated team of analysts is deeply involved in research to frame investments in adaptation, particularly in developing climate adaptation technology tools enabling stakeholders to better understand and integrate physical risk data into decision-making processes. Employing location-specific and context-specific frameworks rooted in publicly available geospatial or satellite data, IMPact collaborates with software development firms to develop climatech products internally while forging strategic partnerships with external data providers to implement prototypes of diverse climate adaptation technology products. One example of their innovative approach to climate finance is the quantification and measurement model of the net impact of investments adopted by IMPact, which relies on semantic artificial intelligence technology developed by a partner start-up. This technology enables the estimation of the net impact generated by each investment by quantifying the social and environmental costs and benefits generated by businesses.

Champion 3: Alterfin (Belgium) - Champion in social investment

Alterfin is a Belgian social cooperative providing investment opportunities aimed at creating a beneficial social and environmental impact. Investors are drawn to Alterfin for two key reasons:

- Their investments benefit people and the planet, and
- Alterfin maintains complete transparency about the projects financed with these investments.

Alterfin focuses on low—and middle-income countries in Africa, Latin America, and Asia, investing in places where it can make a significant difference and where access to finance remains limited. Today, Alterfin has 70.5 million euros in capital and comprises 6,000 co-op members, both private individuals and businesses. The capital raised through its members is invested through loans into two types of organisations that help the most disadvantaged people develop economic activities: microfinance institutions and sustainable smallholder agriculture organisations.

As of 2023, Alterfin supports 139 partners and has a significant impact. It reaches over 4.6 million vulnerable families, empowers 4 million women to achieve equity, provides 157,000 small farmers with new opportunities, and enables over 4.5 million people to access financial services. They have the saying '*Be the positive change you want to see! Join Alterfin and become a co-op member for as little as €62.50 (or €250 for non-profits and companies*).

Source : https://en.alterfin.be/

Champion 4: The Nature Conservancy – Nature fund

The Nature Conservancy (TNC) is a global non-profit and one of the most effective and wide-reaching environmental organizations in the world. TNC has direct or indirect conservation activities in 79 countries and territories, including in Europe. Aside from their experience with conservation, and climate mitigation and adaption, TNC also has expertise about sustainable finance, having helped pioneer innovative financing strategies like debt-for-nature swaps. They have developed innovative adaptation funding and financing solutions in various initiatives. A recent example is the development of the Norfolk Water Fund (UK). In February 2024, with the help of the Nature for Water Facility, the NWSP released a business plan for a £30 million portfolio of nature-based solutions that offer a holistic approach to managing the region's water resources, including opportunities for financing nature restoration through private markets. Drawing inspiration from the water fund model (where water users pay for upstream conservation actions to maintain water quality and quantity) that TNC has pioneered in 13 countries over the past two decades in Latin America and Africa, the NSWP seeks to demonstrate how nature-based solutions can be used to complement traditional grey infrastructure in tackling Norfolk's water challenges—showcasing the county as an international exemplar for collaborative water management. The business case provides an overview of short and long-term funding

needs and assesses how potential revenue streams from environmental markets might contribute toward covering costs and be used in repayable finance schemes.

5.3.3. Flagship climate finance platforms and initiatives

We have also interviewed and reviewed international projects providing support and services to FIEs and PAs in climate finance and related activities. The aim of reviewing Flagship Projects involved in adaptation, nature, or climate finance initiatives is to probe into the most effective ways to engage with FIEs and to increase their commitment to finance new areas such as adaptation. The aim is to learn from these numerous initiatives what activities and resources have been most effective in catalysing commitment and activity across FIEs. CLIMATEFIT has reviewed several flagship finance initiatives (n=4) and also undertaken a scoping of knowledge platforms as part of the research for the CLIMATEFIT One Stop Shop (OSS) (Deliverable D1.2). A research project was developed to link all the different research elements – all inform CLIMATEFIT activities in three key areas (1) addressing barriers and opportunities, (2) growing FIE maturity and (3) exploiting opportunities to engage and build commitment in FIEs.

The CLIMATEFIT One-Stop-Shop is to provide a knowledge platform to assist in bridging the climate adaptation financing gap between public authorities and FIEs. As such, we talked to organisations with experience in designing, developing, and managing such knowledge platforms. The aim was to highlight the main strengths, and weaknesses of existing knowledge platforms, so that CLIMATEFIT can learn from and build upon those. Seven platforms were selected for screening: the EU missions' adaptation to climate change platform, the CCFLA website, Climate Adapt, the Climate finance Lab, WeADAPT, the IIGCC website, and the UNEP-FI platform. In this part of our investigation, we found that FIEs in general would benefit from access to the following: business cases for investment, clear definitions of what qualifies as a successful climate adaptation project and how they fit into the investment market, material to help understanding the characteristics of adaptation projects and the sustainability disclosure requirements. In terms of content, it appears that PAs, by contrast, would benefit from other material and assistance in the following areas: methodologies to develop and structure their financing plans (models, data, and clear processes); guidance about the types of investors and instruments and funding strategies; case studies including investor requirements; interactive networking opportunities; and a place to showcase their adaptation projects to investors. The review found that, in the case of FIEs, the needs are not well covered in the literature. However, it is possible to point to a consensus in the available literature of a lack of knowledge and awareness regarding climate adaptation generally.

Three of the platforms analysed provide deep insights into CLIMATEFIT's engagement processes, these are Climate Finance Lab, the IIGCC website, and the UNEP-FI platform.

Table 5.4. Reviewed knowledge platforms

Platform	Description
Climate Finance Lab	• 'The Lab' is a website animated by the Climate Policy Initiative, an analysis and advisory non-profit organization, with deep expertise in finance and policy. • It is dedicated to an annual call for ideas aiming at fostering climate finance ideas from different regional programs and thematic streams. It is limited to a display of information on the call for ideas, and previous developed solutions. • Database of developed solutions to have an overview of financial mechanisms. • Easy to use service and platform. • Call for ideas section with resources such as investment calls from previous years and successful financial tools.
Institutional Investors Group on Climate Change	• A very active member area with privileged content and collaborative opportunities • The IIGCC is tasked with developing guidelines, technical standards, and methodologies that investors can use in their own investment processes, in their dealings with the companies in which they invest, and on how to involve policymakers and regulators. • Supports investors to address climate risk and ensure they are well-positioned to make the most of investment opportunities offered by climate mitigation and adaptation efforts. • A place to showcase project and initiatives done by members. • A lot of guidance about recent industry development to help handle regulations and financial instruments.
UN Environment Programme – Finance Initiative (UNEP-FI)	• The website is gathering all the information about the global initiative helping financial institutions to shape the sustainable finance agenda. • It presents the programs, works, regional networks and initiatives linked to the UNEP-FI. • Very comprehensive with all kinds of FIEs and all industries represented (banking, insurance, investment, policy & regulation). • Resources to help FIEs understand financial instruments & regulations. • Resources sorted by key themes, region, industry. • Resources focused on adaptation finance. • A member area with extra tools and webinar recording. • Interactive tools. • The program has a section about NbS investment.

The analysis of these platforms highlights the various challenges facing CLIMATEFIT, generally, in engaging FIEs. There are indeed already a lot of existing content and platforms or websites related to climate change adaptation, developed with the aim of supporting adaptation policy and action. Platforms mainly address public authorities, and to a lesser extent FIEs. A few platforms address both audiences. Platforms for FIEs are created to show reports and tools developed for private investors mainly in relation to climate risks. As a result, the content is also relatively diverse in nature and contains limited detailed information that FIE may need. Moreover, the content is often not particularly interactive. Several studies we examined emphasised the need for an easy access to existing content or tools. None of the projects we examined focused on adaptation finance in a European context pointing to a gap which CLIMATEFIT can address. The options for the OSS are set out in the deliverable D1.2 (M10).

A list of Flagship Projects was developed through desk top research (n=44) (Annex 11). These included the Investor Group for Climate Change's (IGCC) membership platform, the Climate Action 100+ signatories platform, the Cities Climate Finance Leadership Alliance (CCFLA), the CPI's Climate Finance Lab, the Resilient Planet Finance Lab run out of Oxford University, the EC's Platform on Sustainable Finance, the Net Zero Cities Project, the EIB's Natural Capital Financing Facility (NCFF) pilot financing instrument and the EU funded Trinomics platform. It was not possible in the time available in WP1 to secure interviewees with all these initiatives but the team intends to seek out their advice in later WPs. Interviews for the four projects were undertaken. (refer to Table 5.5 for a summary of key responses). The main comments received from these experienced operators in the adaptation financing/funding field align very closely with both the literature to the responses from our FIE and other interviewees.

Table 5.5. Summary of key responses from Flagship Project interviews

Finance issues discussed	Summary of the responses
Leverage to scale up climate finance adaptation at a global level	• Create more tools to complement the existing taxonomy. • Contribution from CLIMATEFIT could be significant. • Public financing is essential as business cases for adaptation are less compelling compared to mitigation projects. • Capacity building, awareness raising, and clear regulations are crucial. • Citizen action and demands can influence policy-makers. • EU has a focus on Disaster Risk Reduction, which can streamline adaptation and resilience building. • Adaptation is more complex than mitigation, requiring more effort and facing more roadblocks. • The public sector and regulators play a critical role. • Public-private partnerships (PPPs) and legislative frameworks are essential. • Structured tenders should include climate, environmental, and social aspects. • Focus on public financing due to less compelling business cases for adaptation. • Legislative frameworks boost climate adaptation investments. • Structured tenders should include climate, environmental, and social aspects.
Useful information for PAs and FIEs	• Integration of private and public sector efforts, sharing best practices, and clear categorisation of adaptation. • Assessment of maturity levels and adaptation capacity of companies. • Case studies with technical support instruments, processes, and policies. • Scientific-based knowledge organised by clusters and audiences. • Opportunities for adaptation projects and financing for various regions and sectors. • Comparative research and overcoming governance barriers. • Science data and experiences from other cities. • Clear checklists for accessing financing opportunities. • Technical and digested information.
What is missing in current initiatives/platforms/projects in the climate finance and adaptation landscape ?	• Connection between local projects and authorities with companies' adaptation planning. • Addressing the finance gap through crowdfunding approaches. • Better tools for estimating the impact of climate projects, including risk assessments and returns on investments. • Templates with necessary and important information for investors. • Descriptions of projects highlighting adaptation perspectives and critical reviews. • Standardized formats for feasibility studies to ensure a uniform approach for investors.
Matchmaking services	• Matchmaking services are currently in the early stages. • A central repository of projects that investors can access is crucial. • Detailed data on projects is often lacking, which is necessary for investors. • Ensuring that the offer meets the needs is vital for success. • Provide frameworks and examples.

In summary, based on their experience of working with PAs and FIEs, the Flagship Project representatives we interviewed all emphasised that scaling up climate finance for adaptation requires a multifaceted approach that includes public funding, capacity building, standardised information, the use of different financing mechanisms, and the development of comprehensive tools and frameworks. In addition, collaboration between the public and private sectors is essential for effective climate adaptation. Public-private partnerships are highlighted as key to achieving good results and ensuring that projects meet climate, environmental, and social criteria. There is a need for more tools and frameworks to complement existing taxonomies and disclosure requirements. Platforms such as CLIMATEFIT can make an important contribution by providing these resources. Templates, feasibility studies, and standardised formats for investment decisions are needed to streamline processes and make projects more attractive to investors. Adaptation is more complex and faces more barriers than mitigation. Achieving similar levels of impact will require considerable effort and overcoming many challenges. One suggestion that was not emphasised in other interviews was the recommendation to perhaps focus on disaster risk reduction (DRR): The EU has a strong focus on DRR, which can be used to build adaptation and resilience to civil disasters. Of particular note is the comment that matchmaking services (between finance supply (FIEs) and demand (PAS)) are still developing, and there is a need for a central repository of projects that investors can access. Sharing case studies, best practices, and technical support instruments is valuable for stakeholders. These resources should cover processes, policies, and overcoming barriers. This repository should contain detailed data to meet investors' needs. It is also important to connect local projects and PAs dealing with adaptation challenges with broader company adaptation planning and financing opportunities.

P2R have also examined several projects facilitating nature, climate and/or adaptation finance activity in D5.2. The findings of this review have also been considered here.

5.3.4. CLIMATEFIT FIE Engagement Strategy

The FIE engagement case has been developed to:

"Create a community of practice and network of FIE's curious and active on financing and funding adaptation solution."

Annex 12 is a draft of the FIE engagement strategy for CLIMATEFIT (version June 2024)

This Financing and Investment Entities Engagement Strategy defines CLIMATEFIT's activities to engage key stakeholders in advancing climate adaptation and resilient investments. The Strategy complements CLIMATEFIT's Communication and Dissemination Plan. By identifying priority FIEs for engagement and defining the roles and responsibilities of CLIMATEFIT's FIE Engagement Leader, FIE Account Managers, and FIE Engagement Facilitators, the strategy provides a framework for activities, tools, and mechanisms to engage FIEs effectively. This cohesive approach across all CLIMATEFIT's Consortium partners sets standards to accelerate finance flows towards adaptation. The Strategy paves the way for co-creating smart adaptation funding and financing solutions through collaborative efforts with FIEs.

The Strategy's primary objective is to create a robust and engaged network of FIEs committed to financing climate adaptation projects across Europe. This involves capturing FIE interest in adaptation finance and ensuring collaboration on developing investment strategies, financing solutions, and credit models. The strategy's ultimate goal is to secure FIE participation in financing pilot adaptation projects for four territories. Overall, it represents a comprehensive, multi-pronged approach to engaging and systematically upskilling the FIE ecosystem on adaptation finance.

The draft FIE Engagement Strategy should be adopted throughout the Work Packages within CLIMATEFIT. The document is dynamic in nature and will be updated as the project progresses. This FIE engagement Strategy operates as a complement to the D6.5 Communication and Dissemination Plan. Project activities in which we will engage FIEs are numerous and include the codesign of Investment Strategies/Plans, the identification of innovative adaptation financing/funding solutions - Adaptation Finance and Funding Solutions (AFFS), the codesign of both Investment Concepts (ICs) and Incentive Mechanisms (IM) and the negotiation of investment agreements potentially resulting in investment cases.

From their involvement in these activities the following benefits to FIEs will eventuate:

- **Knowledge sharing and advice:** Advice, knowledge, and networking opportunities to assist FIEs in meeting sustainable finance commitments.
- **Facilitating connections**: Facilitate connections between FIEs and leading public authorities with investable adaptation projects through our Advisory Board, Consortium networks, and relationships as well as the Local Resilience Taskforces (LRTs).
- **Promoting best practices:** Encourage and promote FIEs' adaptation finance best practices within the finance sector and wider.
- **New markets**: Development of new investment opportunities.

- **Policy and regulation development**: Engage with the policy development process to pursue the recommendation of CLIMATEFIT, Engage with financial and other regulators and though-leaders e.g., SIBs, EIB.

Based on the research undertaken in WP1.2, we are able to make several recommendations on CLIMATEFIT's FIE engagement approach. Conclusions on capacity building from the trialling of the MAM pointed to a need to provide information and awareness raising activities on adaptation finance for all FIEs. Best practice examples demonstrating the different finance sources, instruments, and actors used in each would be very useful (Chapter 6). Training on methods for climate risk screening, tagging, and tracking adaptation aligned investment, monetising adaptation and impact assessment would also be very valuable to raise general awareness and competencies in adaptation finance.

When the insights from the research activities are combined - experiences with recruiting CLIMATEFIT FIE Champions, the Flagship Project review, the results of the OSS Scoping Study and the EIB nature financing facility review - FIE recommended. engagement activities could be developed.

5.4. Synthesis of insights: Financing opportunities

By synthesising insights from our various research activities - including the CLIMATEFIT FIE Champions recruitment, the flagship project evaluations, the OSS scoping study and the EIB's assessment of the EIB's Nature Finance Facility - we can start to classify the potential for upscaling adaptation and resilience investment. These opportunities are categorised into high, medium and low growth potential (see Table 5.6). This is a preliminary assessment and will be further developed in the later work packages of CLIMATEFIT.

Table 5.6. Potential for upscaling adaptation and resilience aligned investment (extreme flooding, sea level rise and heatwaves)

Opportunity for growth in investment in adaptation	High	Medium	Low
Property	• Policy instruments in place (building standards/codes - resilience standards) • Asset climate risk assessment • Adaptation disclosures (SFRD) • Potential for revenue streams through carbon offset • Potential for insurance products (e.g., green roofs) • Green real estate development • TCFD – disclosure across the economy	Riverine and Floodplains improvements • Lack of incentives for private investment (market externalities and perception of public good. • Water sector can invest in water management to meet regulatory requirement s and recoup through customer charging • Potential for insurance products (resilience mortgages	Coastal and sea level rise protection • Few privately owned coastal zone limit investment potential with incentives or regulation (property rights) • Key driver is future public investment in flood protection, opportunity for blended financing approaches • Opportunities for land value capture and payment for ecosystem services approaches • Restoration sea grasses, kelp forests and coastal wetlands has carbon sequestration, nature and biodiversity potential • Significant gap in knowledge/data
Infrastructure	• Policy instruments in place (infrastructure standards/codes) • Asset climate risk assessment • Adaptation disclosures (SFRD) • Critical infrastructure - Govt. encouragement for NbS and adaptation • Govt. and regulator focus on long term business plans- restrengthen accounting for climate risks • Require adoption of ISO 1409/14091 - Adaptation to Climate Change Guidelines – build systemic resilience in interconnected infrastructure • PCRAM or CLIMADA strengthened as part bank standard lender due diligence processes • Increase Green Sovereign bonds – leverage international Best Practice on Green Bond with ICMA Green Loan / Bonds Principles - dedicated National Adaptation Bonds (NAB) • Consider tax exemptions for ABs. • TCFD – disclosure across the economy. • Implement Pension Fund pooling investment advantages • Expand fiduciary duty guidance to climate proofed infrastructure • Expand active ownership models		

Water	• Potential for revenue streams through levies and water charging • Water sector can invest in water management to meet regulatory requirement s and recoup through customer charging • Risk management and long-term planning industry requirements (ISO 22372 Resilient standards) • Asset management, asset performance and deterioration – prioritise maintenance and renewal Adopt direct procurement models of water sector. • TCFD – disclosure across the economy.		of areas with potential
Biodiversity	• Strong potential for revenue streams through carbon offset • Leverage Biodiversity net gain regulations and TNFD, capture value of ecosystem services provided by natural resources to protect and enhance them • Integrate voluntary nature and carbon standards and codes for measurement of adaptation outcomes. • Enforcement of Voluntary Carbon Markets Offsetting standard.	Urban greening (climate proofing)	
Forestry	• Strong potential for revenue streams through carbon offset • Poorly managed forest assets potential for adaptation linked to nature positive, NbS and carbon sequestration (EU Nature Restoration Law (date)	Wetland enhancement • Wetland and peatland areas have significant carbon sequestration potential • Opportunities in consideration of overlap with agricultural areas and coastal zones	
Agriculture	Adaptation/NbS funding through Common Agricultural Policy (CAP) (NbS instruments under s CAP).		
Technology	Significant investment (venture nd other capital) in ClimTech – climate risk assessment, adaptation monetisation and climate modelling tools tailored to investors		

Chapter 6: International best practices of AFFS

This chapter offers a **deep dive into 20 international best practices of adaptation financing and funding solutions**. As described in the grant agreement and in Chapter 1, we searched for 20 international best practices that are potentially transferable to a European context and include AFFS that may be relevant or inspiring for the CLIMATEFIT territories. Following this aim, our analysis focused on understanding the local context, governance and organisational structure, and the business model and financial model, as described in the analysis framework (Chapter 3.3). As described in the methodology, this chapter only includes an abstract about each case. For each case, a table with key information is provided in Annex 14. After a presentation of each individual case, we discuss the findings of a comparative analysis of the 20 cases with a focus on lessons learned, including success factors, limitations, and transferability conditions. Through this in-depth research, we offer the EU, the CLIMATEFIT territories, and possible other territories, including public authorities, a starting point to consider the applicability of the AFFS presented in the 20 best practices. Additionally, the database, which is currently available only for internal use, offers the CLIMATEFIT territories more examples of innovative AFFS.

Full reports (factsheet) with financial-technical details of each case are available for download on the CLIMATEFIT website. The reports have been reviewed by our consortium partner Stockholm Environment Institute, Oxford office. 20 best practices were selected based on four criteria:

1. Transferability to the European context (if international).
2. Transferability/relevance for local climate resilience projects.
3. An initial needs assessment among the CLIMATEFIT territories.
4. Potential Champions for a novel financing approach established in T1.1.

The 20 best practices include projects with financial involvement from FIEs and/or other private sector stakeholders (e.g. real estate project developers) for either the financing or funding, or both, of climate measures. Their involvement is part of an integrated AFFS that may combine different financial sources and instruments (e.g., different bond types, grants and loans, impact financing, payment for ecosystem services, land value capture mechanisms…). The objective of the best practices research is to gain an in depth understanding of their context, governance structure, business and financial model, outcomes, successes and limitations, and conditions for transferability. These insights will help understand if these AFFS are relevant for the CLIMATEFIT territories, and how they could be possibly transferred to the territories and the EU. These insights feed the capacity building activities, the development of investment strategies and plans, and early-stage dissemination purposes in other work packages. Some best practices are about mitigation but were selected because they have an innovative financing and funding solution that could be applied to adaptation cases (in the EU) too.

6.1. The 20 international best practices

Table 6.1. Overview of the 20 best practices researched for T1.3

ID	Name	Location	AFFS
01	Greater Cape Town Water Fund (GCTWF)	Cape Town, South Africa	Water Fund with contributions from corporates, municipality, philanthropy
02	Clean Water Partnership (CWP)	Prince George's County, Maryland, USA	Community-based public-private partnership (repayment through bonds and water charges)
03	Cloudburst Management Plan (CMP)	Copenhagen, Denmark	co-financing from municipal budget, public utility water tariffs, landowner direct investment
04	Ecomarkets	Victoria, Australia	Offsetting mechanisms used for Payment for Ecosystem Services
05	NICE GREEN Nagoya	Nagoya, Japan	Greenification certificates system with preferential interest rate on loans
06	Groenfonds	Midden-Delfland, The Netherlands	Developer contributions fund reimburse farmers for green services (PES)
07	Washington Stormwater Retention Credit System (Washington SRC)	Washington DC, USA	Stormwater credits
08	Resilient Hampton	Hampton, Virginia, USA	Environmental impact bond
09	Paris Climate Bond (PCB)	Paris, France	Climate bond
10	Flood Buyouts	USA	Public budget: local sales tax increase
11	Lower Don Valley Flood Defense Project (LDV)	Sheffield, UK	Business Improvement District and public grants
12	Dorset Heathlands	Dorset, UK	Developer obligations

13	Project Finance for Permanence (PFP)	North/Central/Latin America	Project Finance for Permanence
14	RPPNM Program	Curitiba, Brazil	Transferrable Development Rights
15	Seychelles Debt for Nature Swap (SDNS)	Seychelles	Debt for Nature Swap
16	Viveracqua Hydrobond	Veneto, Italy	Pooled mini bond
17	Wetland Mitigation Banking Program (WMBP)	USA	Offsetting mechanism used for Payment of Ecosystem Services
18	Gothenburg green bond	Gothenburg, Sweden	Municipal green bond
19	Bilbao Flood Proof District	Bilbao, Spain	Public Private Partnership
20	Edwards Aquifer Protection Program (EAPP)	San Antonio, Texas, USA	PES program paid by local sales tax and municipal green bond

6.1.1. The Greater Cape Town Water Fund (Cape Town, South Africa)

The Greater Cape Town Water Fund (GCTWF) is a collective action funding and governance mechanism that enables downstream public and private water users in the City of Cape Town to provide financial and technical support for catchment restoration alongside upstream communities. The GCTWF was initiated by The Nature Conservancy (TNC) in 2017 as a program to clear invasive species in the City of Cape Town's sub-catchment areas to improve water supply and water security, following extreme drought events between 2015 and 2018. The program also contributes to job creation, biodiversity conservation, and the restoration of indigenous ecosystems. The business model's main principle is that nature-based solutions and ecological infrastructure that address water supply problems at the source are cheaper and more cost-effective than traditional grey infrastructure solutions.

The GCTWF is an example of blended finance that pools financial resources from various sources and through various instruments, including public sector budgets through performance-based contracts, philanthropic contributions, and direct corporate investments from water-dependent industries. The main success factors for securing financing are the partnership model through a steering committee with representatives from public and private actors, and the business case developed by TNC that quantifies the value and impact of ecosystem services. The GCTWF is one of more than 30 water funds that have been established by TNC in North and Latin America, and Africa. It is a scalable and replicable model for other contexts and can use a variety of instruments and sources to secure financing for climate-related investments.

Sources: Public: Local (metropolitan) municipality. Private: Large enterprise and multinationals (water-dependent industries). Third sector: Foundations and trusts, philanthropies, charities

Instruments: Blended finance, public budget (general taxes), donations, private corporate investments.

Further reading: The Greater Cape Town Water Fund business case

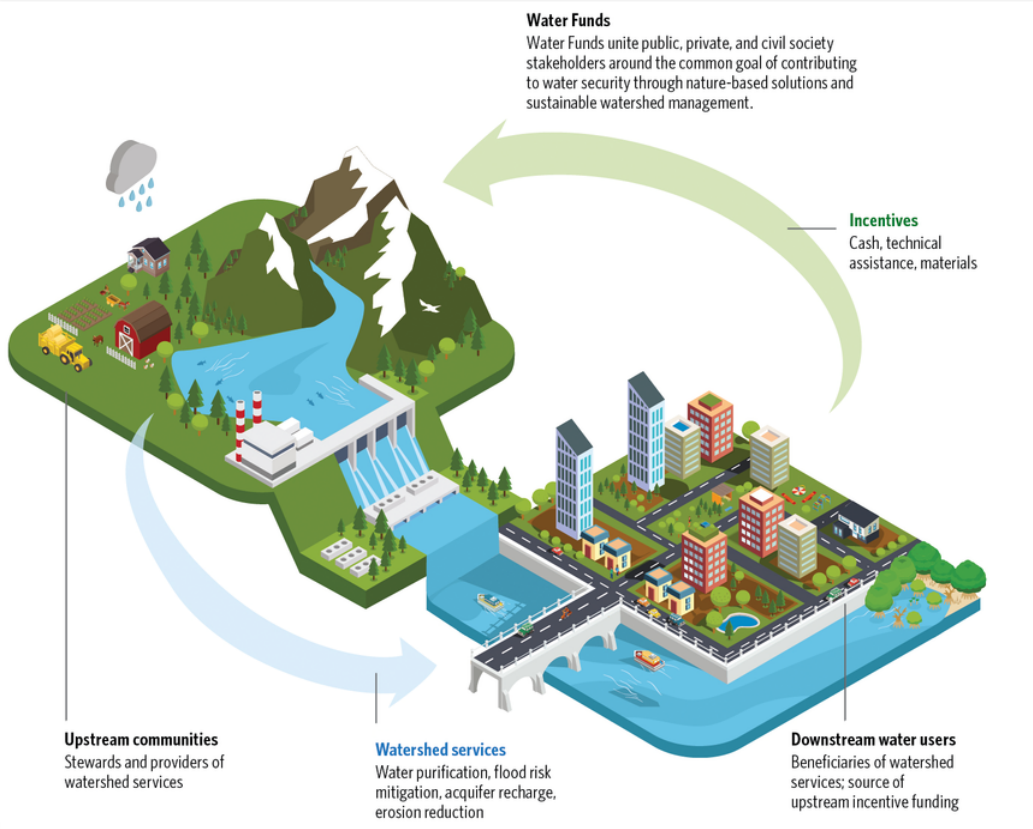

Figure 6.1. Financing and funding structure of the GCTWF[39]

[39] The Nature Conservancy. (nd), *What is a Water Fund*. The Nature Conservancy. Last consulted on 18 March 2024. URL

6.1.2. Clean Water Partnership (Prince George's County, Maryland, USA)

In 2014, Prince George's County faced the regulatory challenge of retrofitting uncontrolled impervious surfaces by 2025 to improve water quality and reduce polluted stormwater runoff into the county's rivers that flow into the Chesapeake Bay. The county partnered with the construction firm Corvias to initiate The Clean Water Partnership (CWP), a design-build-operate-maintain community-based public-private partnership (CBP3) with the aim of retrofitting 4,000 acres of impervious area through green infrastructure. The CWP is a novel model that integrates environmental, social, and economic impact performance targets, which were successfully achieved during the program. The model emphasizes a community-driven procurement process and includes a pay-for-performance element, with provisions for extending the private partner's contract upon achieving community impact performance targets alongside stormwater performance targets. Funding for the Clean Water Partnership comes from government agency grants and the county's Watershed Protection and Restoration Fund. The Fund is supplemented with bond proceeds from general obligation bonds and loans from the Stormwater State Revolving Fund. Incomes from the Clean Water Act Fee levied on private property owners are used to repay the bonds and loans.

This innovative approach allows for the accelerated implementation of green infrastructure projects at reduced costs while fostering local economic development through the engagement of the local workforce, and local, small, and minority businesses. This model highlights the effectiveness of shifting project delivery risks to a private partner, and of combining public and private resources for sustainable water management solutions. The CWP model may successfully be applied in other contexts under the conditions of early outreach and education about CBP3, and a long-term dedicated funding mechanism.

Sources: Public: government agencies. Private: asset owners/institutional investors, property owners (households)

Instruments: Blended finance: Community-based public-private partnership (CB3). Debt: general obligation bond. Fee/user charges: property-related fee (Clean Water Act Fee)

Further reading: Prince George's County's Approach to meeting regulatory stormwater management requirements

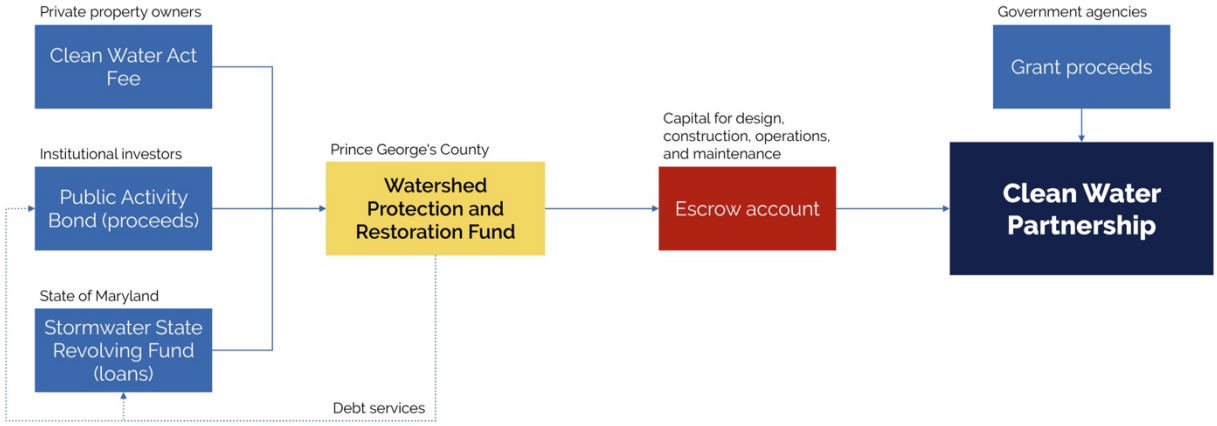

Figure 6.2. Financing and funding structure of the CWP[40]

[40] Adapted from: Alexandrovich, A. (2017). *Achieving Better Outcomes in Local Government Stormwater Programs through Pay for Performance*. Master Project. Nicholas School of the Environment of Duke University.

6.1.3. Cloudburst Management Plan (Copenhagen, Denmark)

Copenhagen was hit by a 1000-year storm (cloudburst) in 2011, creating a sense of urgency and momentum to prepare climate adaptation strategies. The Cloudburst Management Plan (CMP) was developed in 2012 as an offshoot of the city's Climate Adaptation Plan (2011). The CMP includes more than 300 projects, with more than half of them being surface blue-green infrastructure measures, and others being traditional underground grey infrastructure.

The financial model is an innovative co-financing strategy that shares the main financial responsibilities between the municipality and HOFOR, the utility company. A legal change at the national level was lobbied for by the City of Copenhagen to allow utility companies to co-fund multifunctional surface solutions from water tariffs (user fees). Additionally, private property owners are responsible for stormwater management investments on their own properties. The new legal framework allows this co-financing by the utility company under strict conditions:

- Alternative blue-green infrastructure must be proven more cost efficient than traditional (grey infrastructure) solutions.
- Funding from water tariffs can only be used for purposes directly related to the handling of wastewater (stormwater management measures, the drainage system).
- Utilities are not allowed to propose or carry out alternative water projects on their own. They can only provide funding, but the projects must be initiated, in this case, by the municipality.

Although the entire implementation of the plan has been challenged by recent national changes in service level requirements, the CMP has been successful in facilitating a transition from traditional grey infrastructure only to climate adaptation through nature-based solutions. The success is explained by the strong partnerships between various actors, a strong business case that quantifies the cost-efficiency of nature-based solutions and having a long-term reliable funding source with the water tariffs.

Sources: Public: local municipalities, publicly owned utilities. Private: property owners

Instruments: Fees/user charges: stormwater fees (Water tariffs). Public budget from general taxation. Direct private investment from property owners. Debt: concessional finance (loans with below market rate interests)

Further reading: Copenhagen Cloudburst Management Plan

Figure 6.3. Co-financing climate adaptation solutions.[41] The green dots on the image are the elements of a project that HOFOR is allowed to fund, because these are stormwater management measures for the city's drainage system and handling wastewater. The purple dots are project design elements that are not HOFOR's core task, e.g., tree and green plantings that also serve an aesthetic or public space improvement purpose. These must be paid for by the municipality.

[41] City of Copenhagen. (2023). *Climate Adaptation in Copenhagen*. Presentation (received via personal communication; not publicly available).

6.1.4. EcoMarkets (Victoria, Australia)

The EcoMarkets program in Victoria, Australia, provides a financial and business model that addresses climate challenges through a market-based mechanism. Initiated in 2006, the program is designed to incentivize private landowners to engage in land management practices, such as biodiversity enhancement and improved water management. This model allows landowners to earn income by generating tradable credits that reflect the ecological value of their land management improvements. These credits can then be purchased by developers required to offset their environmental impact, thus fulfilling their regulatory obligations.

EcoMarkets effectively addresses the climate challenges of biodiversity loss and the impacts of wildfires by encouraging native revegetation and better land management practices. The program's financial model is self-sustaining, reducing reliance on public funding and fostering private investment in biodiversity. It operates under the regulatory oversight of the Department of Energy, Environment, and Climate Action (DEECA), which ensures compliance and the integrity of the trading system.

The main successes of the EcoMarkets program include the promotion of private funds for biodiversity protection, the creation of a new income stream for landowners, and the establishment of a more streamlined offsetting process for developers. These achievements demonstrate the program's ability to balance economic development with environmental sustainability, making it a promising model for other regions facing similar climate and environmental challenges.

Sources: Private: Project Developers, landowners

Instruments: Results based financing: Payment for ecosystem services. Fees/user charges: offsetting

Further reading: Innovative Market Approaches- Ecomarkets

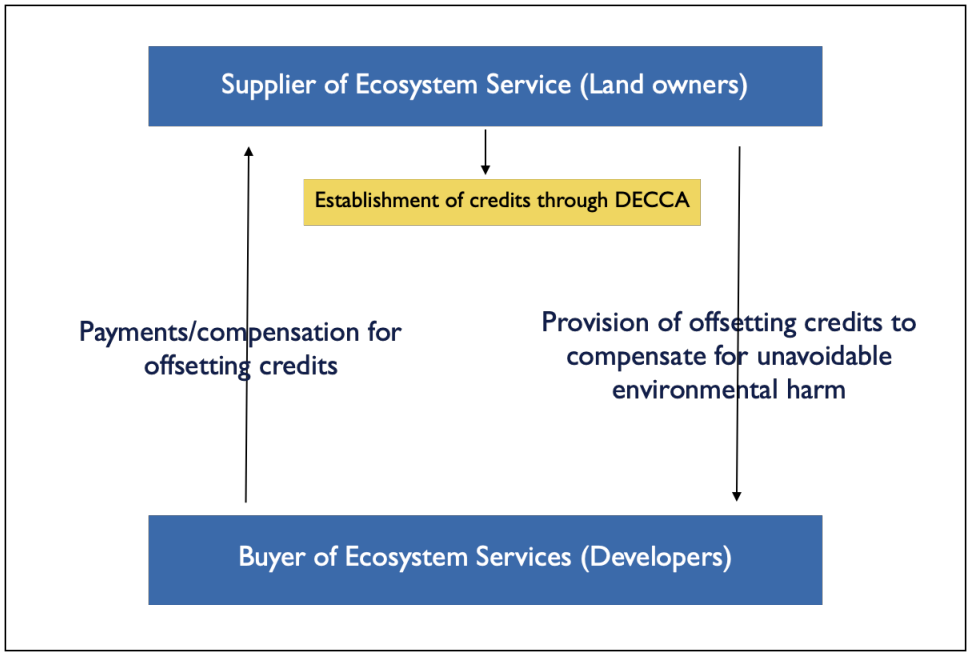

Figure 6.4. Financing and funding structure of the Ecomarkets. Source: UA

6.1.5. Greenification Certificate System (Nagoya, Japan)

The Greenification Certificate System (GCS) is a voluntary mechanism that complements the regulatory System of Greening Area instrument, both introduced in 2007-2008 in the City of Nagoya, Japan. The GCS is an incentive mechanism to encourage landowners to include more green area elements in the design of new residential and industrial developments than those legally imposed through the System of Greening Area. Landowners can receive loans with a preferential interest rate for projects that incorporate significant green elements. This system, evaluated on various criteria including green area coverage and conservation efforts, awards projects with up to three stars, directly influencing the interest rate benefits provided by participating banks. Although data was limited to determine the outcomes and current status of the program, and early limitations were identified, the case is an example of a generic, simple, and straightforward model to foster sustainable urban development while offering financial incentives for greener construction practices.

Sources: Private: corporate/retail banks, developers/landowners

Instruments: Debt: concessional loan. Non-financial instruments: Incentives (preferential interest rates

Further reading: Financial Incentives for Encouraging Biodiversity in Nagoya

Table 6.2. Participating banks in the Greenification Certificate system and their preferential interest rates.[42]

Bank	Star rating	Preferential interest rates
The Aichi Bank, Ltd.	TBD	TBD
The Chukyo Bank, Ltd.	Two Three	0.1% below the usual interest rate 0.2% below the usual interest rate
The Bank of Nagoya, Ltd.	Three	(During the period of thefixed interest rate) the interest rate –1.5% ~1.7% (After the expiration ofthe fixed interest rate) the interest rate – 1.2 %~1.25%
Aichi Shinkin Bank	Two Three	0.05% below the usual interest rate 0.1% below the usual interest rate
Chunichi Shinkin Bank	Two Three	0.05% below the usual interest rate 0.1% below the usual interest rate

[42] Kohsaka, R. (2010). Economics and the Convention on Biodiversity: Financial Incentives for Encouraging Biodiversity in Nagoya. In N. Müller, P. Werner, & J. G. Kelcey (Eds.), *Urban Biodiversity and Design* (pp. 593-607). Blackwell Publishing Ltd.

6.1.6. Groenfonds Midden-Delfland (South Holland, The Netherlands)

Groenfonds Midden-Delfland, initiated in 2005 by three municipalities, represents a pioneering financial and business model aimed at preserving the agricultural cultural landscape of the Midden-Delfland green area. This model harnesses developer obligations from real estate projects as a source of funding, which are defensively invested by an asset manager, after which the return on capital is used to compensate dairy farmers for executing a range of green services, a form of payment for ecosystem services. These services include, but are not limited to, meadow bird management, maintenance of historic grasslands, and upkeep of landscape elements like fruit and pollard trees. An innovative aspect of this model is its reliance on defensive investments of developer contributions, ensuring a sustainable, steadily increasing, and long-term financial flow.

The success of Groenfonds Midden-Delfland is evident in its ability to provide a steady income for participating farmers, thus contributing to the maintenance of valuable landscape and ecological elements. This approach not only supports biodiversity but also strengthens the socio-economic link between urban and rural areas through educational and recreational initiatives. Groenfonds offers an offering a replicable framework for other regions because of its flexibility, simplicity, and scalability. Transferability to other regions is contingent upon several conditions, including the presence of a shared interest among stakeholders, prospects for future development contributing to a reliable income stream, and the establishment of a governance structure that transcends political cycles. The adaptability of the model to incorporate new green services in response to evolving environmental and societal needs is crucial for its applicability in diverse contexts.

Sources: Public: local municipalities. Private investors: project developers, asset managers

Instruments: Land value capture: developer contributions. General public budget. Results-based financing (payment for ecosystem services). Asset management (return on capital from defensive investments)

Further reading: Website Groenfonds Midden-Delfland

Figure **6.5**. Financing and funding structure of Groenfonds Midden-Delfland. Source: UA

6.1.7. Washington Stormwater Retention Credits (Washington DC, USA)

The Washington Stormwater Retention Credit (SRC) trading program, initiated in 2013 along with new stormwater regulations for real estate developments, represents a pioneering market-based mechanism designed to mitigate stormwater runoff through incentivizing green infrastructure. The business model leverages stormwater regulations to shift financial responsibilities from public to private sector, enabling private developers to meet retention standards either onsite or offsite through purchasing credits in the market from SRC generators (aggregators), thus encouraging private sector investment in green infrastructure. These regulations and SRC trading program are part of wider District program to improve water quality of its water bodies. By offering regulated developments the opportunity for offsite compliance with retention requirements, the District wants to disperse green infrastructure as much as possible to areas where it has the highest impact.

The program's success lies in its ability to offer flexibility to stakeholders, creating a dynamic market with a steady increase in available credits each year. A critical success factor and de-risking mechanism is the SRC price lock program, which allows aggregators to sell credits to the DOEE at a fixed price. An important limitation is the program's voluntary nature that encourages but not requires private developers to opt for offsite stormwater management. The transferability of this model to other territories hinges on alignment with local building codes, a large enough scale, regulatory simplicity, and the development of an informed and engaged market of participants. The program underscores a strategic shift from public to private investment in stormwater management, emphasizing cost-efficiency and environmental stewardship.

Sources: Private investors: project developers, NGOs. Households: property owners. Public: regional agencies

Instruments: Incentives: stormwater credits. Fees/user charges: stormwater/wastewater fees ('stormwater impervious surface fee'). Risk mitigation: guarantees (SRC Price Lock Program). Non-financial instruments: regulations and mainstreaming (stormwater regulations), subsidies (subsidy program)

Further reading: Establishing a stormwater volume credit trading program. A practical guide for stormwater practitioners

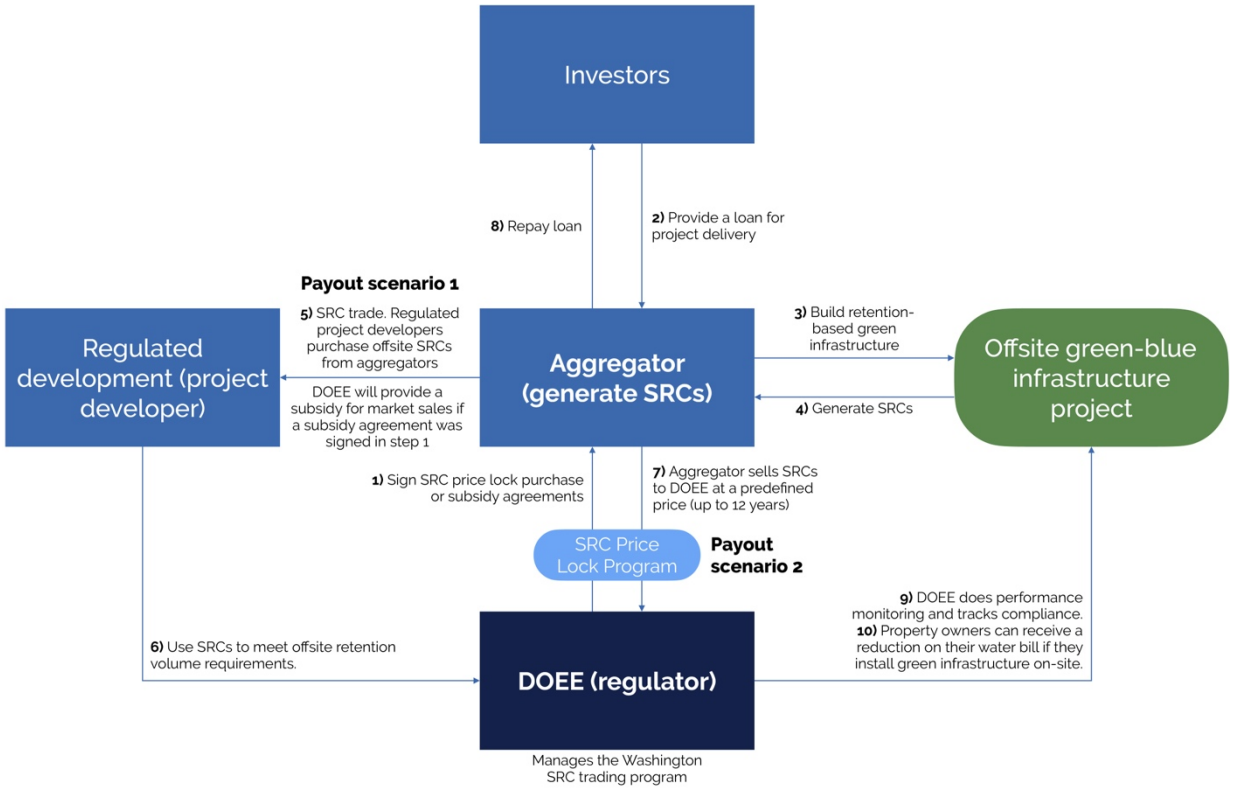

Figure 6.6. Organizational, financing and funding structure of the Washington Stormwater Retention Credit trading program. Source: UA

6.1.8. Resilient Hampton (Virginia, USA)

The Hampton Environmental Impact Bond (EIB) is an innovative financial instrument designed to finance the Resilient Hampton initiative in Virginia, USA. This initiative focuses on green infrastructure projects to improve stormwater management and enhance urban resilience to climate change. The bond financed three pilot projects: the Big Bethel Blueway, North Armistead Avenue Road Raising, and Lake Hampton, totalling an investment of $34 million, with $12 million funded through the EIB. These projects aim to increase stormwater volume storage capacity, reducing polluted water runoff and flooding, while providing additional benefits like improved air quality and green spaces.

An EIB is a designation given to a "green" municipal bond that not only funds environmentally or socially beneficial projects but also commits to a quantitative prediction, post-implementation evaluation, and disclosure to both bond investors and the community, of actual project outcomes. There are generally two types of EIBs: a performance payment EIB where the financing terms are related to the project outcomes, and a disclosure only EIB without a pay-for performance mechanism. Although its development and issuance required external technical and financial expertise, and despite the bond's relatively small size, the bond received overwhelming attention from a mix of investors, including large international investors, due to its quantification of project outcomes. This case proves that even small- or medium-sized municipalities can successfully use an EIB to finance (innovative) green infrastructure projects. This requires cross-departmental collaboration, high-ranked 'champion' officials that advocate for it, external expertise, early involvement of the financial department, and the ability to quantify (non-)financial project outcomes.

Sources: Private: asset owners/institutional investors (impact investors, insurers, pension funds, investment banks). Public: national- and state-level government agencies.

Instruments: Debt: environmental impact bond. Grants: implementation grants.

Further reading: Using Environmental Impact Bonds to Finance Green Stormwater Infrastructure in the Chesapeake Bay Watershed: A Case Study

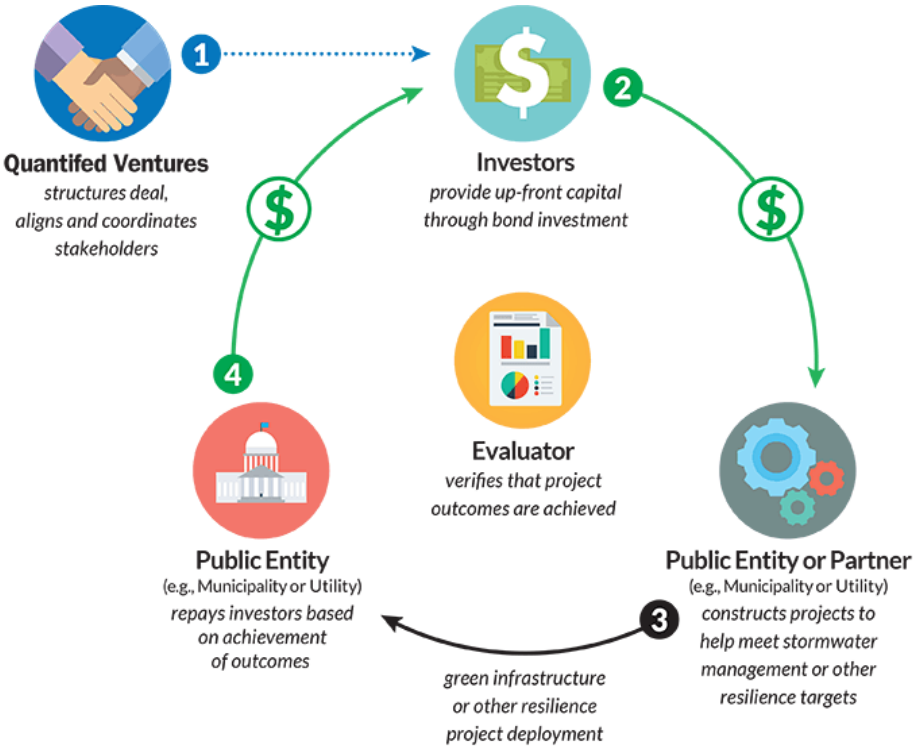

Figure 6.7. An overview of Overview of how an environmental impact bond works. © Chesapeake Bay Foundation

6.1.9. Paris Climate Bond (City of Paris, France)

The €300 million Paris Climate Bond (2015) funnels private capital into climate adaptation and energy projects as outlined in the Paris Climate and Energy Action Plan, and the plan's Adaptation Strategy. The bond's financial framework is structured to ensure transparency and accountability, allocating bond proceeds to pre-selected projects before issuance, which reassures and attracts investors. The Paris Climate Bond and subsequent bonds issued under the expanded Sustainability Bond Framework (2017) are used to finance a large portion of two adaptation projects with the main objective to reduce urban heat island effects: building 30 hectares of green spaces and the planting 20,000 trees by 2020. A small portion is funded directly from the city's greening budget. The projects have a total investment cost of €85 million. The target was achieved by 2021.

Enabling conditions for the success of the Paris Climate Bond include robust municipal expertise and resources, supplemented by external financial and sectoral advisors. The bond adheres to the Green Bond Principles, enhancing investor confidence through rigorous project selection and annual impact reporting protocols. Projects are selected by the City's Sustainability Bond Committee prior to a bond issuance, offering transparency to investors about the use of their funds. Key lessons from the implementation of the Paris Climate Bond for other municipalities highlight the importance of collaboration with knowledgeable stakeholders to optimize project outcomes, establishing comprehensive frameworks for reporting and transparency, seizing strategic timing for issuance to maximize investor interest, and having a strong political commitment towards climate adaptation initiatives. Replicating this model in (smaller) municipalities might be challenging because the implementation of a green bond requires extensive resources, including the development of a climate plan or adaptation strategy prior to developing the bond framework.

Sources: Private: Asset owners/institutional investors (pension funds, asset managers). Public: local municipality.

Instruments: Debt: climate bond, sustainability bond. Taxation: public budget (general and greening budget) from local taxes.

Further reading: Climate bond financing urban adaptation actions to reduce heat stress in Paris

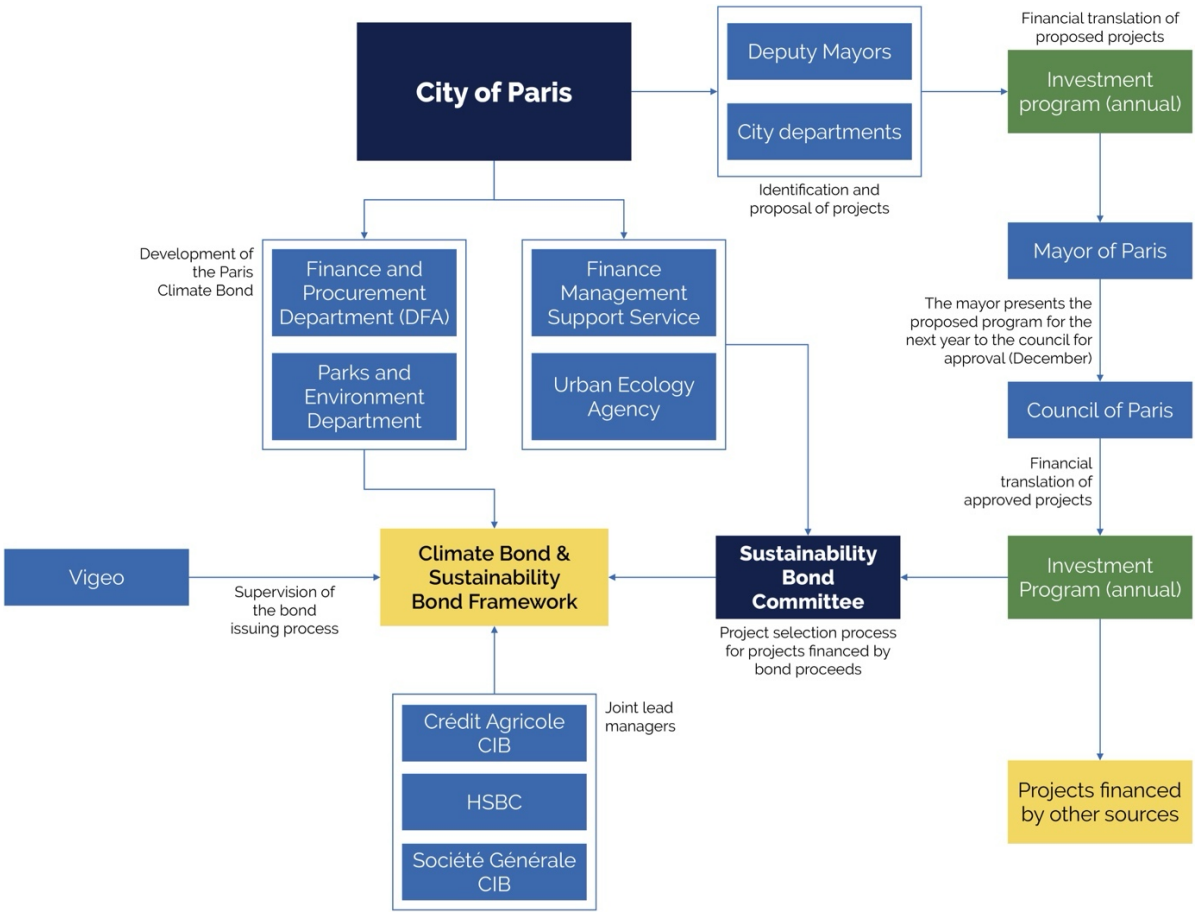

Figure 6.8. Organisational structure of the Paris Climate Bond and the subsequent Sustainability Bond Framework. Source: UA

6.1.10. Flood Buyouts (USA)

The Flood Buyouts program in the United States aims to mitigate flood risk through property acquisition and transformation into green spaces. This initiative, funded primarily by Federal Emergency Management Agency (FEMA) and the Department of Housing and Urban Development (HUD), along with local government contributions, strategically targets properties in flood-prone areas. Homeowners are offered fair market value for their properties, which they can choose to accept voluntarily.

By converting acquired properties into undeveloped public spaces, the program effectively reduces flood risk and enhances community resilience against future flooding events. This approach alleviates immediate flood threats by removing structures from high-risk areas. It also contributes to long-term environmental benefits by restoring natural floodplain functions.

The program relies on a mix of financial sources like federal grants, local funds, and financial instruments like green bonds and stormwater management fees, facilitating sustainable funding flows. The business case offers value proposition of reduced long-term disaster recovery costs and improved public safety.

Sources: Public: National level government entities, government agencies, local municipalities. Private: households (direct), investors

Instruments: Grants (public and private). Debt based instruments: green bonds. Fee/User charges: stormwater fees. Taxations: local options sales tax

Further reading: Property Buyouts can be an effective solution for Flood-Prone communities

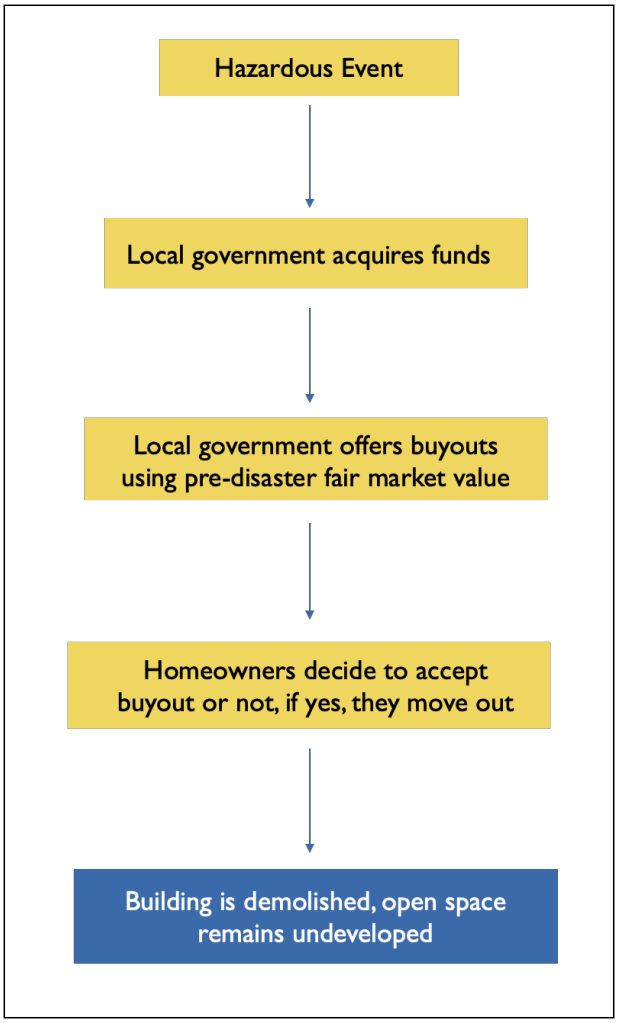

Figure 6.9. Typical flood buyout process. Source: UA

6.1.11. Sheffield Business Improvement District (Sheffield, UK)

The Sheffield Lower Don Valley (LDV) Flood Defence Project, initiated in response to devastating floods in 2007, exemplifies an innovative approach to urban flood risk management. Funded through a blend of public national grants and a Business Improvement District (BID), the project aimed to lower flood risk from a 1:25 likelihood to at least 1:100, enhancing insurance accessibility for businesses. The LDV, particularly vulnerable to flooding, saw its flood defences revamped with new barriers and continuous riverbank maintenance, covering an 8km stretch. The BID rallied local businesses to co-fund the project, marking a precedent in the UK for private sector involvement in flood defence. A BID as "a not-for-profit arrangement whereby businesses agree through a ballot to fund specific activities chosen to strengthen the success and sustainability of those operating in a defined area.

Key to the project's success were the collaborative efforts between Sheffield City Council, the Sheffield Chamber of Commerce, and the Environment Agency, establishing a symbiotic public-private partnership. This synergy between various stakeholders underpinned the project's financial model, where businesses contributed through the BID, leveraging substantial national grants. The success of the LDV project, anchored in collective investment and shared responsibility, offers valuable insights for replicating similar schemes in other flood-prone urban areas if BIDs are possible through national or regional legal frameworks. The financing volume that can be collected through BIDs is small compared to financing needs for climate adaptation investments. A BID should be considered as complementary to other instruments, in this case national grants.

Sources: Private: businesses (large enterprises and MSMEs). Public: national-level government agencies

Instruments: Grant: implementation grant. Fees/user charges: business improvement district

Further reading: Sheffield Lower Don Valley Flood Defence Project. Business Improvement District (BID) Business Plan

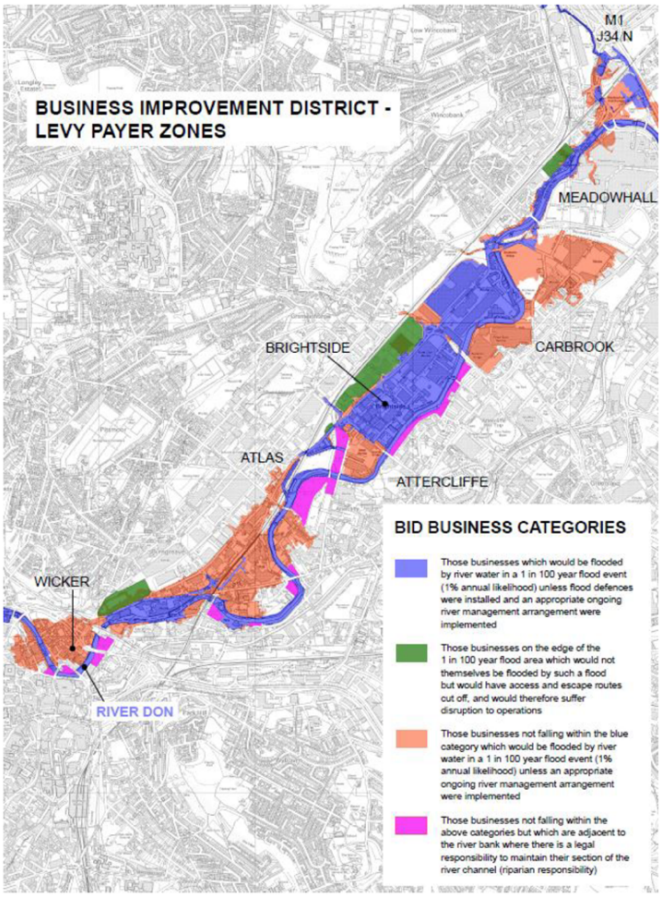

Figure 6.10. The levy rate for businesses within the BID area is determined based by the flood risk zone in which they are located.[43]

[43] Sheffield Chamber of Commerce and Industry. (2013). *Sheffield Lower Don Valley Flood Defence Project. Business Improvement District (BID) Business Plan*. Sheffield Chamber of Commerce and Industry, Sheffield City Council, Environment Agency. PDF

6.1.12. Dorset Heathlands (Dorset Council, UK)

The Dorset Heathlands in England are facing an increased risk of fires due to warmer and drier summers, and increased pressure from urban development near the heathlands. The Dorset Heaths Partnership, a collaboration between local councils, other public actors, and charities focused on conservation, have implemented a novel financial mechanism to mitigate the environmental impact of urban development. This model harnesses developer obligations from new developments, turning them into funding for mitigation activities. Introduced in 2007, these obligations are calculated as part of local policy frameworks based on expected developments and cost estimates for mitigation measures. The framework obliges developers to contribute financially to the preservation and enhancement of the heathlands. Over €3.5 million was allocated for mitigation efforts between 2020 and 2025, focusing on Strategic Access, Management and Monitoring (SAMM) and Heathland Infrastructure Projects (HIPs), including the creation of alternative natural green spaces (SANGs).

The model exemplifies a successful partnership among local councils, conservation groups, and developers, underpinned by legal mandates like the 2017 Conservation of Habitats and Species Regulations, and an existing section in the Town and Country Planning Act allows local authorities to harness developer obligations and allocate them for conservation activities. This synergy ensures that development pressures do not compromise the ecological integrity of the heathlands. While developer contributions finance mitigation measures, the arrangement also highlights a paradox: development, a threat to heathlands, is essential for funding their conservation. The Dorset case offers a scalable and transferable model for harmonizing urban development with environmental stewardship, contingent upon legal, financial, and collaborative frameworks.

Sources: Private investors: project developers.

Instruments: Land value capture: property and land tax (one time developer obligation at time of development).

Further reading: The Dorset Heathlands Planning Framework 2020-2025. Supplementary Planning Document

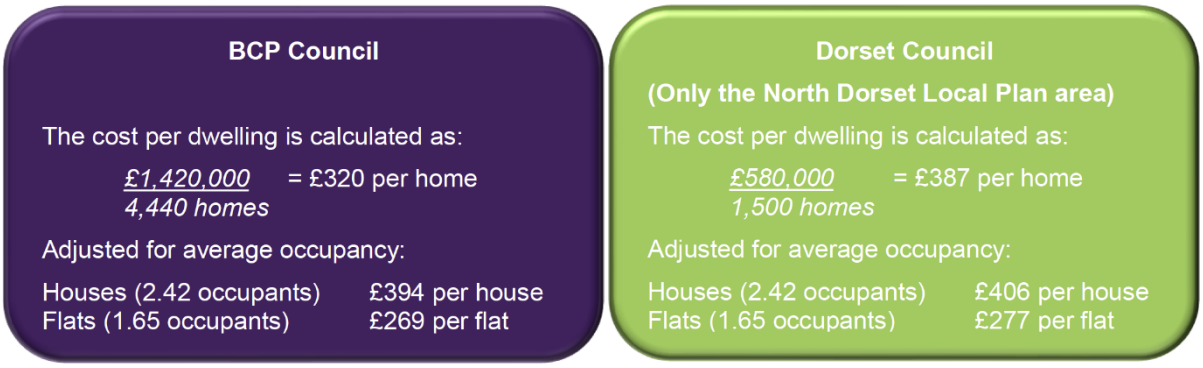

Figure 6.11. The calculation of the SAMMs contribution for development the BCP Council area and for Dorset Council the 5km area covered by the North Dorset Local Plan.[44]

[44] Dorset Council and BCP Council (2020). *The Dorset Heathlands Planning Framework 2020-2025. Supplementary Planning Document*. Dorset Council and BCP Council. PDF

6.1.13. Project Finance for Permanence

Conservation areas (ecosystems) like the Amazon Forest have global and local importance but are under increased pressure from climate face and human interventions like deforestation. A key barrier to long-term conservation is a consistent lack of funding and management. There is a global gap to finance for the protection of conservation areas. Project Finance for Permanence (PFP) is defined as "an approach or single initiative that secures important policy changes, and all funding necessary to meet specific conservation goals of a program over a defined long-term timeframe, with the ultimate aim of achieving the ecological, social, political, organizational, and financial sustainability of that program". PFPs have been applied in Brazil, Peru, Columbia, Bhutan, Canada, and Costa Rica. The smallest PFP has an investment volume of $77 million (Forever Costa Rica), the largest one has an investment volume of $642 million (ARPA for Life Brazil).

PFP is a large-scale conservation program rather than a conservation projects, and it takes a long-term approach that much longer than the average conservation project. It involves many partner organisations, including authorities, NGOs, donors, and conservation trust funds. PFP's business model is based on the reconciliation of conservation goals with financial means. The PFP approach is modelled after the private sector practice of "project finance" in which funding is raised for complex projects. The essence of project finance is that "financial closing is a condition upon the development of an agreed business plan. The financial model roughly is composed of two phases for implementation: (a) initially covering the estimated financial gap during the agreed implementation period through a transition fund; and (b) ensuring sufficient recurrent in-country funding to cover needs beyond that period. The ultimate financial objective of any PFP is to ensure long-term financial sustainability of a country/region's conservation priorities.

Ten enabling conditions that are key to success are described in this report. It warrants to evaluate whether the enabling conditions are met, and whether there are other approaches that are more cost efficient given that you need the time and the investment at the beginning to develop all these agreements.

Sources: Public: national and/or regional-level public entities. Private: NGOs, philanthropies, international cooperations. Other sources could be involved depending on which sustainable finance mechanisms are used.

Instruments: Blended finance through a combination of multiple sustainable finance mechanisms. Examples include taxation, results-based financing (debt for nature swaps, payment for ecosystem services), fees/user charges (carbon pricing, user charges, entrance fee), grants, donations.

Further reading: Securing sustainable financing for conservation areas: A guide to Project Finance for Permanence

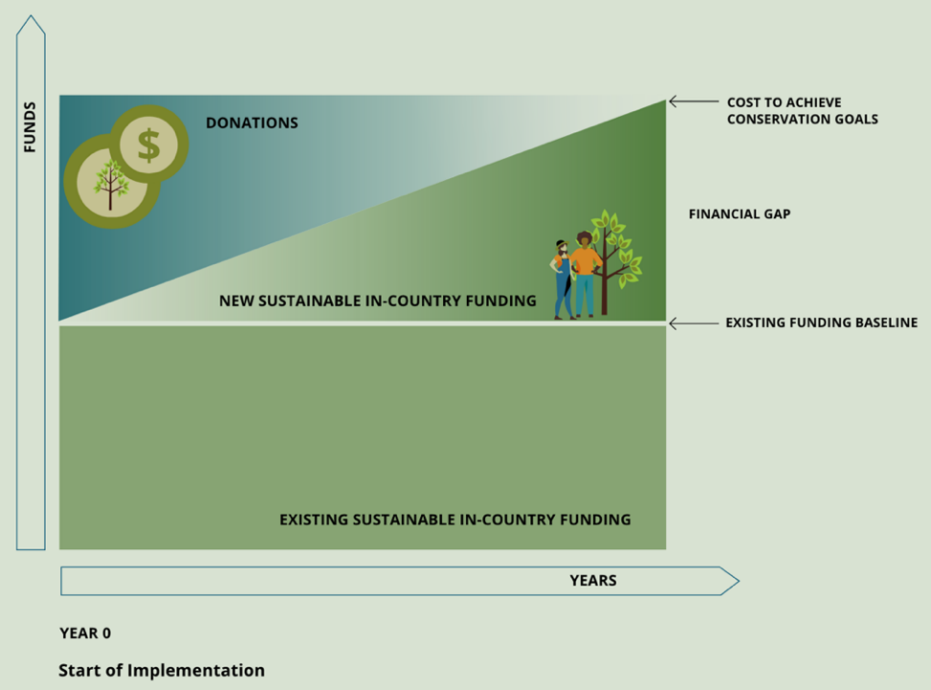

Figure 6.12. Simplified approach of PFPs that employ a transition fund.[45]

[45] Cabrera, H. N., Planitzer, C., Yudelman, T., and Tua, J. (2021). *Securing sustainable financing for conservation areas: A guide to Project Finance for Permanence*. Amazon Sustainable Landscapes Program and WWF. PDF

6.1.14. Reserva Particular do Patrimonio Natural Municipal (RPPNM) (Curitiba, Brazil)

The Reserva Particular do Patrimônio Natural Municipal (RPPNM) program in Curitiba, Brazil, was instituted in 2006 and leverages the concept of Transferable Development Rights (TDRs) to incentivize landowners to protect urban forests on their properties. By converting their lands into RPPNMs, property owners receive tax benefits and the opportunity to generate income through the sale of TDRs. These rights allow developers to fulfill green space requirements in their projects by purchasing unused development potential from preserved lands. This innovative financial and business model, initially funded with $1.5 million from public sources, has facilitated the conservation of urban biodiversity without imposing significant financial burdens on the municipal budget.

The success of the RPPNM program is attributed to its comprehensive framework, which includes strong public support, transparent procedures, and a synergistic blend of federal and municipal policies. The initiative has significantly reduced the financial strain on Curitiba's municipality by encouraging private investment in environmental conservation. As a result, the program has not only contributed to the preservation of urban forests and biodiversity but also to the improvement of air quality and the reduction of municipal expenses related to land expropriation and urban forest maintenance.

The RPPNM model showcases a successful integration of environmental conservation with urban development, offering valuable insights for similar initiatives globally. Its financial sustainability, coupled with its ability to engage private landowners and developers in conservation efforts, marks it as a best practice in addressing urban sprawl and biodiversity loss through innovative economic instruments.

Sources: Public: Government Agencies. Private: Households: property owners, private investors (project developers)

Instruments: Transferrable Development Rights

Further reading: RESERVA PARTICULAR DO PATRIMÔNIO NATURAL MUNICIPAL (RPPNM) in CURITIBA

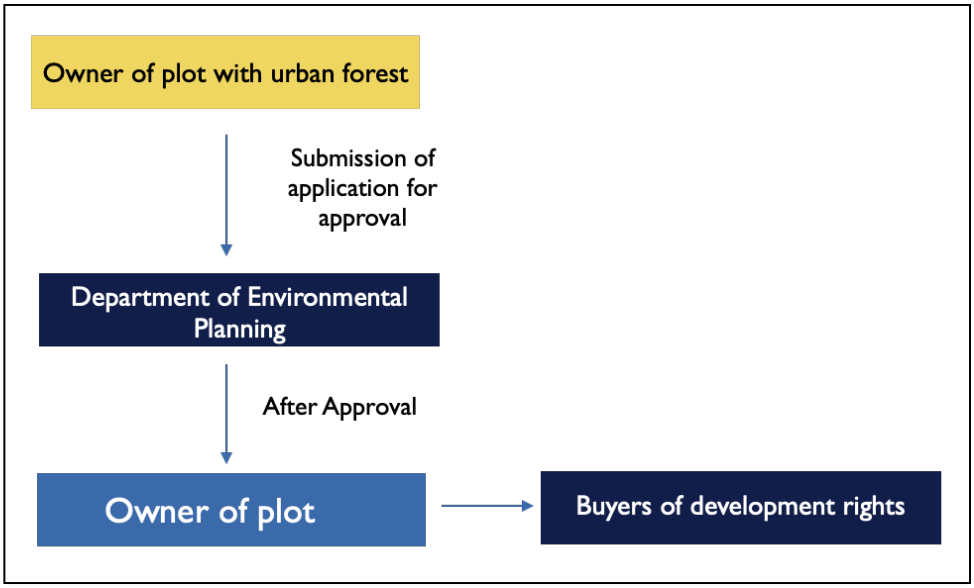

Figure 6.13. Financial and business model of RPPNMs. Source: UA

6.1.15. Seychelles Debt for Nature Swap (Seychelles)

The Seychelles, facing significant environmental threats and substantial national debt, innovatively tackled both by implementing a debt-for-nature swap. The Seychelles created the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT), which facilitated the buyback of 21.6 million USD of the nation's external debt at a discounted rate. This initiative resulted in reduced debt-servicing costs for the Seychelles, allowing SeyCCAT to redirect the saved funds towards marine conservation and climate adaptation projects.

This debt-for-nature swap restructured part of the national public debt and was financed through a combination of loans and grants. The restructuring effectively lowered interest rates and extended repayment periods. This concerted effort towards substantial environmental conservation was underscored by the establishment of Marine Protected Areas (MPAs) and the bolstering of the Seychelles' blue economy. The swap aims to significantly increase the area under protection, potentially reaching close to 400,000 square kilometers of the Seychelles Exclusive Economic Zone. The swap made a considerable amount of new financing available, with five projects completed so far. The success of this model is also evident in its replication potential, inspiring similar initiatives in other nations, notably the Super Blue Bond in Belize. It shows the pivotal role of multi-stakeholder collaboration, including governments, non-governmental organizations (NGOs), and philanthropic entities, in achieving sustainable development goals. This case demonstrates the feasibility of leveraging financial restructuring for environmental conservation, providing a scalable model for other vulnerable economies grappling with similar challenges.

Sources: Third sources (NGOs and Philanthropic organisations), National level government entities

Instruments: Results-based financing (Debt for nature Swaps)

Further reading: Innovative Financing – Debt for Conservation Swap, Seychelles' Conservation and Climate Adaptation Trust and the Blue Bonds Plan, Seychelles

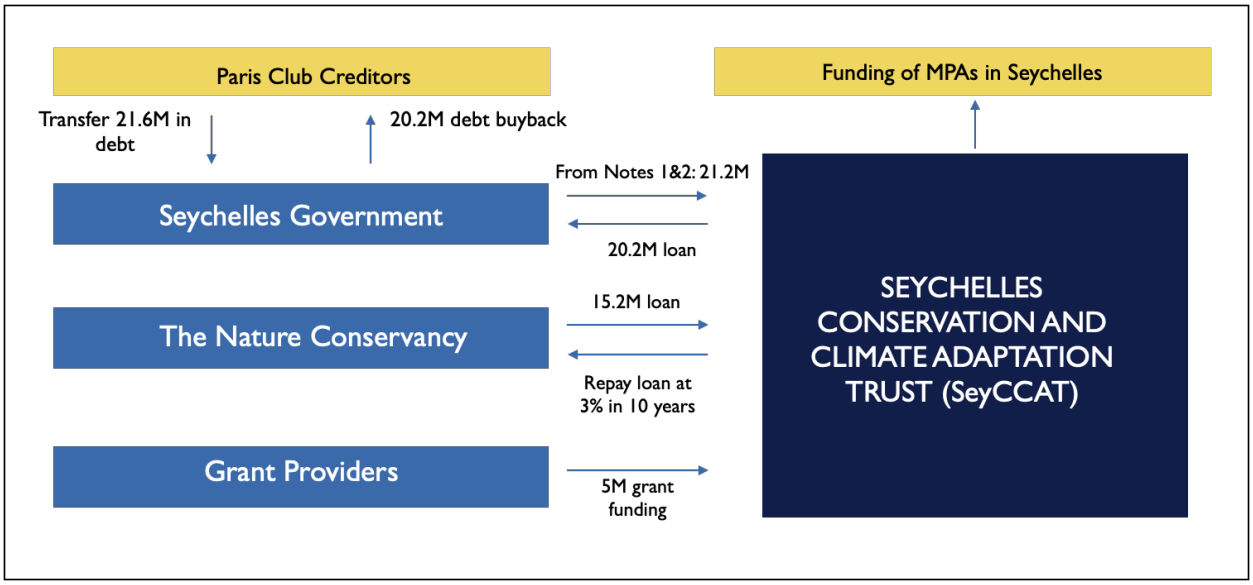

Figure 6.14. Financial model of Seychelles Debt for Nature Swap. Source: UA

6.1.16. Viveracqua Hydrobond, Veneto, Italy

The Viveracqua Hydrobond project, initiated in 2014 in the Veneto region of Italy, showcases an innovative financial model for water infrastructure through the issuing of pooled minibonds. This model was developed due to the critical need for long-term financing solutions that align with the extensive lifespans of infrastructure projects, without imposing immediate financial burdens on consumers through increased water tariffs.

The Viveracqua consortium, comprising eight water utilities, collectively issued minibonds totalling €227 million between 2014 and 2017 and an additional €396.5 million between 2020 and 2022. These bonds were then aggregated and securitized into an Asset-Backed Security (ABS) to enhance investment attractiveness and diversify funding sources. This strategic financial arrangement was designed to reduce administrative costs and complexity, offering a sustainable financing mechanism while promoting stable water pricing for consumers.

The business model included the participation of the European Investment Bank (EIB) and other institutional investors, which provided substantial financial backing, thereby ensuring lower borrowing costs and enhanced credit standing for the minibonds. This project led to the stabilization of water service costs for end-users and provided a framework for financial planning and investment in public utility infrastructure. By extending the repayment period and securing favorable financing terms, the project demonstrates effective financial innovation to address and mitigate the impacts of climate-related challenges on water management systems.

Sources: Public: European Investment Bank, Financial arm of Veneto region. Private: MSMEs, households (property owners)

Instruments: Debt based instruments: Minibonds. Fees/user charges: water bills

Further reading: Viveracqua Hydrobond: When Infrastructure Investments Meet Securitization

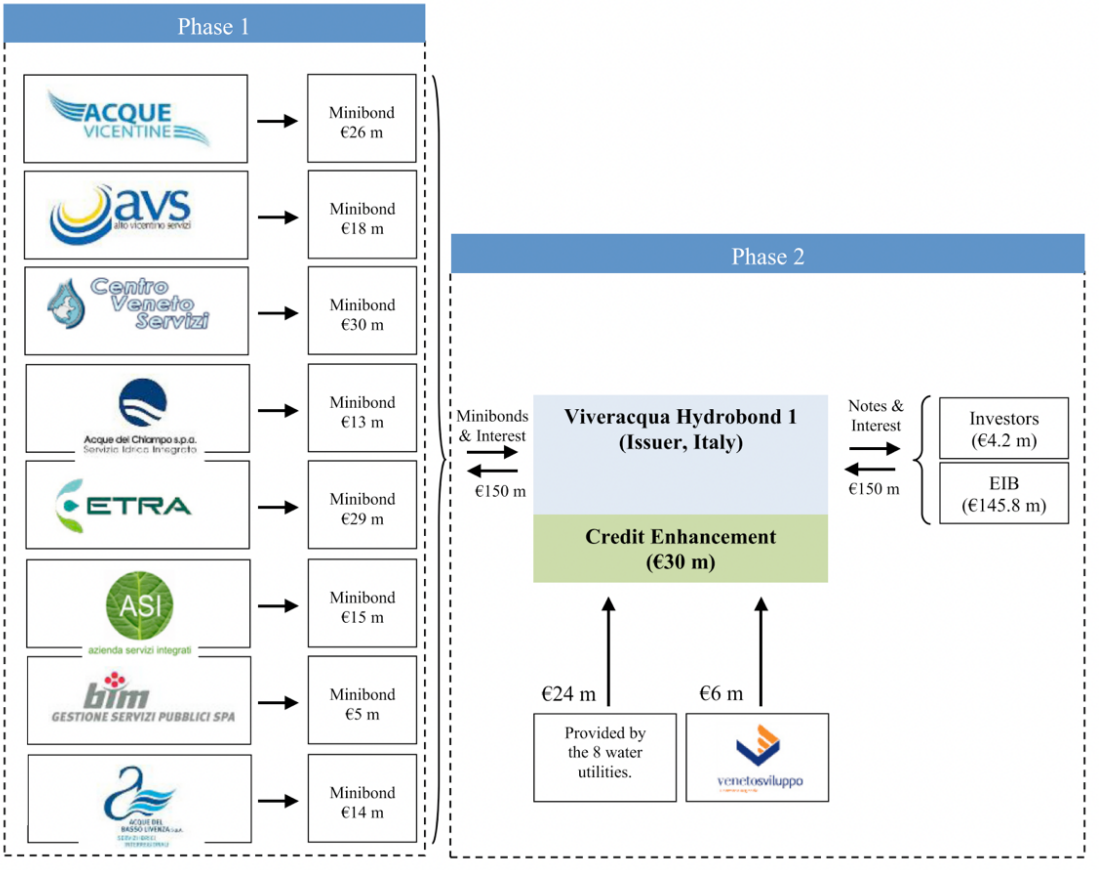

Figure 6.15. Financial model of the Viveracqua Hydrobond[46]

[46] Gatti, Nobili, Massimi, & Florio. (2016). Viveracqua Hydrobond: When Infrastructure Investments Meet Securitization . In *Project Finance in Theory and Practice: Designing, structuring and financing Private and Public Projects* (4th ed.). Peter B. Linsley

6.1.17. Wetland Mitigation Banking, USA

The Wetland Mitigation Banking Program (WMBP), managed by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), is designed to support agricultural producers who need to offset their negative impacts due to regulatory compliance requirements. This program has been operational since 2014 and facilitates the establishment of wetland mitigation banks, which are crucial for farmers needing to drain wetlands for agricultural use while maintaining compliance with environmental regulations. These banks provide participating producers with an efficient mechanism for mitigating lost wetlands.

WMBP is a market-driven approach where farmers purchase credits from mitigation banks to offset the environmental impact of draining wetlands. This setup allows for the balancing of agricultural productivity and environmental preservation. The program's success depends on its ability to provide a streamlined solution for farmers to continue their agricultural operations without compromising environmental standards. By purchasing credits, farmers can adhere to compliance regulations and maintain eligibility for other USDA benefits. This approach not only supports sustainable agricultural practices but also promotes the restoration and preservation of wetland ecosystems, contributing to broader environmental objectives such as flood control, habitat protection, and water quality improvement.

Sources: Public: National government. Private: Households (property owners)

Instruments: Results based financing: Payment of Ecosystem Services. Fees/user charges: offsetting.

Further reading: Wetland Mitigation Banking Program

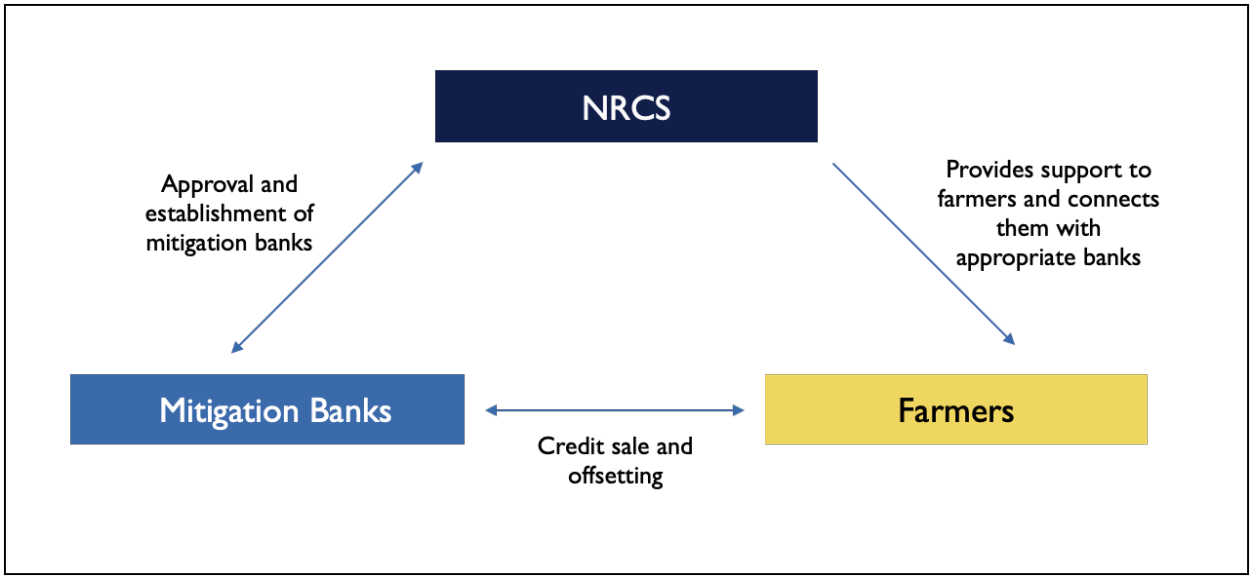

Figure 6.16. Financial model of the Wetland Mitigation Banking. Source: UA

6.1.18. Gothenburg Green Bonds, Sweden

The city of Gothenburg has been a pioneer in green finance by issuing the world's first municipal green bond in 2013, aiming to transition to an environmentally sustainable city by 2030. This initiative is grounded in the city's comprehensive Environment and Climate Programme. The green bond has been renewed annually, ensuring a continuous flow of capital towards green projects. The governance of these bonds is managed by the City's Green Bond Committee, which evaluates eligible green projects for allocating proceeds. As of December 2023, the City of Gothenburg's total volume of outstanding green bonds was €2.15 billion.

The Gothenburg green bond framework is based on the 'Green Bond Principles'. The green bond has successfully attracted investors' interests each year, which is a consequence of the Swedish business and financial culture that has a strong focus on sustainability, and the expertise and resources present within the City that allows Gothenburg to manage the green bonds nearly on its own. A current limitation is that none of the proceeds have been allocated to climate adaptation projects, which could be explained by the city's priority for investing in energy efficient buildings (76% of bond proceeds) against the backdrop of a growing city.

Any city could issue a green bond, but some conditions are important: the ability to have a large enough green bond volume; a government with a commitment to sustainability; leading financial institutions that take leadership in sustainability will encourage the issuance of a green bond; and an institutional structure that requires sustainability and impact disclosure from companies makes issuing green bonds easier.

Sources: Private institutional investors (banks, pension funds…)

Instruments: Debt: municipal green bond

Further reading: Green Bonds. City of Gothenburg website

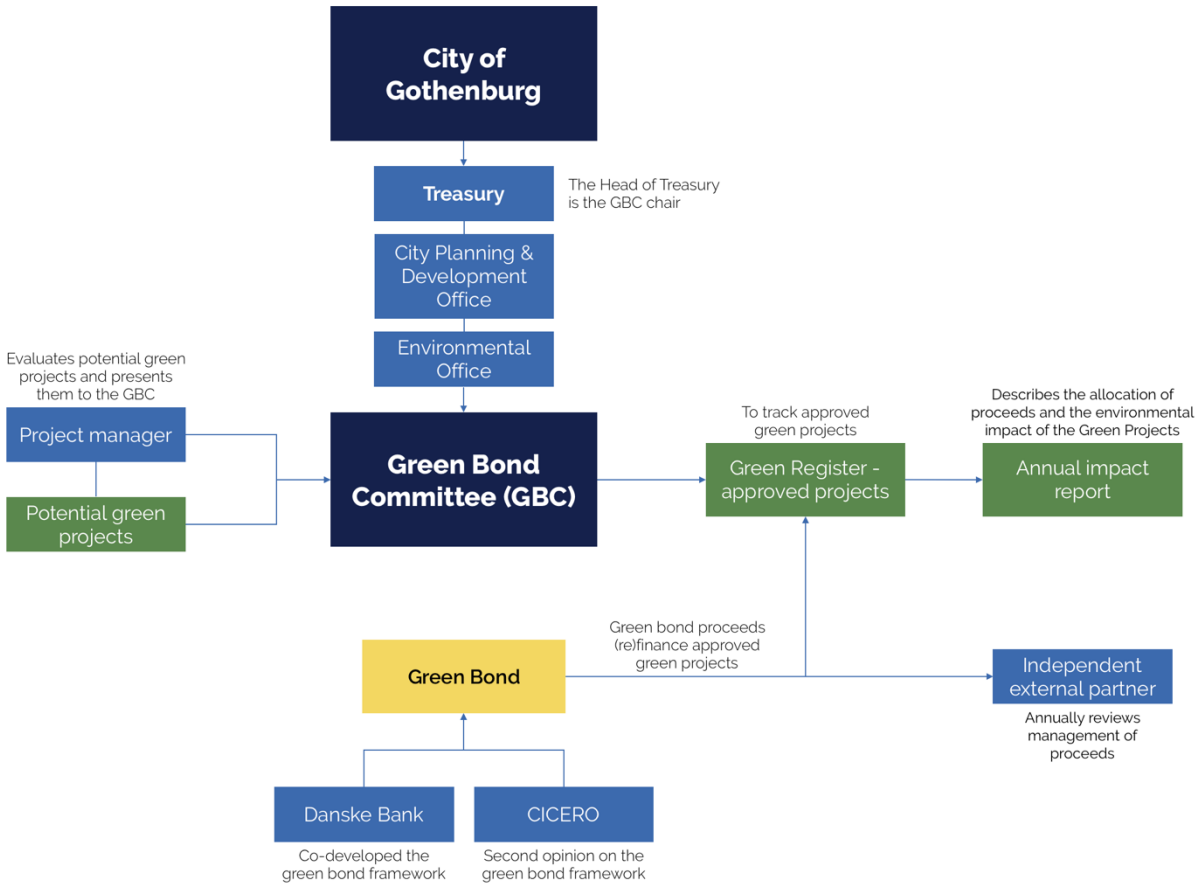

Figure 6.17. Organisational and financial structure of the Gothenburg Green Bonds (no information was found about the repayment of green bonds). Source: UA

6.1.19. Zorrotzaurre flood Proof district, Bilbao, Spain

The Zorrotzaurre redevelopment project in Bilbao, Spain, aims to manage flood risks through a Public-Private Partnership (PPP). Initiated in 2012, this PPP seeks to convert an industrial peninsula into a residential area capable of withstanding severe flood events. The financial structure of the project is a blend of public and private investments, with costs shared according to land ownership proportions, integrating 51% public and 49% private contributions.

The City of Bilbao and regional government entities have contributed significantly, with initial investments focusing on infrastructure critical for flood management, such as the opening of the Deusto Canal and the construction of floodwalls and stormwater systems. Private developers have invested in raising land levels and developing green spaces that contribute to the area's sustainability and flood resilience. The project was designed by the renowned architect Zaha Hadid. The project demonstrates the effectiveness of combining public resources and private sector efficiency to address complex urban challenges like climate change and urban flooding, setting a precedent for future PPPs in urban redevelopment.

Sources: Public: Regional and subnational government entities (Local Municipalities). Private: Project developers

Instruments: Blended finance: Public Private Partnership

Further reading: Zorrotzaurre Flood Proof district

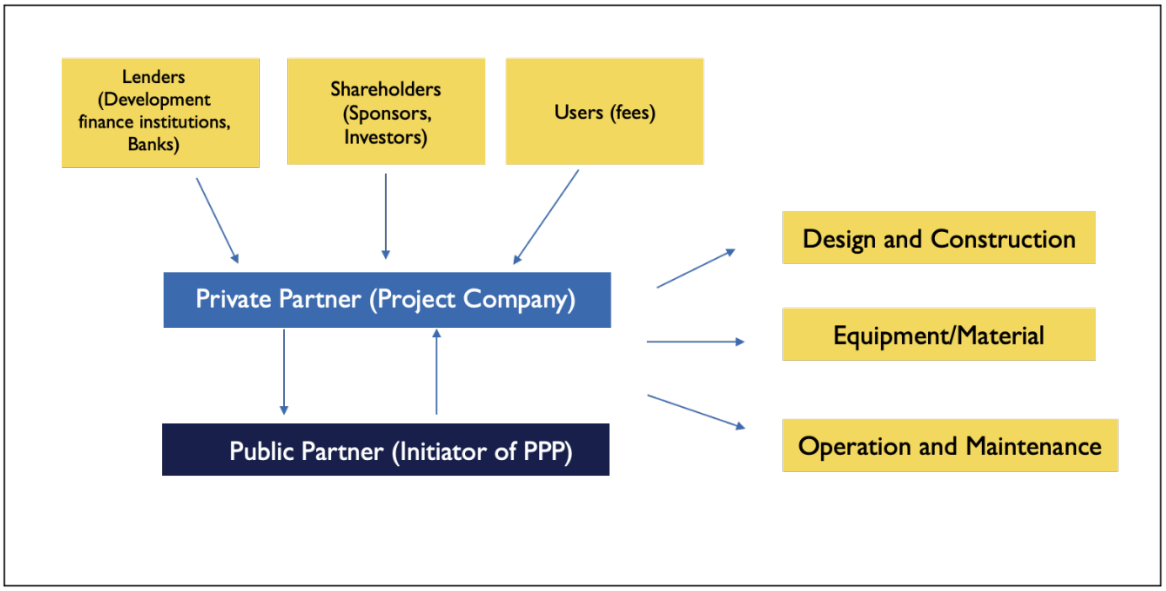

Figure 6.18. General Financial model of Public-Private Partnerships. Figure adapted from Global Centre on Adaptation (2021)[47]

[47] Global Center on Adaptation. (2021). *Knowledge Module on PPPs for Climate-Resilient Infrastructure.* (2021, September). Global Centre on Adaptation. Last consulted on 1 January, 2024, URL

6.1.20. Edwards Aquifer Protection Program, San Antonio, USA

The Edwards Aquifer Protection Program (EAPP) in San Antonio, Texas, safeguards the city's vital source of potable water, the Edwards Aquifer. Launched in 2000, the EAPP secures conservation easements to protect the aquifer, which is crucial for the region's water supply. This strategic financial initiative was strongly supported by voters, reflecting its wide acceptance and the community's commitment to sustainable water management. It has leveraged local sales tax increases and green bonds to fund ecosystem services.

Initially funded by a voter-approved 0.125% sales tax increase, the program has raised 335 million USD since its inception, enabling significant land conservation over the aquifer. These funds are used for the acquisition of land easements that restrict development, maintaining the aquifer's recharge zones and ensuring a stable water supply. In 2021, the funding strategy evolved to include green bonds, further diversifying its financial base and ensuring continued support for aquifer protection efforts.

The EAPP not only illustrates the importance of community support with repeated voter approvals but also serves as an effective model of public engagement and long-term environmental stewardship. This program conserves critical habitat, supports biodiversity, and secures a sustainable water resource for San Antonio and conserves critical habitat for biodiversity, proving that strategic financial planning and strong voter support can drive successful environmental programs.

Sources: Public: Local municipalities (Local options sales tax), Private: Property owners, Sources of green bond funding are not known

Instruments: Results based financing: Payment of Ecosystem Services. Debt based instruments: green bonds, Taxation

Further reading: Edwards Aquifer Protection Program Website

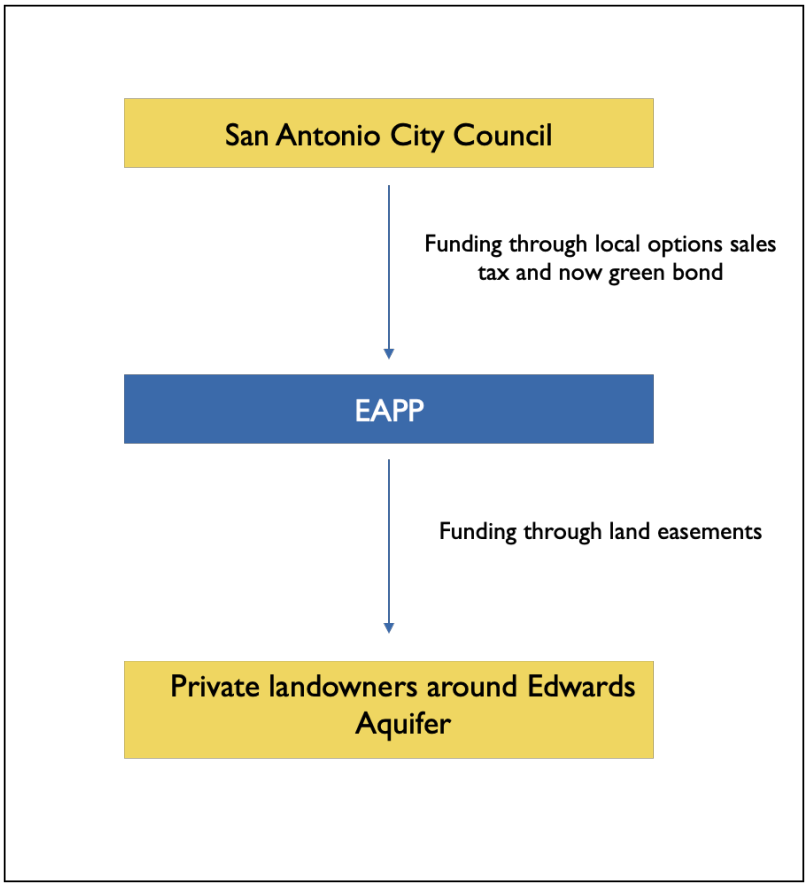

Figure 6.19. Financial model of the Edwards Aquifer Protection Program. Source: UA

6.2. Lessons learned across the 20 best practices

We performed a comparative analysis of the 20 international best practices on five topics that we will discuss in this final section of the chapter:

- **Key barriers** to climate adaptation finance that were overcome by installing a new AFFS, or that led to the choice of adopting a specific AFFS. This refers to barriers that inhibited climate adaptation finance prior to the AFFS discussed in each case.
- **Success factors** that contributed to the establishment and operation of the AFFS. These can be considered as elements that helped increase positive outcomes as much as possible, or they can be seen as conditions that should preferably be present, or if not present, could be met first before the AFFS can be successfully developed, implemented, and operated. In addition to these, we discuss some specific **transferability conditions** that can be deduced from the cases but were not explicitly identified as success factors or enabling conditions. These are conditions that are advised to be present in territories interested in adopting one of the cases' AFFS. Taken together, these elements help determine whether an AFFS, as applied in one of the 20 best practices, is a good match for a territory, or which preparatory steps may be needed to ensure the conditions are met to adopt an AFFS.
- **Limitations** or challenges experienced related to the AFFS. These are elements that did not inhibit the development and operation of an AFFS, but rather limited the potential to finance climate adaptation or related measures.

As we will show, these elements are not isolated and are often intertwined with one or more other elements. We only focus on elements that appeared in multiple cases and are not exclusively bound to a particular AFFS. Success factors, enabling conditions, transferability conditions, or limitations that are specific to an AFFS or a financial instrument are detailed in the individual best practice reports that are available on the CLIMATEFIT website. We illustrate each identified element with a few examples from one or more best practices. As the section becomes too extensive if we discuss every best practice related to an element, Tables 6.3, 6.4, and 6.5 provide an overview of the best practices in which each element was discovered by referring to their IDs, indicating reports where you can find more information about each element. It is likely that some elements were present in certain cases, but we did not explicitly uncover them due to lack of data. In Chapter 7, the conclusion, we will reflect on the overall findings of this deliverable, including a brief discussion of how these international best practices exemplify some of the barriers identified from the perspectives of PAs (Chapter 4) and FIEs (Chapter 5).

6.2.1. Key barriers to climate adaptation finance before the AFFS

It will not come as a surprise that, in most cases, an innovative AFFS was developed because **public resources were insufficient**. Budget constraints and priorities in other sectors are widely researched and acknowledged barriers among public authorities to climate adaptation finance. This was an explicit barrier in 11 best practices. The RPPNM (**ID14**) initiative in Curitiba, Brazil, marked a change in strategy to protect urban forests on private lands. Initially, the local government used expropriation to take ownership of the land. Although it worked well for a long time, it was time-consuming and expensive. By allowing transferable development rights among private actors instead, the monetary pressure on the municipality itself was alleviated. The City of Copenhagen (**ID03**) developed a strategy with the water utility company HOFOR to use water tariff incomes for co-financing stormwater projects because the city itself did not possess the capacity nor the financial resources to implement the Cloudburst Management Plan.

Strongly related to, and often because of, limited public resources is the lack of a **long-term (financial) strategy**. In the Groenfonds (**ID06**) case, green services management in the countryside of Midden-Delfland is a patchwork of public and private organisations and actors, with financing being rather project-based or incidental rather than structural and long-term. Similarly, in the City of Cape Town (**ID02**), prior to the instalment of a water fund, there was a lack of a coherent and long-term ecological infrastructure restoration strategy. Additionally, the **legal framework** prevented the City of Cape Town from playing a more active role and taking ownership of its water resources because the sub-catchments are outside the jurisdictional boundaries of the City of Cape Town.

There are some cases where green area management or conservation practices must take place on privately owned lands, but **private landowners lack resources or incentives** to do it. EcoMarkets Australia (**ID04**) was a way to offer private landowners financial rewards for conservation practices on their land because landowners may lack the time or resources to readily adopt new conservation practices. In Midden-Delfland, even before the instalment of the Groenfonds (ID06), the dairy farming industry active in the area became responsible for maintaining valuable landscape elements in Midden-Delfland's agricultural areas. Since maintaining landscape elements is not a legal obligation for farmers and not part of a farmer's core business, it is not prioritised as an activity. Consequently, many farmers do not have the resources to voluntarily maintain the valuable landscape in agricultural areas.

6.2.2. Success factors

We identified multiple key factors or conditions that enabled the successful development, implementation, and operation of an AFFS for climate-related policies or investments (Table 6.3). Some of these ten elements include sub-elements that are strongly related.

(1) Stakeholder involvement. Successful stakeholder involvement is by far one of the most important conditions for developing and operating an AFFS successfully, as found in the best practices, and often mentioned by interviewees as the most important success factor. Stakeholder involvement, as researched in the 20 best practices, takes four different forms:

- **Collaborations between public and private partners.** Climate programmes or projects initiated by public authorities may require collaboration with private partners to acquire private sector expertise, obtain financing and funding from multiple public and private sources, or share risks between public and private actors. In many best practices, interviewees pointed to this as the crucial success factor. The Sheffield Lower Don Valley Flood Defence project (**ID11**) was a collaboration between the Environment Agency, the City of Sheffield, and the Chamber of Commerce. The three partners were prepared to work on it together quickly on a solution that would offer benefits to both the municipality and the businesses that faced flood risks. Seychelles' debt-for-nature swap (**ID15**) is also an example of a successful collaboration between governments, creditors, NGOs, and philanthropic foundations for debt management and environmental challenges. Particularly, the support from the Paris Club ensured favourable terms were offered to Seychelles for buying the debt.
- **Collaboration between public partners.** A frequently cited barrier to climate finance is siloed government structures whereby departments each have their own projects but do not collaborate with other departments. Because climate adaptation projects usually transcend the responsibility or boundaries of one sector, siloed governments inhibit climate adaptation investments. Some of the best practices successfully overcame that barrier. Resilient Hampton (**ID08**) is a city-wide interdepartmental sustainability initiative with the objective to improve residents' quality of life in the face of water-related challenges by increasing the city's ability to withstand and recover from them. Overall, within the City of Hampton, there are strong relationships across city departments, including the finance department. The management of Copenhagen's Cloudburst Management Plan (**ID03**) relies on the successful horizontal integration of all relevant departments and administrations.
- **Community support and involvement** has been an explicit contribution to success in half of the best practices and can take different forms. It could mean active involvement of partners with a stake in the project, such as landowners, or involvement could take place through community-wide support for decisions made by public authorities. Engaging communities is important to raise awareness about climate challenges and to find support for climate programmes and the mechanisms required to finance and fund them. The Edwards Aquifer Protection Program (**ID20**) has since its inception been financed through mechanisms that were voted for by the citizens of the City of San Antonio. The most successful flood buyout programmes (**ID10**) involve ongoing conversations with the community to ensure their needs and concerns are addressed. This includes defining community boundaries and ensuring an inclusive process. The latest audit (2023) of Groenfonds (**ID06**) showed that participant numbers have remained stable and even increased for the period 2018-2023, meaning dairy farmers participating in the programme and delivering green services in return for financial compensation are overall satisfied with the system.

(2) Legal framework and legal compliance. Appearing in almost all the cases, the legal conditions in an area are, together with stakeholder involvement, one of the key elements to ensure that an AFFS is allowed and that it complies with the legal framework. In some instances, significant legal changes were required to adopt an innovative AFFS. To finance its Cloudburst Management Plan (**ID03**), the City of Copenhagen had to lobby the national government to enforce a legal change to the water sector law that allows utility companies in Danish municipalities to co-finance surface stormwater management measures for drainage systems from water tariffs. In other best practices, legal changes were not needed, but at least legal approval was required from a local council. In Nagoya, the implementation of the Greenification Certificate System (**ID05**) required some legal changes. The national level implemented the System of Greening Area as a legal instrument, which was adopted by the city of Nagoya. The city then further complemented this regulatory framework with the voluntary framework of the GCS. In the Clean Water Partnership (**ID02**) best practice, Prince George's County's legal framework already allowed for public-private partnerships under the state of Maryland, but legal compliance had to be checked and council approval was needed because the CBP3 approach was a relatively new PPP approach.

As a specific example of legal compliance, **fiscal regulations** can be an important factor to enable the use of tax-based instruments by different government levels. In countries like the UK and the US, local authorities have a larger autonomy on local taxes than other countries that are more dependent on the state or national government for collecting taxes. This is exemplified through the Edwards Aquifer Protection Program (**ID20**), where the City of San Antonio used a voter-approved sales tax increases to fund aquifer protection measures for almost 20 years.

Table 6.3. elements that were explicitly identified as success factors in the 20 best practices.

Success factors / ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Collaborations between public and private partners	X	X	X		X		X	X	X		X	X			X	X	X		X	X
Collaborations between public partners			X					X	X			X				X				
Community support		X			X	X		X		X	X		X	X				X		X
Legal compliance	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X		X
Political support			X					X	X				X		X			X		
Public resources			X	X	X	X	X	X	X	X	X	X	X		X		X	X		
Private resources		X		X		X		X	X						X	X	X	X		
De-risking mechanisms	X	X		X			X	X				X				X				
Business case	X		X					X			X		X							
Accountability, transparency, reporting	X			X			X	X	X					X		X		X		
Financial incentives	X	X		X		X	X				X			X						
Multiple sources/instruments	X	X	X			X				X	X		X			X	X			X
Long -term strategy	X	X	X			X		X	X			X	X					X	X	X
Sustainable finance			X	X		X	X						X			X				
flexibility		X		X		X	X						X							

(3) Political support or political buy-in was found to be an explicit enabling condition in about a third of the best practices to speed up or facilitate climate investments and their accompanying AFFS. The green bond proposal for the City of Gothenburg (**ID18**) in 2013 quickly found consensus among city employees and policymakers. There was little political debate, and everyone believed it was a good idea, also because private investors quickly jumped at the opportunity. In the Seychelles debt-for-nature swap (**ID15**), the Seychelles Government created the ideal preconditions for debt conversion: a government interested in pushing forward climate adaptation, especially at the opportunity of alleviating some of its national debt. In the City of Paris (**ID09**), the political will to push for ambitious climate policies has been continuously strong, especially since green and left parties have formed the local government for multiple terms in a row, which eased the implementation of the green bond.

(4) Public and/or private resources. In almost all the cases, specific public and/or private resources were important to enable the proper development and management of the AFFS and the project or programme. From a public authority perspective, resources can either be readily available or must be acquired by hiring new staff or by partnering with private sector actors. Resources can mean different things, such as staff, time, expertise, or financial resources to prepare or run a programme. In most cases, financial expertise was important to work out the financial technicalities of the AFFS. Similarly, legal expertise was often important to ensure the AFFS or the programme complies with local and supra-local legal frameworks. Because of the large scale of Project Finance for Permanence (**ID13**) programmes, each PFP case has 50 people with different expertise who work around three to five years half-time or full-time for only the development and preparation of the PFP. Copenhagen is a large city that can manage the Cloudburst Management Plan (**ID03**) itself, but it requires significant resources in terms of staff, time, and money. Smaller public authorities like the City of Hampton (**ID08**) could not have developed the Environmental Impact Bond without the help of private partners, being Quantified Ventures and the Chesapeake Bay Foundation in the Resilient Hampton best practice. The issuance of a bond requires the involvement of banks or, in the case of green bonds, a third-party validator, regardless of the resources available within a public authority.

The next four elements (5-8) are strongly related because they all contribute to gaining trust from investors and can help convince partners to participate in a climate program or project.

(5) De-risking mechanisms (risk sharing and allocation). De-risking mechanisms are important to convince actors to invest by safeguarding their financial interests, especially in situations where innovative AFFS or climate measures are implemented. De-risking mechanisms can take different forms or serve different purposes. For example, de-risking can mean certainty for investors over a longer period. In the Dorset Heathlands best practice (**ID12**), where mitigation measures are financed from developer obligations, the Supplementary Planning Document describes the rates that project developers in the vicinity of the heaths must pay for a five-year period. The predefined rates ensure transparency and accountability. The simplicity of this approach avoids unnecessary delays in the determination of planning applications, and it offers developers who prepare applications for developments certainty about contribution rates. In the Greater Cape Town Water Fund (**ID01**), the City of Cape Town contributes to the water fund through performance-based contracts, which means that it only needs to pay if the programme meets its performance targets. In the case of the Viveracqua Hydrobond (**ID16**), the water utilities involved addressed the issue of mini-bonds being unattractive for investors by pooling their mini-bonds, thus enhancing their creditworthiness.

(6) A business case with quantifiable outcomes. Climate measures increasingly involve green-blue infrastructure or NbS to replace traditional grey infrastructure investments. There is a consensus that green-blue interventions have multiple co-benefits, but it remains more challenging to quantify these benefits and determine the cost-efficiency compared to grey infrastructure. Examples of co-benefits of urban green-blue infrastructure projects can include increased biodiversity and improved habitats, reduction of atmospheric pollution, more recreational space that encourages healthier lifestyles, aesthetic values and city attractiveness, rainwater recycling, and reduced urban heat island effects. Many benefits are long-term and cannot be expressed in direct revenue streams, which decreases attractiveness for private sector parties to invest.

Several best practices exemplified that it is possible to prepare a strong business case that can convince both public (mainly politicians) and private sector actors to participate. The Sheffield Lower Don Valley Flood Defence project (**ID11**) could only secure national funds if a part of the investment costs would be funded by other sources. After exploring multiple alternatives, the solution became to collect the remaining 17% of the LDV budget through a business improvement district (BID). The Sheffield Chamber of Commerce allocated resources to develop a BID business plan. This plan included data and information from the Council and the Environment Agency's work, comparing damage costs and high insurance premiums in case of no flood protection with a relatively minor contribution from businesses to the flood defence project. This business plan proved vital in convincing businesses and resulted in an overwhelming majority vote in favour of the BID. In the case of the Greater Cape Town Water Fund (**ID01**), the design and implementation of the water fund required a strong narrative backed up with scientific evidence that the proposed nature-based solutions would be effective. The business case was therefore an important resource to secure public and private financing.

(7) Accountability, transparency, reporting. These elements are required to convince investors and gain trust from investors or other partners. Accountability and transparency are facilitated by reporting the outcomes of

the AFFS or climate measures in terms of efficiency, effectiveness, or broader impacts, depending on the reporting structure that is set up. The green bond best practices have a green bond framework based on the Green Bond Principles developed by the International Capital Market Association (Gothenburg Green Bonds, **ID18**; Paris Climate Bond, **ID09**). The fourth and final part of the framework describes procedures for reporting and disclosure of green finance investments, which are vital to building confidence that green finance is contributing towards a sustainable and climate-friendly future, both among investors and in society. Transparency, reporting, and verification of impacts are important for investors. The Resilient Hampton's Environmental Impact Bond (**ID08**) can be considered a next step in disclosing investment impacts, whereby impacts must be disclosed once the projects become operational. Using an environmental impact bond means committing to a quantitative prediction, post-implementation evaluation, and disclosure to both bond investors and the community of actual project outcomes. Compared to a standard green bond, this requires extra resources and thus implies higher transaction costs, which should be weighed against the EIB's greenium.

(8) Financial incentives for all partners involved. In several cases, successful partnerships depended on the ability to offer a financial incentive for all key partners involved, ensuring everyone benefited from participation and/or investing. The most straightforward types of AFFS that require this element are market-based mechanisms that have supply and demand sides, such as offsetting, payment for ecosystem services, or transferable development rights. The Washington SRC Trading programme (**ID07**) is beneficial for multiple involved partners. Property developers and owners can reduce the cost of stormwater management requirements by purchasing stormwater credits while maximising the buildable area on-site. Developers of green infrastructure projects can get financial compensation from selling stormwater credits. Landowners that allow green infrastructure projects to be developed on their land can receive a reduction on their water bill. Similarly, the RPPNM programme (**ID14**) in Curitiba, Brazil, required minimal or no expenditure from the side of the municipality to protect urban forests. Landowners of urban forests could sell their development rights to developers, which was an attractive option since many landowners did not like living near or in the forest. Finally, developers could acquire additional development rights to increase the maximum buildable size of their projects in other areas. With this element, we want to show that financial incentives can be a reason for potential partners to participate, but we are convinced that AFFS must also consider broader non-financial, or indirect financial impacts. Some of the best practices are examples of community involvement or support for an AFFS because the climate project offers community-wide benefits without direct financial gains, such as water security (Edwards Aquifer Protection Program, **ID20**), more green spaces (Copenhagen Cloudburst Management Plan, **ID03**), or flood protection (Resilient Hampton, **ID08**).

(9) An AFFS with multiple sources and instruments. In almost half of the best practices, the AFFS relied on the inclusion of funds coming from multiple sources, and/or through multiple instruments. This can significantly improve the robustness and financial sustainability when a programme does not rely solely on a single source of financing or funding. It is therefore also related to the success factor about sustainable finance. Also, combining multiple sources and instruments can increase the investment volume available and upscale climate investments. This element can take different forms, either through cost-sharing between different sources, by pooling multiple sources into a single entity, or by transitioning from one source and/or instrument to another. In the Wetlands Mitigation Banking Program (**ID17**), a cost-sharing approach is used to cover up-front costs. Mitigation banks contribute a portion of project funding and government agencies can allocate resources to support staff overseeing the banks. In a Project Finance for Permanence programme (**ID13**), the objective is to become financially sustainable by transitioning from reliance on donation-based funding to ensuring sufficient recurrent in-country funding to also cover needs beyond a programme's implementation period, and PFP programmes combine multiple sources and instruments. Theoretically, any financial instrument could be employed as a sustainable finance mechanism to ensure recurrent in-country funding. Some instruments mentioned in the PFP guide include public funding/budgets, entrance and user fees, debt-for-nature swaps, concessions and easement payments, taxes and levies, compensation payments, payment for ecosystem services, microfinance, and fees on licences and permits. The Viveracqua Hydrobond (**ID16**) pooled multiple mini-bonds from eight water utilities into an Asset-Backed Security (ABS) to enhance investment attractiveness and diversify funding sources.

(10) Long-term strategy and sustainable finance. The upscale of climate finance can be inhibited by the lack of a clear long-term strategy and having sustainable financing or funding streams, two related elements. BPs that relied on these elements communicated them as part of official plans, or study documents like a business case. Among public authorities, investments are often tied to election cycles and political terms, which are usually only around five years. The negotiation of budget allocation at the start of a new term or to determine annual budgets can slow down climate investments. Grant or subsidy programmes are usually project-based and require each time to go through application and reporting procedures. Having a long-term strategy or structure in place is a first important condition to overcome short termism. Additionally, sustainable finance means that an AFFS is put in place that ensures a reliable income stream over a longer period that can be allocated to climate investments. Both long-term strategies and sustainable finance are related but are not always present at the same time. A long-term strategy, such as a climate plan, can form the basis of identifying and selecting projects or investments, without necessarily having secured financing. Conversely, financial mechanisms can be available that offer regular income streams, such as levies on private properties or water

bills, without these being allocated already to investments as part of a long-term strategy. Some best practices exemplify this point and at the same time illustrate what these elements entail:

- **A long-term strategy** can take the form of a climate plan, a specific institute or a vehicle such as a partnership. In Paris (**ID09**), the first Climate and Energy Action Plan was adopted in 2007 and has been renewed three times, with the latest version published in 2024. The latest plan also includes an adaptation strategy. Developing a long-term plan eased the implementation of a bond framework because the green mitigation and adaptation projects that the bond will finance are readily available through the plan and can be communicated to potential investors. Copenhagen's Cloudburst Management Plan (**ID03**) has an implementation period of 20 years, totalling more than 300 prospected projects across the city. The Greater Cape Town Water Fund (**ID01**) has a long-term strategic plan, although financing secured at the beginning does not yet cover the cost of the whole duration of the plan.
- **Sustainable finance** is one of the key objectives of PFP programmes (**ID13**). In PFP programmes, this means transitioning completely from donations to ensuring in-country financial resources by the end of the implementation period so that financial mechanisms are also in place to keep financing conservation protection when a PFP programme ends. In Groenfonds (**ID06**), developer contributions are not directly used to pay farmers for delivering green services. Instead, they are invested first, after which only the return on capital is used to reimburse green services. This way, the fund steadily grows each year, making Groenfonds less and less dependent on contributions from future developments. This decouples the maintenance of green areas from development demand because Groenfonds must not rely on new developments in the future once green services can be paid 100% with the return on capital from their investments. That way, Groenfonds slowly becomes financially self-sustainable.

(11) Flexibility. In some best practices, the AFFS or the content of the programme was flexible, allowing learning and adaptation based on experience. In the Clean Water Partnership (**ID02**), the contract of the private partner in the CBP3 can be renewed every three years upon meeting predefined performance targets. This allowed changes in the scope of the projects that will be implemented in the next three years, as long as the projects related to water management, stormwater quality, or water volume. In EcoMarkets (**ID04**), the Department of Energy, Environment and Climate Action of the state of Victoria first performed pilot trials to demonstrate the value of innovative management schemes. This allowed the creation of a first level of commitment while also addressing challenges or risks that arose, prior to enrolling the entire programme. In Washington D.C., as the SRC market matured (**ID07**), the Department of Energy and Environment adjusted its incentives and rules governing credit trading, thus adaptively managing the programme.

The above-discussed factors contributed to the successful development, implementation, and operation of the AFFS in the best practices in which they were explicitly uncovered. This does not mean that the absence of one or more factors would have led to an unsuccessful AFFS. It is possible to see a correlation between success factors and outcomes in certain types of AFFS and best practices, but we cannot determine if there is a causal relationship, also because best practices with a similar AFFS do not (explicitly) have the same success factors. This would require more research, explicitly comparing successful and failed practices of similar AFFS. Regardless, these insights remain valuable considering every success factor appeared in multiple best practices and were not bound to a particular context or AFFS. Territories can consider these factors as conditions that, if present, can positively influence the AFFS' potential.

6.2.3. Limitations

As described in the research limitations, we purposively sampled best practice examples of AFFS, and did not actively research limitations or negative externalities or impacts. Also, the stakeholders that we interviewed in 16 of the 20 best practices were actively involved in the best practice and are expected to have a positive perspective. We did not target possible critical voices due to time constraints. In each case, we were able to identify at least one limitation or challenge experienced that inhibits the maximisation of the potential of an AFFS, or that leads to constraints regarding the scale or scope of climate (adaptation) investments. The overview below is therefore not exhaustive but still contains valuable information about elements that should be considered when adopting innovative AFFS. We only discuss the limitations that were identified in at least two best practices. Case-specific or AFFS-specific limitations are not included here but can be consulted in the individual reports.

Table 6.4. Elements that were explicitly identified as limitations or challenges in the 20 best practices.

ID	Voluntary mechanisms	Unsustainable mechanisms	Supply and demand imbalance	Quantification of ES	Transaction costs and scale	Negative externalities
01	X	X		X		
02						

03				X		
04	X		X			
05	X					
06	X					
07	X					X
08						
09					X	
10	X	X		X		X
11		X				
12		X				
13		X			X	
14		X	X			
15		X				
16						
17			X		X	
18					X	X
19						
20		X		X		

(1) Voluntary mechanisms. The use of voluntary mechanisms can be considered as limiting the effectiveness of a programme or an AFFS. Voluntary participation or investment in a programme, such as the Greater Cape Town Water Fund (**ID01**), relies on contributions from the City of Cape Town and corporations. This requires a constant effort from The Nature Conservancy (TNC) as the leading partner to secure financing. Fortunately, TNC can rely on experience with securing financing in more than 30 water funds in different countries and continents, through different instruments. In flood buyout programmes (**ID10**), homeowners approached to sell their homes in flood-prone areas can choose whether they participate. If enough residents do not sell their properties, this can lead to incomplete mitigation and flood protection for local governments. The voluntary nature is also a limitation of the Washington SRC trading programme (**ID07**). While compliance with stormwater regulations is required, choosing to have an off-site retention requirement by purchasing credits is optional. The district's Department of Energy and Environment encourages project developers to purchase stormwater credits from the MS4 areas to incentivise green infrastructure construction where it is most needed. Currently, 14.7% of regulated developments meet retention requirements off-site instead of on-site. DOEE is exploring incentive mechanisms to increase that number.

(2) The lack of sustainable financial mechanisms can inhibit long-term plans or initiatives or make initiatives vulnerable to changing conditions if they are dependent on a single source or instrument. The Dorset Heathlands (**ID12**) approach to mitigating the effects of new developments is paradoxically dependent on new developments. Development is needed to ensure available funds for the DHP's implementation group; otherwise, there is no funding for mitigation measures, but these mitigation measures are only required because of those developments. In many cases of flood buyouts (**ID10**), whereby homes are purchased from flood victims after a disaster and the home is destroyed, the land remains vacant because the local governments do not have enough money for restoration or conservation (although an empty lot offers more flood protection than a developed one). The Sheffield Lower Don Valley Flood Defence project (**ID11**) is a successful example of an innovative AFFS for flood protection, but only for a single project. The available national funding, in combination with the BID, placed constraints on the design dimensions of the LDV project. The total amount of funding available made a larger project unaffordable and undeliverable. After that project, the City of Sheffield developed a long-term Flood Investment Programme, but as of 2017, there was still a shortfall of £70 million to implement all the flood schemes.

(3) Imbalance between supply and demand. AFFS that rely on market-based mechanisms with a supply and demand side (e.g., transferable development rights, PES, offsetting) can face the challenge of an imbalance between supply and demand. One of the major challenges associated with EcoMarkets (**ID04**) programmes lies in the concept of like-for-like offsets. This principle states that developers clearing a specific habitat type must compensate by providing an offset of equivalent ecological value. However, suitable offset areas may not always be readily available. Recent developments in national offsetting policy at the Australian Government level introduce compensation payments as an alternative option. Under this approach, developers can pay a sum of money instead of directly providing an offset. The responsibility of finding a suitable offset location then falls to the government, with no guarantee of success or even sufficient funding available. Similarly, a big challenge for mitigation banks part of the US Wetland Mitigation Banking (**ID17**) is securing suitable restoration sites to offset the transformation of other wetlands in agricultural plots. Certain wetland types, such as linear wetlands in Nebraska, are very desirable for irrigated agricultural expansion but are particularly difficult to locate for restoration. In Curitiba, Brazil, the RPPNM programme (ID14) has been

successful in the sense that many landowners of urban forests want to participate in the transferable development rights scheme, but due to a declining birth rate in the city, the demand for building rights is not as high as it was a few decades ago.

(4) The quantification of ecosystem services appeared as a challenge in some best practices or was indicated as a possible challenge but addressed through a business case, as was the case in the Greater Cape Town Water Fund (**ID01**). In the implementation of the Copenhagen Cloudburst Management Plan (**ID03**), grey infrastructure and green-blue infrastructure project alternatives must be compared, and the most cost-efficient one in economic terms (avoided flood damage) must be selected. The limitation here is that the changed Water Sector Law does not allow the consideration of co-benefits of green-blue infrastructure projects in the comparison, which may also reflect the general difficulty of quantifying and monetising wider benefits of nature-based solutions that could strengthen the business case. Inclusion of such benefits in the case of the Cloudburst Management Plan would be possible if more flexible economic costing and appraisal methods were used.

(5) transaction costs and scale of projects/programs. In some cases, the AFFS only enabled investments in projects or interventions of a particular scale, meaning the investment volume and transaction costs related to the size of the intervention (large versus small scale). The Paris Climate Bond (**ID09**) cannot be used for projects of less than €1 million because the time and effort (transaction costs) spent collecting data on a project's impact for reporting becomes more costly relative to the project investment cost if a project is smaller. There is no minimum area size that a Project Finance for Permanence Programme (**ID13**) must have before it becomes worthwhile to invest in the expensive and multi-year phases designing the PFP before implementation. It warrants evaluation on whether there are other approaches that are more cost-efficient given that there are high transaction costs in terms of time and the investment at the beginning to develop a PFP. The smallest PFP that is currently prepared is for an area of 500,000 hectares. On the contrary, the Wetland Mitigation Banking Programme (**ID17**) targets small and low-level wetlands. If a farmer wants to drain a semi-permanent or a large wetland on their field, that is outside the scope of the programme. In that case, a farmer is not permitted to drain the wetland.

(6) Negative externalities or societal impacts. While understanding the broader impacts was not within the scope of researching the 20 best practices, in some cases, we found that AFFS (potentially) lead to negative externalities or societal impacts. The Gothenburg Green Bonds (**ID18**) have received some criticism because green buildings in public housing projects paid for with green bond proceeds have increased local rents due to higher construction costs, making them unaffordable for single-parent and/or low-income households. Flood buyout programmes (**ID10**) have been critiqued because there can be significant human consequences that are not always considered. Many residents who accept buyouts experience regret later. Studies have shown that many homeowners have said yes to buyouts under emotional distress that can lead to rushed decisions. Some buyout recipients report a decline in well-being after relocation. The long-term impact on individuals remains largely unexplored. While evidence of negative impacts was not reported for the Washington SRC Trading Programme (**ID07**), a guide for stormwater credit mechanisms warns that green infrastructure investments may potentially contribute to increased property values, and associated gentrification and displacement of established, lower-income residents. This risk applies to other best practices that include urban greening projects, such as the Copenhagen Cloudburst Management Plan (**ID03**), the Bilbao Zorrotzaurre flood-proof district (**ID19**), the Paris Climate Bond (**ID09**), the Greenification Certificates System in Nagoya, Japan (**ID05**), or the Clean Water Partnership (**ID02**).

6.2.4. Transferability conditions

We end this chapter by presenting some elements that were specifically identified as transferability conditions, i.e., conditions that are preferably present before specific AFFS can be transferred. In any case, an AFFS must always be tailored to the local context. Although it was not within the scope of our research, tailoring the AFFS could mean considering whether it's possible to rescale the AFFS to better match the scale of a territory, or resources available in a territory.

Table 6.5. Elements that were explicitly identified as transferability conditions in the 20 best practices.

ID	Public resources	(re)payment capacity and risk rating	Objectives and governance structure	Outreach and awareness	Public or private champions	Established models or mechanisms
01						X
02	X	X	X	X		X
03	X				X	
04	X		X			X
05				X		
06						X

07	X			X		
08		X		X	X	
09	X	X	X	X		X
10	X	X	X	X		X
11			X			X
12						X
13	X		X			
14			X	X		
15		X	X		X	
16	X	X				
17	X		X	X		
18	X	X			X	X
19						
20	X			X		X

(1) Public resources. One of the most important things a territory must consider is whether it possesses the right resources or has the (financial) means to acquire the necessary resources externally. This also includes considering whether the territory has the right scale to adopt an AFFS. In some best practices, resources required from the public authority were limited, but mainly thanks to partnerships with private sector actors. The Clean Water Partnership (**ID02**) did not require many resources from the county, but there was still staff required that are knowledgeable about PPP approaches for follow-up and collaboration with the private actor(s). Cities like Paris, Gothenburg, and Copenhagen are large and have sufficient public resources to run large-scale programmes like the Paris Climate Bond (**ID09**), the Gothenburg Green Bonds (**ID18**), and the Cloudburst Management Plan (**ID03**) respectively. Copenhagen, the Danish capital and city with the highest capacity and resources, is to date the only Danish municipality that benefited from the water sector law change, exemplifying the importance of having sufficient public resources. Some AFFS, like the Washington SRC Trading programme (**ID07**), will be more efficient the bigger it can become. This means that the success of this mechanism may be limited in small geographical areas or in areas with low development pressure. Likewise, the development of a stormwater credit programme requires specialised skills that are usually not available in smaller municipalities.

Smaller territories that lack public resources to manage an AFFS on their own should try to **cooperate with higher-level government agencies or other territories**. The Viveracqua Hydrobond (**ID16**) is a good example where multiple small and medium-sized enterprises, in this case, water utility companies, pooled their resources (mini bonds) into a larger vehicle to attract wider interest from investors. By American standards, Hampton (**ID08**) is a smaller city but still managed to develop an Environmental Impact Bond through the help of a research project about EIBs initiated by the Chesapeake Bay Foundation. Furthermore, the Hampton Environmental Impact Bond had a value of €12 million, proving that bonds of this type can also be successful with a small investment volume.

(2) (Re)payment capacity and risk rating. Related to public resources, a territory must consider its (re)payment capacity and accompanying risk rating when adopting an AFFS with debt-based instruments, as in the Paris Climate Bond (**ID09**) and the Gothenburg Green Bonds (**ID18**) best practices. Payment capacity is also important when a public authority wants to hire private sector services, for example, through a public-private partnership as in the Clean Water Partnership (**ID02**). In flood buyout programmes (**ID10**), funding must be readily available, especially after a flood event, to avoid delays that can cause hardship. It is possible to alleviate some of the (re)payment obligations by creatively combining multiple sources and instruments. Prince George's County pays the Clean Water Partnership (ID02) run by Corvias with the county's Watershed Protection and Restoration Fund. The Fund is supplemented with bond proceeds from general obligation bonds and loans from the Stormwater State Revolving Fund. Income from the Clean Water Act Fee levied on private property owners is used to repay the bonds and loans. What seems like a complex structure is just a creative combination of fairly standard instruments like municipal bonds and water fees or property taxes.

(3) Predefined objectives and organisational structure (governance). It is important that the **objectives and organisational structure** are defined before deciding on the financial sources or instruments to be included in the AFFS. This helps determine which sources or instruments may be relevant, and it may speed up the overall process of securing financing and funding. In the case of P3 approaches like the Clean Water Partnership (**ID02**), or other governance structures that involve public and private partners, knowing the preferred governance structure means understanding how the risks are shared between the public and private partners. If these are prepared well, the programme can be communicated clearly to the community, allowing them to understand what's in it for them and who bears the risks. Alternatively, objectives can be captured in policy plans, as was the case with the City of Paris' Climate and Energy Action Plan (**ID09**). In best practices like the Greater Cape Town Water Fund (**ID01**) and the Sheffield Lower Don Valley Flood Defence project (**ID11**),

the organisational structure of the water fund and the business improvement district respectively were already thought out as part of the business case.

(4) Outreach and awareness prior to launching and during the programme can help gauge public perceptions, gain support from communities, politicians, or administrations, and upscale initiatives. This can involve raising awareness about climate challenges to increase the likelihood of support for climate policy plans. If an innovative AFFS is used, it can be valuable to familiarise communities and potential participants through outreach and capacity building activities. Outreach and awareness-raising activities can also continue when the AFFS is operational. In Washington D.C. (**ID07**), the Department of Energy and Environment has staff dedicated to engagement activities with the real estate development sector, landowners, and SRC Aggregators to encourage market participation in the SRC trading programme. Early in the development of the Hampton Environmental Impact Bond (**ID08**), the finance team was involved early in the process to familiarise them with the concept of an EIB. In Curitiba, Brazil (**ID14**), the Municipality of Curitiba, in partnership with the Society for Research in Wildlife and Environmental Education, held meetings with landowners of urban forests to train them on the conservation of the Araucaria Forest and RPPNMs. Because of these meetings, many owners became interested in participating in the RPPNM programme and selling their development rights. As a final example, the landowners around the Edwards Aquifer were apprehensive about collaborating with a government entity in the Edwards Aquifer Protection Programme (**ID20**). The City of San Antonio educated the landowners on conservation easements. The time and effort spent to foster a long-term partnership resulted in positive relationships with landowners. The programme has a good reputation among landowners, and it helped to receive a majority vote for the local sales tax increase.

(5) Public or private champions. Support from public or private champions in the early (development) phases of an AFFS can help to get the right political decisions or to receive initial financial support that demonstrates investor interest, which may lead to trust and confidence from other investors. In the Seychelles debt-for-nature swap (**ID15**), an early funding commitment from one foundation of USD 1 million was useful in demonstrating that there was significant funder interest behind debt restructuring and debt conversion for increased money in climate adaptation. In Sweden, the SEB is considered a green bond champion, which, combined with the political commitment from the City of Gothenburg (**ID18**) government to sustainability, encouraged the issuance of green bonds and successful investor interest. High-ranking politicians from the City of Copenhagen (**ID03**) were important to successfully lobby the national government for a change to the water sector law. Finally, in the City of Hampton (**ID08**), high-ranking champions within a public authority were important to create trust among the city staff, the community, investors, and other partners about the environmental impact bond.

(6) Use established or tested financial models and mechanisms. A final important lesson learned from the AFFS that were developed and implemented is that in many of the best practices, established or already tested financial models or mechanisms were adopted and tailored to a specific context, or once a model was developed, it has been further upscaled and replicated in other contexts. There are many AFFS available that use financial instruments or mechanisms that have been tested and successfully applied in numerous cases. Often, guidelines and manuals that are publicly available can serve as inspiration. This means that searching for innovative solutions to boost climate (adaptation) finance does not require territories to reinvent the wheel, but rather to learn from how existing instruments have been combined and applied in other territories as we did with this research. In cases where more innovative AFFS were developed, the mechanisms used are not bound to their specific context and can be replicated in other territories. Some examples illustrate these points:

- Since 2000, The Nature Conservancy has implemented more than 30 water funds in North America, Latin America, and Africa, like the one in the City of Cape Town (**ID01**), and more will be initiated in the future. In 2024, The Nature Conservancy published the business case of the first water fund in Europe, the Norfolk Water Fund in the UK.
- The Clean Water Partnership's CBP3 approach **(ID03)** is a relatively new form of public-private partnership but is not context-bound and thus has the potential to be applied in other contexts as well, specifically in areas that are already experienced with public-private partnerships. Corvias has replicated the CWP's CBP3 approach in other areas in the US, including Milwaukee, Seattle, and Chester (PA).
- The emergence of programmes like EcoMarkets (**ID04**) around the world suggests their potential for successful implementation.
- Groenfonds (**ID06**) is a non-profit public benefit institution, which is a common entity form in the Netherlands that did not require legal changes. This form was allowed under existing legislation, including the fund financing and how the fund is managed.
- While the flood buyouts (**ID10**) are a federal programme, there is no single unified approach. Local governments generally must identify the most appropriate funding source based on the specific circumstances of each buyout effort.
- The pre-existing legal framework for BIDs in the UK allowed the BID to be voted for and established on short notice in the Sheffield Lower Don Valley Flood Defence project (**ID11**). At that time, more than 120 BIDs were in operation in the UK, underpinned by the Local Government Act 2003 and Business

Improvement District Regulations 2004. It simply became the first to be used for co-financing a flood protection project.

- The choice to fund mitigation measures in the Dorset Heathlands (**ID12**) with developer obligations was immediately possible because of Section 106 (S106) of the Town and Country Planning Act 1990, which allows a local planning authority to enter into a legally binding agreement or planning obligation with a landowner in association with the granting of planning permission. At that time, it was innovative to use developer obligations for measures in nature areas, but legally possible.
- A green bond or an environmental impact bond is a straightforward instrument that can be used by municipalities to raise financing for climate adaptation and mitigation (Resilient Hampton, **ID08**; Paris Climate Bond, **ID09**; Gothenburg Green Bond, **ID18**). Green bonds and traditional bonds are similar financially and technically. This means that the low credit risk is the same for both, and the repayment ability of the issuer must be assessed for green bonds in a similar way. A green bond does not entail an extra risk for investors compared to traditional bonds. The main difference between a green bond and a traditional bond is the green bond framework. Municipalities that have experience with municipal bonds would only need some additional resources to establish and manage a green bond framework.
- The City of San Antonio has a large tax base to enable the Edward Aquifer Protection programme's (**ID20**) funding through voter-approved sales tax increases.

Chapter 7: Conclusion

In this concluding chapter, we compare the main findings from Chapter 4 (PA and territory perspective) and Chapter 5 (FIE perspective). We focus on the similarities and differences between experienced barriers, and subsequent recommendations or enablers required to overcome these barriers. Reference to the lessons learned from the international best practices research in Chapter 6 exemplifies how main challenges can be overcome through innovative AFFS. Based on this concluding overview, we discuss how these deliverable feeds into CLIMATEFIT's deliverables feed into CLIMATEFIT's next steps, including how the content of this deliverable can be used and how barriers and challenges identified for PAs and FIEs will be addressed in subsequent work packages.

The identified barriers experienced by PAs largely confirm what we already knew from the literature study. This deliverable complemented that existing knowledge with a deep dive into the challenges of specific territories, and PAs in those territories, including information about the flows and needs of adaptation finance in these territories. For the FIE perspective, the in-depth review of the literature (scholarly and practitioner), validated with FIE interviews, showed there is a constellation of barriers, which is, to our knowledge, among the most detailed studies on FIE adaptation finance barriers to date. Additionally, previous works have identified barriers but research about the causes of barriers is scarce, a gap that was addressed in Chapter 5 of this deliverable. Furthermore, new methods were developed to measure the maturity of PAs (MASC) and FIEs (MAM) regarding accessing or unlocking climate adaptation finance. Finally, the 20 international best practices are among the first involving innovative AFFS that have been researched in such detail, and the database from which they were sourced is, to our knowledge, the largest at the time of publication that collects international examples of innovative AFFS.

7.1. PAs and FIEs: similar challenges but different worlds

The main barrier for both PAs and FIEs is the lack of knowledge and expertise. For many FIEs, it appears challenging to distinguish between climate mitigation and adaptation, and to name best practice examples of climate adaptation investments (involving the private sector). However, there are differences in expertise levels between FIEs. FIE Champions were active in industry networks, policy, adaptation markets and knowledgeable on adaptation. Their activities included investment climate risk screening, investment in some way in adaptation and/or nature and having dedicated teams and resources for climate risk and adaptation. Other FIEs were less informed about adaptation, could not cite best practice examples, lacked any history in adaptation finance, were not using any novel investment approaches, and were not disclosing climate risks. Generally, the interviews only revealed a small amount of adaptation financing, but it was not at scale and not replicable. FIE Champions or climate adaptation finance leaders were targeted, so the inspirational stories are an exception rather than the norm, and most of the financial sector is still far behind. The limited solutions (AFFS) are very context, sector and geography specific. The lessons learned from the international best practices showed that in most cases, established or tested financial models and mechanisms were used that are not bound to their specific context, but can be replicated and tailored in other contexts and territories.

Among **PAs**, there are **regional differences in the level of climate risk awareness and knowledge about climate adaptation**. There is a large adaptation finance gap, and territories struggle to allocate sufficient funds to climate adaptation because of other priorities, but at least climate is increasingly becoming a priority across the EU, also under the influence of EU policy and programme initiatives. PAs lack knowledge about alternative sources and financial instruments, specifically those that involve private capital, because of the historically strong reliance on public funding.

Another barrier that appeared among both PAs and FIEs is the challenge of **quantifying economic or monetary benefits of adaptation**, particularly green-blue infrastructure with many non-monetisable co-benefits. For PAs, this makes it more difficult to make a strong business case for nature-based adaptation projects and prove their cost-efficiency compared to generally more expensive traditional grey infrastructure projects. Comparing cost-efficiency means comparing how much return, saved costs, or other value you get for one Euro invested, i.e., comparing the cost-benefit ratio. The most cost-efficient investment is the one that generates the highest returns relative to its investment cost. For FIEs, it means a **limited availability of bankable projects** to invest in due to the absence of reliable cash flows and revenue streams. In the international best practices research, we noticed that (political) decisions in favour of NbS can only happen if their cost efficiency is proven, but it is possible, as exemplified in the Cloudburst Management Plan Copenhagen and the Greater Cape Town Water Fund.

Other frequently cited barriers to climate adaptation finance highlighted during the interviews are more specific to either PAs or FIEs. The **most important barriers for PAs include a lack of capacity and staff constraints to apply for funding, as well as siloed governance**. Adaptation projects are cross-sectoral and touch on multiple facets, and the responsibilities for the projects are usually spread across different PA departments or government agencies. The 20 best practices research showed us that the availability of public resources or the possibility of acquiring resources (from the private sector) is a sector) is a prime consideration. Many of the best practices showed that public-private partnerships (e.g., Hampton Environmental Impact

Bond) and collaboration between multiple public partners or government departments (e.g., Cloudburst Management Plan Copenhagen) can be cost-efficient and are important contributing factors to the success of an AFFS. We are aware that this is particularly a challenge for smaller PAs or PAs that do not yet have a department dedicated to climate, but it was recommended that collaborating across borders and with higher-level governments can increase the geographical scale, capabilities/capacities, and resources available (e.g., Dorset Heathlands).

For all the FIEs interviewed, regulation poses the most significant barrier to accessing finance for adaptation. Specifically, they highlighted the **lack of an overarching stable policy framework** covering all types of climate hazards. In the best practices, we saw that an AFFS success can depend on complying with the local legal and policy frameworks, and therefore this does not always require significant legal changes. Some cases show that innovative AFFS do not necessarily require changes to the legal framework, but going through procedures to check legal compliance and achieving legal approval can be sufficient, as was the case in the Washington Stormwater Retention Credit Trading Program.

Criticisms of (national and local) government were also frequently voiced for its failure to provide a **comprehensive vision of adaptation**. Having a long-term climate strategy proved to be an important success factor in more than half of the 20 international best practices. AFFSs need to be preceded by government and PAs clearly articulating their climate goals, targets, or objectives in the form of long-term strategies accompanied by investment plans. Some international best practices illustrate that a climate adaptation plan can speed up investments, for example in green bond cases like the Paris Climate Bond and the Gothenburg Green Bonds, because FIEs can be offered more transparency about the policies or even specific projects to which their investments will be allocated.

When comparing the overall findings of Chapters 4 and 5, we see that there is a **mismatch between PAs and FIEs**. **PAs and FIEs may experience some similar and some different barriers, but they are two different worlds when considering the objectives that PAs and FIEs have regarding climate financing**. PAs in the EU must prepare policies, plans, and projects to align with the EU climate policy framework, including Green Deal targets to achieve climate neutrality by 2050, and the EU adaptation strategy. The adaptation strategy does not impose targets that member states must achieve, but the increasing severity of the impacts of climate change is incentivising an increasing number of PAs to accelerate climate adaptation policies. So, achieving climate resilience and climate neutrality are becoming priority objectives for many PAs. While many FIEs support the transition to climate neutrality and more resilience, their objectives largely remain to generate a return on investments and to focus on mitigation and net zero activities. There are of course differences between FIEs in risk appetite and thus investment types (this excludes third-party FIEs like NGOs or philanthropic institutions).

Climate mitigation investments such as renewable energy projects have matured and are marketable products with a quantifiable return on investments and risk, but, as shown in the literature review, climate adaptation investments are more difficult to quantify. This creates a mismatch between PAs and FIEs, because the **adaptation projects for which PAs require more financial resources are not the type of investments FIEs are looking for**. Because of this, there is a poor track record of collaboration and communication between PAs and FIEs regarding climate adaptation investments in the EU. This mismatch can become an even more serious challenge when EU adaptation policies will impose mandatory targets on member states as for mitigation. The recently voted EU Nature Restoration Law is a first example of this. As a key element of the EU Biodiversity Strategy, the Nature Restoration Law will "set binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters". These targets are expected to require more investment from PAs in nature areas, which are the type of investments that do not have immediate revenue streams and can be difficult to quantify (long-term) benefits and monetise.

It would be too easy to just accept that we cannot match PA and FIE objectives in climate adaptation investments. The international best practices have shown that there are AFFS that included successful partnerships between public and private partners thanks to the ability to offer a financial incentive for all key partners involved, ensuring everyone benefited from participation and/or investing. Even in situations where there are no direct or short-term revenue streams, best practices like the Greater Cape Town Water Fund showed that private partners, multinationals in that best practice, can be convinced to financially participate with the help of a business case that quantifies the outcomes and cost efficiency of NbS and adaptation.

A first important step to overcoming barriers to climate adaptation finance is to **bridge the chasm that currently disconnects PAs from FIEs regarding adaptation finance and bring both together in collaborative processes of capacity building, matchmaking exercises, and co-designing AFFS**. The core of CLIMATEFIT focuses on this challenge. CLIMATEFIT will engage its experts, PAs and FIEs in the co-creation of investment strategies, investment plans, and bankable transformational investment cases for the CLIMATEFIT territories. Collaboration between PAs and FIEs is at the heart of CLIMATEFIT because it will streamline collaboration for innovative finance across EU contexts, pair public authorities with financial experts, and prove a unique collaborative platform catered to the financial sector and governments. To achieve this collaborative environment and effectively co-create strategies, plans, and bankable cases, important steps will be taken

first in subsequent work packages, which require the insights from this deliverable about PAs' and FIEs' perspectives on climate adaptation finance.

7.2. The value of D1.1 for other Mission Projects

We believe this deliverable can be a valuable resource for other EU-funded projects that are part of the EU Mission for Adaptation to Climate Change. The results can inform other Mission Projects active in similar territories and countries about context-specific barriers and challenges to climate adaptation finance, and the investment landscape in those countries. Mission projects that focus on developing climate adaptation solutions but are not focused mainly on financing can gain an understanding of the state of the art by reading the literature study or can quickly source examples from the 20 best practices research. To upscale best practices research, we will continue to collaborate with P2R and explore the possibilities of merging P2R's "Catalogue of sources, instruments and best practice case studies" with CLIMATEFIT's international examples database. In addition to the valuable content we have provided, the deliverable also contains research methods that may be adopted by other mission projects. For example, the maturity assessment methods can be used to measure the capacity and evaluate the maturity of PAs and FIEs in accessing adaptation finance and managing funded adaptation projects.

7.3. The role of D1.1 in CLIMATEFIT's next steps

The findings from Chapters 4 and Chapters 5 help us understand what we are (not) able to do within the scope of CLIMATEFIT. This falls into three activity tracks that align with the tasks in the other work packages, and for which the content of this deliverable can be used: **(1)** capacity building and awareness-raising; **(2)** co-creating AFFS in investment strategies, investment plans, and bankable investment cases; **(3)** and policy recommendations. The first two are related to barriers that CLIMATEFIT can directly address by engaging with PAs and FIEs. The third is related to a whole suite of barriers that are outside the control of CLIMATEFIT. These are barriers that must be overcome mainly through regulation changes, for which CLIMATEFIT can only offer advice in the form of policy recommendations. We briefly explain each trajectory, including an overview of other CLIMATEFIT tasks and a description of how D1.1 could be used in those tasks.

7.3.1. Capacity building and awareness raising activities

Through capacity-building and awareness-raising activities, CLIMATEFIT can help to overcome one of the most cited barriers that are experienced widely by PAs and FIEs: the lack of knowledge. It is also important for related barriers in lack of expertise in understanding climate risks, climate adaptation (policy making), and AFFSs. Capacity building can also focus on barriers related to one of the other areas. Training about these barriers may not directly help overcome them, but it is important to increase knowledge and awareness. Among the most important training needs of both PAs and FIEs are methods for monetising or quantifying adaptation benefits and assessing impacts, as well as best practices about AFFS. Detailed training needs can be found in Chapters 4 and 5. The international best practices research in Chapter 6 also provides inspirational examples of innovative AFFSs which can also be tied to this training need.

Capacity building can be done through training materials such as webinars or manuals, supplemented with knowledge sharing. This could include disseminating the database and international best practices that provide effective examples of AFFS. This fits within the scope of WP2: "Build capacities, project pipeline and resilient investment strategies". **Tasks 2.1 and 2.2** are focused on building capacities in PAs and FIEs respectively through different level trainings that include awareness-raising, addressing PA and FIE needs, and knowledge sharing. Related deliverables D2.1 (Capacity building package for PA and for FIEs) and **D2.4** (E-learning platform operational). This deliverable can be used to shape the content of the training material. The identified barriers and challenges experienced by PAs and FIEs can be the focus of the training material, with attention to territory-specific needs. The challenges expressed by PAs and FIEs in the interviews can be considered as the topics for which they would like to build capacity. The 20 international best practices, the international examples database, and the FIE champions allow for the inclusion of explicit examples and inspirational stories.

7.3.2. Co-create and Co-develop investment strategies/plans and bankable cases

Barriers such as the inability to make a business case, siloed governance, confusion between mitigation and adaptation, limited bankable projects, low returns on investments, impact measuring, lack of financial products, lack of financial instruments, difficulties in climate risk disclosures, high transaction costs, and lack of liquidity can be addressed as part of developing AFFSs during the co-creation and co-development of 20 investment strategies, ten investment plans, and four bankable investment cases. These barriers are related to the enabling conditions proposed in Chapter 5 (Table 5.2), including dedicated instruments, incentives, project de-risking, capital aggregation, pipeline of projects and bankable projects. These can also

be part of the creation of investment strategies/plans, and bankable investment cases, particularly in the four leader territories.

Task 2.3 involves the development of a common methodology to define investment strategies and identify and analyse relevant adaptation projects, and **Task 3.1** involves the development of a common process to translate investment strategies into budget planning and investment plans for public authorities. Methodologies to develop an investment strategy and an investment plan should consider approaches that address barriers related to climate adaptation policy making and AFFS development. This deliverable contains more details about what each of these barriers means, and the needs of PAs and FIEs can be incorporated into the methods that will be developed in **D2.3** (Report containing methodology to build investment strategy) and **D3.1** (Report containing guidelines to build investment plan), and **D4.3** (Guidelines for PA on manual for leveraging finance). Table 5.6 in Chapter 5 shows examples of opportunities for scaling adaptation finance that will assist PAs in their prioritisation of climate actions in the investment strategies and plans. The lessons learned from the 20 best practices contain important success factors and transferable conditions that can be incorporated into guidelines for the development of specific AFFSs.

This deliverable also offers valuable information for **Task 4.1**, which involves the establishment of Local Resilience Taskforces (LRT) in the four CLIMATEFIT leader territories, and **D4.5** (LRTs informally established for relevant territories. The LRTs will be composed of PAs and FIEs that propose and co-design adaptation projects through a catalytic and systemic approach to resilience financing in the four CLIMATEFIT leader territories This work package included the identification and recruitment of FIE Champions that could be possible members of the LRT. FIE Champions are a cornerstone of our FIE engagement. We will continue to recruit further FIE Champions because they can inspire, inform and innovate further. They will help develop a small number of similar bankable projects in our four leader territories. Depending on the scope of climate adaptation plans and projects in the leader territories, the investment landscapes in Chapter 4 can be consulted to see which other stakeholders may be relevant to recruit for the LRT. An important consideration is when to involve FIEs in the LRTs. Some FIEs will only invest if there are reliable cash flows or revenue streams; these types of FIEs would possibly not be open to involvement in the development of the investment strategy because projects at this stage do not contain sufficient financial details, yet they are needed to help determine the business case. In later stages of the project, it could be helpful to include entities with an enabling role in financing, such as NGOs, early because their objectives are more diverse and not solely profit-motivated.

Information from D1.1 can also be used as direct input for the investment strategies that will be created for the 20 CLIMATEFIT territories. It is expected that the investment strategy will contain information about climate risks, existing climate adaptation policies and projects, the investment landscape and available sources in each territory. This information has been mapped as part of the territory descriptions and the investment landscapes in Chapter 4. The 20 international best practices and the database with international examples are valuable sources to inspire the development of AFFSs as part of investment plans in **Task 3.4**, in which at least one selected investment concept and one AFFS are described per CLIMATEFIT planner territory suited to investment plan development. This task will also use information from the investment landscape (Chapter 4) to consider which AFFSs are already available in each territory, or which may be proposed as new ones. Other financing channels not highlighted by our interviewees but found to be important include sovereign green bonds and sustainability bonds and need to be investigated further in these future tasks. The importance of making resilience part of investment due diligence processes, growing green infrastructure/property investment, and promoting the dual benefits of net zero and adaptation for infrastructure/property investment in our territories must also be a part of our work.

7.3.3. Policy recommendations

Barriers such as lack of (public) resources, regulatory frameworks discouraging private funding and/or public-private partnerships, lack of a stable adaptation policy, complex and long administration processes are outside the control of CLIMATEFIT but can be addressed in policy recommendations. They can also be addressed by involvement of key actors with a regulatory or industry advocacy role in CLIMATEFIT activities. The involvement of the SIBs in our research is an example of this. This also resonates with some of the recommendations formulated for PAs in Chapter 4: streamlining processes (simplify and standardise funding application and reporting processes to reduce administrative burdens), and consistent funding. PAs advocate for more reliable and long-term funding commitments to ensure continuous support for adaptation projects. Regulatory changes were also often cited by FIEs as a need to enable climate adaptation finance. Also in Chapter 5, market failures were found to be the key underlying cause of barriers to climate adaptation finance, but addressing these is also outside the scope of CLIMATEFIT. Many of the required changes will take years and require actions from organisations like the EC, EIB, SIBs, state government and financial regulators to move this forward. CLIMATEFIT aims to set the direction of change, specifically in **Task 6.1** "Inform regulation, policies and frameworks", which results in **D6.1** (Draft white paper for policymakers and practitioners), **D.6.3** (Further Draft of White Paper for policymakers and practitioners), and **D6.4** (Final White Paper for policymakers and practitioners). The insights from D1.1 can inform the policy recommendations of T6.1.

Aside from these three tracks, methods were developed within the scope of this deliverable that have only been tested or applied to a small sample size. There is potential to further expand and apply these methodologies in the next WPs. The MASC developed for PAs and reported in Chapter 4 was only applied to leader territories. In preparation for the investment strategy creation for the planner and strategist territories, it is valuable to first apply the MASC to these territories. Similarly, the MAM for FIEs has only been applied to a small sample size but could be applied to more FIEs in subsequent WPs. Both methodologies can also be applied multiple times throughout the project to the same PA or FIE, to see how CLIMATEFIT activities, products, and outcomes have influenced their maturity level. For FIEs, this could be most interesting and valuable to apply to those involved in the LRTs. Finally, the FIE survey could also be further disseminated to increase the sample size, targeting further FIE types that were not yet sufficiently involved in T1.2.

To conclude, our research in WP1 has highlighted the enormous amount of work that there is to do to boost climate adaptation finance, but these conclusions highlighted some of the areas that CLIMATEFIT will focus on to maximise our impact in this complex field.

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ANNEXES

Annex 1. Reading guide

The sources below are recommended for further reading related to specific chapters and sections of the deliverable.

Chapter 2.1. Scholarly literature

- Bisaro, A., & Hinkel, J. (2018). Mobilizing private finance for coastal adaptation: A literature review. Wiley Interdisciplinary Reviews: Climate Change, 9(3), 1–15. DOI
- Den Heijer, C., & Coppens, T. (2023). Paying for green: A scoping review of alternative financing models for nature-based solutions. Journal of Environmental Management (Vol. 337). Academic Press. DOI
- Whittaker, S. (2023). Arguing for adaptation: A systematic literature review and bibliometric analysis 2012-2022. In Lehner, O.M., Harrer, T., Silvola, H., & Weber, O. (Eds.). (2023). The Routledge Handbook of Green Finance (1st ed.). Chapter 27. Routledge. DOI

Chapter 2.2. Practitioner literature

- Chau, V., Dhanani, Q., Matthews, N., Caines, C., Stroman, T., Gibbs, R., Yee, M., & Fielding, P. (2023). From Risk to Reward The Business Imperative to Finance Climate Adaptation and Resilience. PDF
- Coalition of Finance Minister for Climate Action. (2023). Strengthening the role of ministries of finance in driving climate action: framework and guide. CFMCA. URL
- de Nederlandsche Bank. (2023). The financial sector and government work together Climate adaptation is gaining momentum The Platform for Sustainable Financing is a partnership between De Nederlandsche Bank. Link
- Frontier Economics. (2022). Barriers To Financing Adaptation Actions In The Uk. Frontier Economics & Paul Watkiss Associates. URL.
- Global Adaptation & Resilience Working Group. (2022). The State of Climate Adaptation and Resilience Investment. Link
- Global Centre on Adaptation. (2023). Financing Nature-Based Solutions for Adaptation at Scale: Learning from Specialised Investment Managers and Nature Funds. *Link*
- IIGCC. (2022). Working towards a climate resilience investment framework A discussion paper by IIGCC (Issue September). IIGCC. Link
- KPMG. (2023). The Investment Case for Nature. Link
- Mullan, M., & Ranger, N. (2022). Finance and Investment: Framing Paper, OECD (Issue 19). Link
- Ranger, N., Bremner, C., Brown, K., England, K., Fankhauser, S., Holmes, I., & Boyd, E. H. (2023). MISSION CLIMATE READY Unleashing finance and investment for a prosperous Climate Ready economy. URL
- Race to Resilience. (2023). Mobilizing private capital for nature to meet climate and nature goals. Race to Resilience. Link
- Sustainable Finance Lab, W. (2024). Finding a way with nature How central banks and supervisors can start acting on nature *Link*
- UNEP. (2023). Adaptation Gap Report 2023 Inadequate investment and planning on climate adaptation leaves world exposed. DOI
- UNEP. (2016). Demystifying Adaptation Finance for the Private Sector. URL
- University of Cambridge Institute for Sustainable Leadership. (2023). Everything, everywhere, all at once How can private finance be unlocked for nature and climate in the international financial architecture? Link
- World Bank Group. (2023). Enabling private investment in climate adaptation & resilience Current Status, Barriers to Investment and Blueprint for Action. World Bank Group. Link
- World Economic Forum. (2022). Delivering Climate- Resilient Cities Using a Systems Approach (Issue August).. Link
- World Business Council for Sustainable Development (2024) Business leaders Guide to Climate Adaptation. WBCSD. Link

Chapter 2.3.3. Barriers to adaptation finance from an FIE perspective

- Knight, C., Stephenson, J., Chellew, T., & McFarland, W. (2022). *Nature Based Solutions—A review of current financing barriers and how to overcome these* [Public Report]. Terranomics (for WWF-UK). Link
- López-Portillo Purata, V., Gómez, S., & Rodríguez, S. E. (2022, November 2). 5 *Barriers That Hinder Green Financing [Project Update*. World Resources Institute. Link
- Nature-based Solutions Accelerator43 (a joint initiative of HSBC, World Resources Institute (WRI) and WWF) WWF.Link
- Asset Owners and Institutional Investors: Pensions for Purpose. (2023). *Natural capital & biodiversity.* Link

- Pauw, W. P., Kempa, L., Moslener, U., Grüning, C., & Çevik, C. (2022). A focus on market imperfections can help governments to mobilize private investments in adaptation. In Climate and Development Vol. 14, Issue 1, pp. 91–97. Taylor and Francis Ltd. DOI
- UNEP. (2016). Demystifying Adaptation Finance for the Private Sector. URL

Chapter 2.3.4. Enablers of adaptation finance

- Chau et al. (2023) From Risk to Reward: The Business Imperative to Finance Climate Adaptation and Resilience. Boston Consulting Group & USAID. PDF
- Fankhauser, S., Britz, K., Dickie, I., England, K., Howarth, C., & Ranger, N. (2023). Case studies for adaptation, Link
- Ranger, N., Bremner, C., Brown, K., England, K., Fankhauser, S., Holmes, I., & Boyd, E. H. (2023). Mission Climate Ready Unleashing finance and investment for a prosperous Climate Ready economy. URL
- Specialised Investment Managers and Nature Funds: Global Centre on Adaptation. (2023). Financing Nature-Based Solutions for Adaptation at Scale: Learning from Specialised Investment Managers and Nature Funds. GCA.Link
- University of Cambridge Institute for Sustainable Leadership. (2023). Everything, everywhere, all at once How can private finance be unlocked for nature and climate in the international financial architecture? *Link*
- UNEP. (2016). Demystifying Adaptation Finance for the Private Sector. URL

Chapter 2.5: Concluding remarks

- Amin, A.-L., Trabacchi, C., & Edmunds, T. (2023). Climate Adaptation and Renewable Energy (CARE) for Water Unlocking private sector investments towards a Paris aligned water sector Framework Report authors Practical thinking on investing for development. Link
- CPI. (2020). Scaling Innovative Climate Finance Instruments: Experience from the Lab (Issue November). Link
- de Nederlandsche Bank. (2023). Accelerating climate adaptation an alliance between the financial sector and government. Sustainable Finance Platform. Climate Adaptation Working Group.: URL
- Fernandes N (2023) Climate Finance. NPV Publishing. Link
- GARP. (2022). Steering the Ship: Creating Board-Level Climate Dashboards for Banks. Global Association of Risk Professionals (GARP) and United Nations Environment Programme Finance Initiative (UNEP FI). Link
- GARI (2022) The State of Climate Adaptation and Resilience Investment. Discussion paper Global Adaptation & Resilience Investment (GARI) Working Group. GARI. Link
- Global Centre on Adaptation. (2023). Financing Nature-Based Solutions for Adaptation at Scale: Learning from Specialised Investment Managers and Nature Funds. GCA. Link
- Stenek, V. (2013). Enabling Environment for Private Sector Adaptation an Index Assessment Framework. International Finance Corporation (IFC). The World Bank Group. Link
- Swiss Sustainable Finance (SSF). (2020). Financing the low-carbon economy Instruments, Barriers, and Recommendations. PDF
- Thomas (2023) Investing in nature-based solutions State-of-play and way forward for public and private financial measures in Europe. EIB. Link
- UNEP. (2016). Demystifying Adaptation Finance for the Private Sector. Link
- Watzke-Helmer N, Nadege S and Dworak T (2024) The Funding and Finance Guide. EU Mission for Adaptation MIP4.Link
- World Bank Group. (2023). Enabling private investment in climate adaptation & resilience. Current Status, Barriers to Investment and Blueprint for Action. World Bank. Link

Chapter 3.2.2: FIE maturity assessment methodology

- Bernhofen, M., & Ranger, N. (n.d.). Contribution to the Adaptation Working Group of the UNEP FI Principles for Responsible Banking: Aligning finance with adaptation and resilience goals Targets and Metrics for Financial Institutions: Technical Note 2 Aligning finance with adaptation and resilience goals Targets and Metrics for Financial Institutions: Technical Note. URL
- *PRI*. (2020). *Incorporating climate change in private markets an investor resource guide incorporating climate change in private markets: Preamble to the principles.* PRI. URL
- Investor Agenda. *(2023). Expectations Ladder Investor Climate Action Plans (ICAPs).* Investor Agenda. *URL*
- Stenek, V. (2013). *Enabling Environment for Private Sector Adaptation: An Index Assessment Framework*. International Finance Corporation (IFC). The World Bank Group. PDF

Chapter 5.2.5: Recommendations

- Amin, A.-L., Trabacchi, C., & Edmunds, T. (2023). Climate Adaptation and Renewable Energy (CARE) for Water Unlocking private sector investments towards a Paris aligned water sector Framework Report authors Practical thinking on investing for development. Link

- Chau, V., Dhanani, Q., Matthews, N., Caines, C., Stroman, T., Gibbs, R., Yee, M., & Fielding, P. (2023). From Risk to Reward: The Business Imperative to Finance Climate Adaptation and Resilience. Link
- CPI. (2020). Scaling Innovative Climate Finance Instruments: Experience from the Lab (Issue November). Link
- Global Centre on Adaptation. (2023). Financing Nature-Based Solutions for Adaptation at Scale: Learning from Specialised Investment Managers and Nature Funds. GCA. Link
- KPMG. (2023). The Investment Case for Nature. KPMG Link
- Stenek, V. (2013). Enabling Environment for Private Sector Adaptation: An Index Assessment Framework. International Finance Corporation (IFC). The World Bank Group. Link
- UNEP. (2016). Demystifying Adaptation Finance for the Private Sector. URL

Chapter 5.3: FIE engagement in CLIMATEFIT

Recommended resources:

- IGCC (2023) *Working towards a climate resilience investment framework. A discussion paper*. IGCC Link
- University of Cambridge Institute for Sustainable Leadership. (2023). *Everything, everywhere, all at once How can private finance be unlocked for nature and climate in the international financial architecture?* University of Cambridge.Link
- World Economic Forum. (2022). *Delivering Climate-Resilient Cities Using a Systems Approach*. (Issue August). WEF. Link

Annex 2. Core list of scholarly literature

Journal	Title	Author(s)
Global Environmental Change	Getting private investment in adaptation to work: Effective adaptation, value, and cash flows.	Barrett, S., & Chaitanya, R. S. K. (2023).
Climate Risk Management,	Building climate resilience through nature-based solutions in Europe: A review of enabling knowledge, finance and governance frameworks.	Calliari et al. (2022).
Journal of Environmental Management	Paying for green: A scoping review of alternative financing models for nature-based solutions.	den Heijer, C., & Coppens, T. (2023)
Climate Risk Management	Infrastructure investments for resilience: Opportunities, barriers, and a future research agenda from the Orange-Senqu River Basin.	Lazurko, A., & Pinter, L. (2022)
Academy of Management Proceedings,	Physical Climate Risk and Firms' Adaptation Strategy	Li, X. (2022)
Antipode	Financing Reparative Climate Infrastructures: Capital Switching, Repair, and Decommodification	Webber et al.(2022)
Brookings Centre on Regulation and Markets	Public investment must be paired with regulation to stop climate change	Meckling, J., & Strecker, J. (2022)
Climate and Development	A focus on market imperfections can help governments to mobilize private investments in adaptation.	Pauw et al. (2022)
Transactions of the Institute of British Geographer	Rethinking the geographies of finance for urban climate action	Robin, E. (2022)
Nature-Based Solutions	Barriers and enablers for upscaling coastal restoration	Sánchez-Arcilla, et al. (2022)
Climate Risk Management	Building climate resilience through nature-based solutions in Europe: A review of enabling knowledge, finance and governance frameworks.	Calliari et al. (2022)
J. Environ. Pol. Plann	Green infrastructure, stormwater, and the financialization of municipal environmental governance.	Cousins, J.J., Hill, D.T., (2021)
Landsc. Urban Plann.	What's behind the barriers? Uncovering structural conditions working against urban nature-based solutions	Dorst et al. (2022)
Nature-Based Solutions	Barriers and enablers for upscaling coastal restoration	Sánchez-Arcilla et al. (2022)
Economy and Society	Climate change and insurance	Collier, Elliott & Lehtonen (2021).
Climatic Change,	Mobilizing private adaptation finance: lessons learned from the Green Climate Fund.	Stoll, P. P., Pauw, W. P., Tohme, F., & Grüning, C. (2021).
Journal of Sustainable Finance & Investment	Mobilizing private sector investment for climate action : enhancing ambition and scaling up implementation	Adhikari, Shaila & Chalkasra, (2021)
Climate Policy	Climate finance policy in practice : a review of the evidence	Bhandary et al. (2021)
Cities	How well do climate adaptation policies align with risk-based approaches ? An assessment framework for cities	Sainz et al. (2021)
Local Econ.	Considering the role of negotiated developer contributions in financing ecological mitigation and protection programs in England: a cultural perspective	Buck, M., (2021)
Nature-based Solutions and Water Security. Elsevier	Funding and financing to scale nature-based solutions for water security	Tremolet et al. (2021)
Landsc. Res.	Co-financing green resilient infrastructures in Copenhagen: integrated or superficial design?	Tubridy, D., (2021)
Land Use Policy	Barriers and opportunities facing the UK Peatland Code: A case-study of blended green finance	Moxey, A., Smyth, M. A., Taylor, E., & Williams, A. P. (2021).
Environment and Planning E: Nature and Space	Getting soaked? Climate crisis, adaptation finance, and racialized austerity	Bigger, P., & Millington, N. (2020
Environmental Science and Policy	Multilevel governance of coastal flood risk reduction : A public finance perspective	Bisaro et al., (2020).
Wire's Climate Change	Privatizing climate adaptation : How insurance weakens solidaristic and collective disaster recovery	Lucas & Booth, (2020).

Global Environmental Change	What makes internationally financed climate change adaptation projects focus on local communities ? A configurational analysis of 30 Adaptation Fund projects	Pomme., Biesbroek & Cebotari, (2020)
Ecological Economics	Financing coastal resilience by combining nature-based risk reduction with insurance.	Reguero et al., (2020)
Current Climate Change Reports,	Paying a Price of Climate Change : Who Pays for Managed Retreats ?	Noy, (2020)
Ocean and Coastal Management	Strategies for governments to help close the coastal adaptation funding gap	Ware & Banhalmi-zakar (2020)
Science of the Total Environment	Financing and implementation of adaptation measures to climate change along the Spanish coast	López-Dóriga, U., Jiménez, J. A., Bisaro, A., & Hinkel, J. (2020)
Environ. Sci. Pol.	Common value: transferring development rights to make room for water	Dyca et al.(2020)
Land Use Pol.	Green infrastructure and public policies: an international review of green roofs and green walls incentives	Liberalesso, T., Cruz, C.O., Silva, C.M., Manso, M., (2020)
Sustainability	A review of funding mechanisms for US floodplain buyouts.	Peterson, et al. (2020)
Ecol. Econ.	Financing coastal resilience by combining nature-based risk reduction with insurance	Reguero et al. (2020)
Ecocycles	Financial instruments for nature-based solutions to reduce the risks of flooding and drought	Ternell et al. (2020)
Mar. Pol.	Innovative financing mechanism for blue economy projects	Tirumala, R.D., Tiwari, P., (2020)
Antipode	Financialization, Climate Finance, and the Calculative Challenges of Managing Environmental Change	Bracking, S. (2019).
Environment Systems and Decisions	California climate adaptation trust fund: exploring the leveraging of cap-and-trade proceeds	Keenan, J. M., & Gumber, A. (2019).
Mitigation & Adaptation Strategies Global Change	How does climate change adaptation affect public budgets? Development of an assessment framework and a demonstration for Austria	Bachner, Bednar-Friedl & Knittel (2019)
ResearchGate, Global Com.	Insurance for Climate Adaptation: Opportunities and Limitations	Jarzabkowski Chalkias & Clarke, (2019)
International Journal of Urban Sustainable Development	From funding to financing perspectives shaping a research agenda for investment in urban climate adaptation	Keenan, Chu & Peterson, (2019)
Ecology and Society	Adaptation finance archetypes: local governments' persistent challenges of funding adaptation to climate change and ways to overcome them	Moser et al., (2019)
Climatic Change	Paying to save the beach : effects of local finance decisions on coastal management	Mullin, Smith & Mcnamara, (2019)
Scientific Review Engineering and Environmental Sciences	A review of green roof incentives as motivators for the expansion of green infrastructure in European cities	Burszta-Adamiak, E., Fiałkiewicz, W., (2019)
Springer Open	Swapping development rights in swampy land: strategic instruments to prevent floodplain development in Flanders. In Nature-Based Flood Risk Management on Private Land: Disciplinary Perspectives on a Multidisciplinary Challenge	Crabbe, A., Coppens, T., (2019)
Mar. Pol.	Constraints and opportunities for market-based finance for the restoration and protection of blue carbon ecosystems	Vanderklift, et al. (2019)
Water	Achieving urban stormwater mitigation goals on different land parcels with a capacity trading approach	Xu et al. (2019)
Sustainability	Stormwater utility fees and credits: a funding strategy for sustainability	Zhao et al. (2019)
Wiley Interdisciplinary Reviews: Climate Change	Mobilizing private finance for coastal adaptation: A literature review	Bisaro and Hinkel (2018)
Routledge Focus	Climate Adaptation Finance and Investment in California	Keenan, J. M. (2018).
Cities and the Global Politics of the Environment	The Power of Cities in Global Climate Politics	Johnson, (2018)
Environment Planning Politics & Space	Boundary spanning for governance of climate change adaptation in cities: Insights from a Dutch urban region	Dąbrowski, (2018).

Land Use Policy	Bridging funding gaps for climate and sustainable development: Pitfalls, progress and potential of private finance	Clark, R., Reed, J., & Sunderland, T. (2018)
Environ. Planning Nature and Space	Risk capital: urban political ecology and entanglements of financial and environmental risk in Washington, D.C.	Christophers, B., (2018)
Ecosyst. Serv.	Business attitudes towards funding ecosystem services provided by urban forests	Davies et al. (2018).
Publ. Works Manag. Pol.	Public–private partnerships: where do we go from here? A Belgian perspective	van den Hurk, M., (2018)
Water Policy	Climate resilience strategies of Beijing and Copenhagen and their links to sustainability	Liu, & Jensen, (2017)
Mitigation and Adaptation Strategies for Global Change	Looking under the hood of local adaptation plans: shedding light on the actions prioritized to build local resilience to climate change	Stults,& Woodruff, (2017).
Ethics, Policy and Environment,	Test Driving' a Financing Instrument for Climate Adaptation: Analysing Institutional Dilemmas using Simulation Gaming	Roberts et al., (2017)
Environmental Politics	Varieties of market-based policy : Instrument choice in climate policy Varieties of market-based policy : Instrument choice	Meckling, J., & Jenner, S. (2016)
Environmental Science and Policy	Measuring the adaptation gap: A framework for evaluating climate hazards & opportunities in urban areas	Chen et al.,(2016)
Mitigation and Adaptation Strategies for Global Change	Barriers and opportunities for adaptation planning: analytical framework & evidence from cities in Latin America and Germany	Lehmann, et al., (2015)
Curr. Opin. Environ. Sustain.	Public-private partnerships for green infrastructures: tensions and challenges.	Koppenjan (2015)
Eur J Law Econ	Insurance models and European climate change policies : an assessment	Porrini, D., & Schwarze, R, (2014)
Curr. Opin. Environ. Sustain	Payments for ecosystem services and the financing of global biodiversity conservation	Hein, L., Miller, D.C., de Groot, R., (2013)
Ecol. Econ.	Growing green money? Mapping community currencies for sustainable development	Seyfang, G., Longhurst, N., (2013)
Antipode	Banking nature? The spectacular financialization of environmental conservation	Sullivan (2013)
Global Environmental Change	Managing private and public adaptation to climate change	Tompkins & Eakin (2012)

Annex 3. Barriers compiled from the practitioner and scholarly literature for markets (FIEs) and for Projects (public authorities)

Institutional (Economic/Financial) Framework

- Regulatory uncertainty & inconsistency (including incentives) (Ameli et al., 2020, Blue Orchard, 2020, Gina et al., 2021, OECD 2015, Rempel & Gupta, 2020, Soto-Montes-de-Ocaa, Bark & González-Arellanod, 2020)
- Regulatory barriers & limiting fiscal and financing polices (especially market entrants) (Blue Orchard, 2020, Rashidi et al 2019, Semieniuk et al., 2020, Gina et al., 2021)
- Distorting subsidies and tariff setting (Blue Orchard, 2020, OECD, 2015)
- Complex system (Hafner et al., 2020)

Market (FIEs)

- Fragmentation of markets & fragmented system (Pauw, 2017, Blue Orchard, 2020 Hafner et al., 2021)
- Non monetarized externalities & mispriced climate related risks (Blue Orchard, 2020, Boissnort, Huber & Lame, 2016, Chander et al., 2019)
- Shortage of specialized funds (Ameli et al., 2020, Blue Orchard, 2020)
- Market failures ((Ameli et al., 2020, ,OECD, 2105, Rashidi, et al., 2019)
- Insurers not equipped or able to address climate change risk (OECD, 2016 , Lloyd's, 2017b; Renn, 2014, Gina et al., 2021)
- Mismatch of risk profiles, time horizons & investment scales (Blue Orchard, 2020, Boissnort, Huber & Lame, 2016, Pauw, 2017)
- Green infrastructure not seen as an asset class and difficulties finding sources of funding (Lam and Law 2016; Plunkett et al. 2016, Migliorelli and Dessertine, 2019)
- 'Missing Link' projects / funds /developers (Blue Orchard, 2020)
- Insufficient market depth(Blue Orchard, 2020)
- Emphasis on costs and risks rather than climate risks (Boissnort, Huber, Lame 2016)
- Pricing and market inefficiency(Semieniuk et al., 2020)
- Systemic barriers (Hafner et al 2020)
- Greenwashing threat (Migliorelli and Dessertine, 2019)
- Personal attitudes and expectation of investors and peer behaviour (Semieniuk et al., 2020)
- Inclination to delay action ((OECD 2015)
- Pension funds are not fully committed to carbon transition (Rempel & Gupta 2020)
- Difficulties of accounting for indirect benefits (Root, van de Krabben & Spit 2016)
- Constraints on decision makers ((Semieniuk et al., 2020)

Finance Products

- Nascent green/adaptation project market (Pauw, 2017, Blue Orchard, 2020, Chander, 2019)
- Lack of access to traditional sources of finance for green/adaptation projects (Lam & Law, 2016; Plunkett et al., 2016, Migliorelli & Dessertine, 2019)
- Lack of standards & rating schemes ((Blakstad and Allen, 2018; Neves and Prata, 2018). Migliorelli & Dessertine, 2019, Blue Orchard, 2020, Migliorelli & Dessertine, 2019)
- Lack transparency (Neves & Prata, 2018, Migliorelli & Dessertine, 2019, Blue Orchard, 2020, Migliorelli & Dessertine, 2019)
- Green benefit valuation challenges (Blue Orchard, 2020)
- Lack of data (Blue Orchard, 2020)
- Uncertainty over benefit of local-level market-based mechanism (property value based) (Root, Van de Krabben & Spit, 2016)
- No Silver Bullet (OECD, 2105)
- Limited acceptance of market-based instruments (Root, Van de Krabben & Spit ,2016)

Adaptation projects proponents (Public Authorities)

- Limited knowledge good practice green/adaptation projects (Blue Orchard, 2020, OECD, 2105)
- Bankability & capital allocation problems (OECD, 2015, Blue Orchard, 2020)
- Lack of historical performance data (Blue Orchard, 2020, Chander, 2019)
- Weak project identification (Blue Orchard, 2020)
- Weak project preparation (Blue Orchard, 2020)
- Uncertain end user demand (Blue Orchard, 2020)
- Complex project structuring & execution (Blue Orchard, 2020)
- Other priorities (Root, Van de Krabben & Spit, 2016)
- Limited project budgets (Gina et al., 2021)
- Theoretical adaptation concepts mismatch to reality (OECD, 2105)

Barriers – Project Financiers (Supply) (Investors)	Barriers – City Project Owners (Demand) (City Government)
Attention	

• Unfamiliarity with concept of adaptation (13, 14, 15, 20 (Agrawala et al., 2011, OECD 2015, Pauw, 2017, Giordano, 2012; Hallegatte et al., 2012, Root, Van de Krabben & Spit, 2016) **(E)** • Uncertainties related to a complex climatic system (Gina et al., 2021, Giordano, 2012; Hallegatte et al., 2012, Root, Van de Krabben & Spit, 2016, OECD, 2105) **(E)** • Lack definition, data and analytics (Ameli & Kammen, 2012, Miller & Swann 2017, Pauw, 2017) **(E)** • Distinguishing adaptation from standard risk management processes. ((OECD, 2105, Pauw, 2017)) **(C)** • Language barriers (OECD, 2015, Pauw, 2017) **(E)** • Unsupportive attitudes of the public and resistance of society (Hafner et al., 2020) **(E)** • Competition between mitigation & adaptation funding/project & carbon bias[48](Blue Orchard, 2020) **(C)** • Competition for green/adaptation projects (Blue Orchard, 2020) **(C)** • Other priorities (Root, Van de Krabben & Spit, 2016)	• Complexity & multiple actors & adaptation processes/responses (Anguelovski et al., 2014, Birkmann et al., 2010, OECD, 2015, Atteridge, 2019, Fritzen et al., 2009, Moser et al., 2019) **(P)** • Low political priority & political engagement incentives (Anguelovski et al., 2014, Kreskitalo, Preston & Howlett, 2019, Mullin & Roy, 2020, Moser et al., 2019, Olzabal et al., . 2019) **(P)** • Political processes (Atteridge, 2019, Few et al., 2007, Fritzen et al., 2009, Henstra, 2016) **(P)** • Lack local leadership (Kreskitalo, Preston & Howlett, 2019, Grafakos et al., 2018, Hamin et al., 2014 9, Moser et al., 2019) **(P)** • Strategy and priorities conflicts (Dilling et all 2017, Kreskitalo, Preston & Howlett, 2019, Moser et al., 2019) **(P)** • Limits of adaptation options (Anguelovski et al., 2014, Dilling et al., 2017) **(I/U)** • Time constraints (Anguelovski et al., 2014, Lehmann, 2015, Moser et al., 2019) **(P)** • Perception of climate change in a distant sense (Hjerpe & Storbjo, 2015)**(E)** • Policy mismatch (Dilling et al., 2017, Lui & Bergen, 2017) **(P)** • Lack mainstreaming climate adaptation (Stults & Woodruff, 2017) **(I)** • Subjective climate projections (Healey, 2006) **(E)** • Conflict of interest (Olzabal et al., 2019, Moser et al., 2019) **(P)** • Larger concern for civil protection (Anguelovski et al., 2014) **(P)** • Lack of sustained political commitment (Moser et al., 2019) **(E)** • Delegitimisation (Gordon & Johnson, 2018, Wittneben, Banerjee & Levy, 2012) **(P)** • Reactive response (Woodruff, Mullin & Roy, 2020) **(P)**
Implementation	
Not applicable*	• Lack human & financial resources (Aguiar et al., 2018, Hamin et al., 2014, Grafakos et al., 2018, Moser et al., 2019, Olzabal et al., 2019) **(C)** • Lack coordination/cooperation (Mullin & Roy, 2020, Moser et al., 2019) **(I)** • Unclear responsibilities/accountability (Mullin & Roy, 2020, Moser et al., 2019) **(I)** • Absence of clear mandates (Anguelovski et al., (2014, Grafakos et al. 2018, Stults & Woodruff 2017) **(I)** • Low capacity - technical/managerial/administrative/policy (Anguelovski et al., 2014 , Hjerpe & Storbjo 2015 12, Lorenz, Porter & Dessai 2019, Moser et al. 2019, Olzabal et al . 2019) **(I)** • Knowledge of risks and vulnerabilities (Kreskitalo, Preston & Howlett, 2019, Mullin & Roy, 2020, Suhardiman, de Silva, 2017) **(I/U)** • Lack knowledge, tools, perspectives, uncertainties, climate modelling & key threats (Dilling et al., 2017, Mullin & Roy,2020, Giordano, 2012; Hallegatte et al., 2012, Root, Van de Krabben & Spit, 2016) **(I/U)** • Limited awareness green/adaptation fund options (Olzabal et al., 2019) **(C)** • Lack of awareness (Hjerpe & Storbjo, 2015) (Mullin & Roy, 2020, Moser et al., 2019) **(I/U)** • Policy mismatch (Dilling et al., 2017 5)(Lui & Bergen, 2017) **(P)** • Weak institutional incentives (Kreskitalo, Preston & Howlett, 2019) (Mullin & Roy, 2020) **(P)**

[48] *Carbon bias – Investors, and stakeholder more widely, can be locked-in to a bias that favours investment in carbon-intensive technologies where they have traditionally invested. This is called a carbon bias in the literature (D'Orazio & Popoyan, 2019).*

	• Insufficient project pipeline preparation (Aguiar et al., 2018) **(C)** • Inefficiency/piecemeal & project-by-project approach (Aguiar et al., 2018) **(C)** • Limited capacity in green project structuring (Aguiar et al., 2018 **(C)** (1) Lack long term vision (Olazabal et al., 2019) **(C)** • Scale mismatch-global change problem/local capacity (Olazabal et al., 2019) **(C)** • Slow authorisation (Grafakos et al., 2018) **(I)** • Bureaucratic opposition (Grafakos et al., 2018, Moser et al., 2019) **(I)** • Poor policy design (Grafakos et al. 2018) **(I)** • Weak implementation (Suhardiman, de Silva, 2019) **(I)** • Legal issues (Anguelovski et al., (2014) **(I)** • Lack champions (Olzabal et al., 2019) **(I)** • Lack of innovation (Lehmann, 2015) **(I/U)** • Difficult trade-offs (Olzabal et al., 2019) **(I/U)** • Political acumen in policy capacity (Lorenz, Porter & Dessai, 2019) **(P)** • Property rights concerns (Healey, 2006) **(P)** • Short termism (Moser et al., 2019, Olzabal et al., 2019) **(P)**
Financing	
• Short termism (OECD, 2015, Blue Orchard, 2020, Hafner et al., 2020, Root, van de Krabben & Spit, 2016) **(F/R)** • Higher transaction cost & burdensome process (Blue Orchard, 2020, Boissinot, Huber & Lam,2016 Fuessler et al., (2018) **(F/R)** • Higher risk, lower returns & perceived risk-return handicap (Blue Orchard, 2020, Boissnort, Huber & Lame 2016, Pauw, 2017, Hafner et al., 2020) **(F/R)** • Difficulties mobilising adaptation finance & access to finance (OECD, 2105, Tonkonogy et al.,2018, Fuessler et al., 2018, Tonkonogy et al., 2018) **(F/R)** • Incompatible business model, including difficulties identifying income streams (ADB, 2021, Climatekic, 2021, Blue Orchard, 2020) **(F/R)** • Lack of investor confidence (Semieniuk et al., 2020, Christophers, 2020) **(F/R)** • Lack of guidance and absence of reliable data (OECD 2015, Blue Orchard, 2020) **(F/R)** • Crowding out by 100% public sector financing (Blue Orchard, 2020) **(F/R)** • Caution about disclosing information for competitiveness (OECD, 2015) **(F/R)** • Skills gap (Ameli & Kammen, 2012, Tonkonogy et al., 2018 21) **(F/R)** • Benefit uncertainty **(**Root, Van de Krabben & Spit, 2016) **(F/R)** • Long processes **(**Hafner et al., 2020) • Lack of suitable financial services (Tonkonogy et al., 2018) • Lack experience in private sector financing (Pauw, 2017) • Uncertainty and unclear lines of responsibility in failure mode (Soto-Montes-de-Ocaa, Bark & González-Arellanod, 2020)	• Lack of viable/allocated funding sources (Aguia et al., 2018, Anguelovski et al., 2014, Few et al., 2007, Hamin et al., 2014, Healey, 2006, Hjerpe & Storbjo, 2015, Kreskitalo, Preston & Howlett, 2019, Lorenz, Porter & Dessai, 2019, Olzabal et al., 2019, Rodrigo & Nicol, 2017, Stults & Woodruff, 2017) **(F/R)** • Inexperience in leveraging finance (Aguia et al., 2018, Moser et al., 2019, Olzabal et al., 2019) **(F/R)** • Poor knowledge financial implications-climate risks (Moser et al., 2019, Torabi, 2018, Runhaar et al., 2019) **(F/R)** • Disproportionate burden of costs of actions (Root, Van de Krabben & Spit, 2016, Nalau et al., 2015, Olzabal et al., 2019) **(F/R]** • Complex funding application processes & lack capacity to administer (Aguia et al., 2018, Olzabal et al., 2019) **(C)** • Limited access to funding (Aguiar et al., 2018) **(F/R)** • Lack of fit to funding requirements, restrictions on access/use & lack matching funds (Moser et al., 2019, Olazabal et al., 2020) **(F/R)** • Lack of business models (Aguia et al., .2018) **(F/R)** • Tendering regimes (Hamin et al., 2014) **(F/R)** • Lack constituency support for adaptation budget allocation (Olazabal et al., 2019) **(F/R)** • Perceived political/cultural issues raising additional fees/ taxes (Moser et al., 2109, Olzabal et al., 2019) **(F/R)** • True risk /cost not borne by those gaining greatest benefit (Olzabal et al., 2019) • Disaster relief funding reliance (Gina et al., 2021)

Annex 4. Interview guide for interviews with the (PAs) territories (T1.1)

Interview guidelines (for interviewers only)

Data Management:

- Make sure you have collected the information form and informed consent, and that the interviewee(s) has properly completed it before you engage in the interview and possible recording.
- Ask the interviewee(s) for their explicit consent to be recorded/videotaped. We ask for a recording to help during the transcription. The transcript will be sent to the interviewee(s) for proofreading. Once the transcript is approved, the original recording will be destroyed in compliance with the data management protocol.

An interview focusing on the topic of adaptation finance. Here are a few key definitions that could be useful:

- Climate adaptation: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects. [IIGCC].
- Adaptation strategy: A general plan of action for addressing the impacts of climate change, including climate variability and extremes. Such a strategy includes a mix of policies and measures that have the overarching objective of reducing vulnerability to climate impacts. Examples here. [IPCC].
- Climate finance: The term climate finance is generally applied to the financial resources devoted to addressing climate change by all public and private actors from global to local scales. Climate finance aims to reduce net greenhouse gas emissions and/or to enhance adaptation and increase resilience to the impacts of current and projected climate change. Finance can come from private and public sources, channelled by various intermediaries, and is delivered by a range of instruments, including grants, concessional and non-concessional debt, and internal budget reallocations. [IPCC].
- Adaptation funding gap: The difference between the available capital for a given adaptation initiative or project and what is required to fully cover the costs of the same. Term commonly referring to sub-national finance gaps.

Introduction (for interviewers and interviewees)

CLIMATEFIT is a Horizon Europe project. The overall objective is to support EU territories in their just and transformational journey toward climate resilience by bridging the finance gap, providing critical insight, and building the capacities of (i) Public Authorities (PAs) to identify, orchestrate and attract various public and private financing sources and (ii) Financing & Investment Entities (FIEs) to identify and access resilient investment opportunities.

WP1's goal is to assess the barriers and drivers for overcoming this finance gap for the 20 territories selected through CLIMATEFIT and the corresponding Public Authorities (PAs). The selected method allows us to describe recurring forms of finance challenges driven by interconnected factors, encompassing strategic, operational, financial, and institutional dimensions. Notably, this method offers a high degree of replicability across various contexts.

We identified seven focal points around which the adaptation finance challenges clustered in existing studies (Moser et al. 2019):

- Establishing climate change risks and adaptation as a matter of concern.
- Establishing the funding need, which involves assessing and justifying adaptation expenditures.
- Proving the financial standing (capacity) of the funding seeker (demander).
- Identifying and accessing funding providers.
- Accessing different types of funding or financing.
- Navigating specific funding mechanisms.
- Having or creating the ability to use and administer funds.

This typology has been thoroughly adapted to the EU context, taking into account structural differences between case studies with the above-mentioned study. The 20 territories selected within CLIMATEFIT are divided into southern, eastern, and northern clusters of the EU, allowing us to address a wide range of regional characteristics.

For each category, we will ask you to share your perspectives and experienced challenges and solutions by responding as completely as possible to an open question. It will allow us to better understand the unique barriers and drivers shaping the landscape of climate adaptation financing in the EU territories selected for the CLIMATEFIT project.

With this interview, we aim to tap into your knowledge, seeking valuable insights into the challenges and opportunities associated with accessing finance for adaptation and resilience projects. The information gathered during this discussion will contribute to constructing an assessment scorecard, evaluating the

maturity of territories in accessing adaptation finance. Additionally, this document will serve as the foundation for conducting an initial assessment of capacity-building needs across diverse territories.

Interview questions (for interviewers and interviewees)

1. **Establishing climate change risks and adaptation as a matter of concern**
   - 1.1. Considering the increasing impact of climate change, on a scale from 1 (low priority) to 5 (high priority), how would you rate climate change as a priority for your administration?
   - 1.2. Is there a climate unit in charge of climate adaptation on your territory? Could be a Public Authority department, a team within a department... Describe its role.
   - 1.3. Have you experienced challenges/opportunities in establishing climate change risks and adaptation as a matter of concern / as an important issue? This could include for instance putting risks and adaptation on the political agenda, creating awareness/setting as a priority among administrations.
   - 1.4. Are there engagements with national policy makers on the topic of climate adaptation?
   - 1.5. Is there a long-term climate adaptation action plan in place at a national level? At a regional level? If yes, how are these initiatives useful?

2. **Establishing adaptation funding need, costs, and benefits**
   - 2.1. Are there existing strategies or initiatives for assessing fundings needs? For assessing funding costs and benefits?
   - 2.2. What challenges remain in identifying and mapping adaptation funding needs? For assessing funding costs and benefits? Detail your answer.
   - 2.3. What tools and support does your authority have for pre-feasibility studies? For cost-benefit analysis? For environmental and social impact assessments?
   - 2.4. Are there existing tools you are aware of (on a national or regional level) your authority is not using? Why not?

3. **Proving the fiscal standing of the Public Authority (adaptation funding seeker)**
   - 3.1. Do you experience challenges/opportunities allocating public budgets for climate adaptation investments or to generate another steady source of funding? Explain.

4. **Identifying and accessing adaptation funding sources**
   - 4.1. Who are your main funding providers for adaptation (public, private, mixed)?
   - 4.2. Do you experience challenges in accessing/finding adaptation fundings opportunities from: governmental actors? Non-governmental actors? Detail your answer.
   - 4.3. Do you experience challenges/opportunities understanding and applying to different types of available funds?
   - 4.4. Have you ever used private financing, or public-private partnerships for financing adaptation?
   - 4.5. Do you have knowledge about innovative financial mechanisms to fund adaptation? If yes, do you encounter challenges/opportunities accessing different types of funding or financing? Detail your answer.

5. **Having or building capacity to research, use, and administer adaptation funds.**
   - 5.1. Do you have the necessary Human Resources (could be part of the climate unit or international relations) to dedicate to research additional sources of funding for adaptation?
   - 5.2. Would you consider your Public Authority to have the qualifications to administer funds successfully? Explain.
   - 5.3. Would you consider your Public Authority to have the Human Resources to administer funds successfully? Explain.

Closing Thoughts: - Is there anything else you would like to add regarding the barriers and drivers of local public authorities in accessing finance/funds for adaptation?

Annex 5. PA Maturity assessment scorecard (adapted from the original Excel file)

Maturity level elements	Scoring criteria	Score
1. National Policy, legal and regulatory frameworks		
1.1. Policy		
Adequate national policies and governance arrangements to support local climate change adaptation **Question**: Are there national policies in place to support local climate change adaptation efforts?	1. Non-existent: "There are no national policies or governance arrangements supporting local climate change adaptation efforts." 2. Limited: "Some national policies exist, but governance arrangements for supporting local adaptation efforts are fragmented and ineffective. 3. Moderate: "There are several national policies in place, and governance arrangements are moderately effective in supporting local climate change adaptation." 4. High: "National policies strongly support local climate change adaptation efforts, and governance arrangements are well-coordinated and effective." 5. Excellent: "Comprehensive national policies and robust governance arrangements provide strong support for local climate change adaptation initiatives, ensuring effective implementation and coordination."	
Adequate mainstreaming of adaptation and policy alignment amongst sectoral strategies and plans **Question**: How well are adaptation considerations integrated into sectoral strategies and plans at the local level?	1. Non-existent: "Adaptation considerations are absent from sectoral strategies and plans, and there is no alignment with overarching policies." 2. Limited: "Some sectoral strategies and plans mention adaptation, but mainstreaming efforts are inconsistent, and alignment with policies is weak." 3. Moderate: "Adaptation is moderately integrated into sectoral strategies and plans, with efforts to mainstream adaptation, although alignment with policies could be improved." 4. High: "Sectoral strategies and plans demonstrate strong mainstreaming of adaptation, and alignment with policies is evident, contributing to comprehensive adaptation efforts." 5. Excellent: "Adaptation is thoroughly mainstreamed across sectoral strategies and plans, and alignment with policies is exemplary, ensuring cohesive and coordinated adaptation actions across sectors."	
Level of prioritization of adaptation in project conception and planning **Question**: To what extent is adaptation prioritized during project conception and planning processes?	1. Non-existent: "Adaptation is not considered in project conception and planning processes." 2. Limited: "Some projects include adaptation considerations, but prioritization is inconsistent and not systematic." 3. Moderate: "Adaptation is moderately prioritized in project conception and planning, with some efforts to integrate adaptation measures." 4. High: "Projects prioritize adaptation, and planning processes systematically incorporate adaptation considerations, ensuring resilience to climate impacts." 5. Excellent: "Adaptation is given the highest priority in project conception and planning, with comprehensive integration of adaptation measures, resulting in highly resilient projects."	
1.2. Legal and regulatory framework		
Adequate legal and regulatory frameworks to promote and support adaptation projects **Question**: Do legal and regulatory frameworks exist to promote and	1. Non-existent: "There are no legal or regulatory frameworks supporting adaptation projects." 2. Limited: "Some legal and regulatory frameworks exist, but they offer limited support for adaptation projects." 3. Moderate: "Legal and regulatory frameworks moderately support adaptation projects, although gaps remain in providing comprehensive support." 4. High: "Legal and regulatory frameworks provide strong support for adaptation projects, facilitating their implementation and ensuring compliance." 5. Excellent: "Comprehensive legal and regulatory frameworks offer robust support for adaptation projects, fostering their development, implementation, and sustainability."	

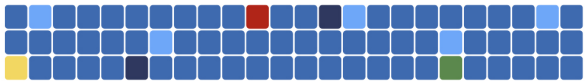
support adaptation projects at the local level?		
2. Strategic		
2.1. Commitment		
Level of internal stakeholder awareness and commitments on the issue of climate adaptation **Question**: What is the level of internal stakeholder awareness and commitments on the issue of climate adaptation?	1. Non-existent: "Internal stakeholders have shown no awareness or commitment to the issue of climate adaptation. There have been no discussions or initiatives regarding climate adaptation within the organization." 2. Low: "There is some limited awareness among internal stakeholders about the issue of climate adaptation, but commitments are minimal. A few individuals have expressed interest, but there hasn't been widespread engagement or action." 3. Moderate: "Internal stakeholders have a moderate level of awareness about climate adaptation, and there are some commitments being made. There have been discussions within the organization, and a few initiatives are underway, but overall, the engagement is not yet comprehensive." 4. High: "There is a high level of awareness among internal stakeholders regarding climate adaptation, and there are significant commitments being made. Many individuals within the organization are actively involved in initiatives, and there is strong support for addressing climate-related challenges." 5. Fully Implemented: "Climate adaptation is fully integrated into the organizational culture, with all internal stakeholders highly aware and committed to addressing the issue. There are comprehensive strategies in place, regular assessments, and continuous improvement efforts to ensure resilience to climate impacts."	
Capacity for the PA to articulate the adaptation need for their territory (adaptation finance gap, potential role of the private sector) **Question**: Does the PA have the capacity to articulate the adaptation need for its territory (adaptation finance gap, potential role of the private sector)?	1. Non-existent: "The PA lacks the capacity to articulate the adaptation needs for its territory. There is no acknowledgment of the adaptation finance gap, nor any consideration of the potential role of the private sector in addressing these needs." 2. Low: "There is limited capacity within the PA to articulate the adaptation needs for its territory. While there may be some recognition of the adaptation finance gap, there is little understanding of the potential role of the private sector in addressing these needs." 3. Moderate: "The PA possesses a moderate level of capacity to articulate adaptation needs for its territory. There are discussions about the adaptation finance gap, and some consideration is given to the potential role of the private sector, but the understanding is not comprehensive." 4. High: "The PA demonstrates a high capacity to articulate adaptation needs for its territory. There is a clear understanding of the adaptation finance gap, and efforts are made to engage the private sector in addressing these needs. However, there may be room for further improvement." 5. Fully Implemented: "The PA has fully developed capacity to articulate adaptation needs for its territory. There is a thorough understanding of the adaptation finance gap, and the potential role of the private sector is actively leveraged. Comprehensive strategies are in place to ensure effective collaboration and resource mobilization."	
2.2. Cooperation		
Partnerships with relevant climate finance stakeholders (national and local level / public, private, civil society) **Question**: Do partnerships with relevant climate finance stakeholders exist (national and local level / public, private, civil society)?	1. Non-existent: "There are no partnerships with relevant climate finance stakeholders at either the national or local level. There is little to no engagement with stakeholders from the public, private, or civil society sectors regarding climate finance." 2. Low: "There are limited partnerships with relevant climate finance stakeholders at the national or local level. While there may be some sporadic engagement with stakeholders from the public, private, or civil society sectors, partnerships are not well-established or comprehensive." 3. Moderate: "Partnerships with relevant climate finance stakeholders exist at both the national and local levels to some extent. There are ongoing efforts to engage stakeholders from the public, private, and civil society sectors, but the partnerships may not be fully developed or inclusive." 4. High: "There are strong partnerships with relevant climate finance stakeholders at both the national and local levels. There is active engagement with stakeholders from the public, private, and civil society sectors, and partnerships are well-established and effective in advancing climate finance goals." 5. Fully Implemented: "Partnerships with relevant climate finance stakeholders are fully implemented and highly effective at both the national and local levels. There is comprehensive engagement with stakeholders from the public, private, and civil society sectors, leading to impactful collaboration and resource mobilization for climate finance initiatives."	

2.3. Mandate and legitimacy		
Endorsement of a local climate adaptation strategy aligned with national goals and priorities **Question**: Does the PA endorse a local climate adaptation strategy aligned with national goals and priorities?	1. Non-existent: "The PA does not endorse any local climate adaptation strategy aligned with national goals and priorities. There is no acknowledgment or consideration of aligning local strategies with broader national objectives related to climate adaptation." 2. Low: "There is limited endorsement from the PA for a local climate adaptation strategy aligned with national goals and priorities. While there may be some awareness of national objectives, efforts to align local strategies are minimal and not well-established." 3. Moderate: "The PA has shown moderate endorsement for a local climate adaptation strategy aligned with national goals and priorities. There are some efforts to align local strategies with national objectives, but the alignment may not be comprehensive or fully integrated." 4. High: "The PA demonstrates a high level of endorsement for a local climate adaptation strategy aligned with national goals and priorities. There are clear efforts to ensure that local strategies are in line with broader national objectives related to climate adaptation." 5. Fully Implemented: "The PA has fully endorsed a local climate adaptation strategy that is closely aligned with national goals and priorities. Local strategies are seamlessly integrated with broader national objectives, ensuring a cohesive and coordinated approach to climate adaptation at all levels."	
Clear mandate and legitimacy given to relevant departments to implement climate change adaptation **Question**: Is there a clear mandate and legitimacy given to relevant departments to implement climate change adaptation?	1. Non-existent: "There is no clear mandate or legitimacy given to relevant departments to implement climate change adaptation. There is no acknowledgment of the need for such mandates, and relevant departments lack the authority to take action on climate change adaptation." 2. Low: "There is a limited mandate and legitimacy given to relevant departments to implement climate change adaptation. While there may be some recognition of the importance of adaptation, departments lack clear authority and resources to effectively implement adaptation measures." 3. Moderate: "There is a moderate level of mandate and legitimacy given to relevant departments to implement climate change adaptation. Efforts have been made to establish mandates and provide resources, but there may be inconsistencies or gaps in authority across departments." 4. High: "There is a high level of mandate and legitimacy given to relevant departments to implement climate change adaptation. Clear mandates have been established, and departments have the necessary authority and resources to effectively carry out adaptation measures." 5. Fully Implemented: "There is a fully implemented mandate and legitimacy given to relevant departments to implement climate change adaptation. Clear mandates have been established at all levels, and departments are empowered with the authority, resources, and support needed to successfully implement adaptation measures.	
3. Operational and technical capability		
3.1. Project preparation capability		
Technical tools and skills to conduct vulnerability studies and access climate data **Question**: Does the PA have the technical tools and skills to conduct vulnerability studies and access climate data?	1. Non-existent: "The PA lacks the technical tools and skills to conduct vulnerability studies and access climate data. There are no resources or expertise available within the organization to carry out such assessments." 2. Low: "There is limited capacity within the PA to conduct vulnerability studies and access climate data. While there may be some basic tools and skills available, they are insufficient for comprehensive assessments." 3. Moderate: "The PA has moderate technical tools and skills to conduct vulnerability studies and access climate data. Efforts have been made to acquire relevant tools and build necessary skills, but there may be gaps in expertise or resources." 4. High: "The PA demonstrates a high level of technical tools and skills to conduct vulnerability studies and access climate data. There are robust systems in place for data collection, analysis, and interpretation, enabling comprehensive assessments of climate vulnerability." 5. Fully Implemented: "The PA has fully implemented technical tools and skills to conduct vulnerability studies and access climate data. State-of-the-art tools and expertise are available within the organization, allowing for advanced analyses and informed decision-making based on climate data	
Technical tools and skills to conduct Cost-Benefit analyses **Question**: Does the PA have the technical tools and skills to conduct Cost-Benefit analyses?	1. Non-existent: "The PA lacks the technical tools and skills to conduct cost-benefit analyses. There are no resources or expertise available within the organization to carry out such assessments." 2. Low: "There is limited capacity within the PA to conduct cost-benefit analyses. While there may be some basic tools and skills available, they are insufficient for comprehensive assessments, and the expertise may be lacking." 3. Moderate: "The PA has moderate technical tools and skills to conduct cost-benefit analyses. Efforts have been made to acquire relevant tools and build necessary skills, but there may be gaps in expertise or resources, and the analyses may not be fully comprehensive."	

	4. High: "The PA demonstrates a high level of technical tools and skills to conduct cost-benefit analyses. There are robust systems in place for data collection, analysis, and interpretation, enabling comprehensive assessments of costs and benefits related to climate adaptation measures." 5. Fully Implemented: "The PA has fully implemented technical tools and skills to conduct cost-benefit analyses. State-of-the-art tools and expertise are available within the organization, allowing for advanced analyses and informed decision-making based on thorough assessments of costs and benefits."	
Technical tools and skills to conduct environmental and social impact assessments **Question**: Does the PA have the technical tools and skills to conduct environmental and social impact assessments?	1. Non-existent: "The PA lacks the technical tools and skills to conduct environmental and social impact assessments. There are no resources or expertise available within the organization to carry out such assessments." 2. Low: "There is limited capacity within the PA to conduct environmental and social impact assessments. While there may be some basic tools and skills available, they are insufficient for comprehensive assessments, and the expertise may be lacking." 3. Moderate: "The PA has moderate technical tools and skills to conduct environmental and social impact assessments. Efforts have been made to acquire relevant tools and build necessary skills, but there may be gaps in expertise or resources, and the assessments may not be fully comprehensive." 4. High: "The PA demonstrates a high level of technical tools and skills to conduct environmental and social impact assessments. There are robust systems in place for data collection, analysis, and interpretation, enabling comprehensive assessments of environmental and social impacts related to climate adaptation measures." 5. Fully Implemented: "The PA has fully implemented technical tools and skills to conduct environmental and social impact assessments. State-of-the-art tools and expertise are available within the organization, allowing for advanced analyses and informed decision-making based on thorough assessments of environmental and social impacts."	
Operational knowledge about innovative financial mechanisms and funding sources **Question**: Does the PA have the operational knowledge about innovative financial mechanisms and funding sources?	1. Non-existent: "The PA lacks operational knowledge about innovative financial mechanisms and funding sources. There is no awareness or understanding within the organization about alternative funding sources or financial mechanisms." 2. Low: "There is limited operational knowledge within the PA about innovative financial mechanisms and funding sources. While there may be some basic awareness of alternative funding options, the understanding is superficial, and there is little exploration of innovative financial mechanisms." 3. Moderate: "The PA has moderate operational knowledge about innovative financial mechanisms and funding sources. Efforts have been made to explore alternative funding options, and there is a basic understanding of some innovative financial mechanisms, but the knowledge may not be comprehensive." 4. High: "The PA demonstrates a high level of operational knowledge about innovative financial mechanisms and funding sources. There is a thorough understanding of various alternative funding options, and the organization actively explores and utilizes innovative financial mechanisms to support climate adaptation initiatives." 5. Fully Implemented: "The PA has fully implemented operational knowledge about innovative financial mechanisms and funding sources. The organization is well-versed in a wide range of alternative funding options and innovative financial mechanisms, and it effectively leverages these resources to support comprehensive climate adaptation efforts."	
Technical tools and skills to design quality and bankable adaptation project proposals **Question**: Does the PA have technical tools and skills to design quality and bankable adaptation project proposals?	1. Non-existent: "The PA lacks the technical tools and skills to design quality and bankable adaptation project proposals. There are no resources or expertise available within the organization to develop such proposals." 2. Developing: "There is some effort within the PA to develop technical tools and skills for designing quality and bankable adaptation project proposals. Basic resources and expertise are being sought, but significant gaps still exist, hindering the effectiveness of proposal development." 3. Moderate: "The PA possesses moderate technical tools and skills to design quality and bankable adaptation project proposals. Efforts have been made to acquire relevant tools and build necessary skills, allowing for the development of proposals that meet basic standards, although improvements are still needed." 4. Advanced: "The PA demonstrates advanced technical tools and skills in designing quality and bankable adaptation project proposals. Comprehensive resources and expertise are available, enabling the development of proposals that are highly competitive and effectively address adaptation challenges." 5. Exemplary: "The PA has exemplary technical tools and skills for designing quality and bankable adaptation project proposals. State-of-the-art resources and expertise are seamlessly integrated, resulting in the development of innovative and highly successful proposals that set industry standards."	

Technical tools and skills to design a pipeline of bankable projects (resources and capacity to replicate on the long term) **Question**: Does the PA have technical tools and skills to design a pipeline of bankable projects (resources and capacity to replicate on the long term)?	1. Non-existent: "The PA lacks the technical tools and skills to design a pipeline of bankable projects. There are no resources or expertise available within the organization to develop such a pipeline, and there is no capacity for long-term replication." 2. Developing: "Efforts are underway within the PA to develop technical tools and skills for designing a pipeline of bankable projects. Basic resources and expertise are being sought, but significant gaps still exist, hindering the organization's ability to replicate projects on a long-term basis." 3. Moderate: "The PA possesses moderate technical tools and skills to design a pipeline of bankable projects. Some efforts have been made to acquire relevant resources and build necessary skills, allowing for the development of a pipeline, although improvements are needed for long-term replication." 4. Advanced: "The PA demonstrates advanced technical tools and skills in designing a pipeline of bankable projects. Comprehensive resources and expertise are available, enabling the development of a robust pipeline that can be replicated effectively on a long-term basis." 5. Exemplary: "The PA has exemplary technical tools and skills for designing a pipeline of bankable projects. State-of-the-art resources and expertise are seamlessly integrated, resulting in the development of an innovative and highly successful pipeline that serves as a model for long-term replication.	
3.2. Identify funding sources		
Public funding from national and local actors **Question**: Is the PA able to identify public funding from national and local actors?	1. Non-existent: "The PA is unable to identify any public funding from national and local actors. There is no awareness or capacity within the organization to access such funding sources." 2. Limited: "There is limited ability within the PA to identify public funding from national and local actors. While some efforts have been made to explore these funding sources, the organization lacks comprehensive strategies or expertise in accessing them." 3. Moderate: "The PA has a moderate ability to identify public funding from national and local actors. Efforts have been made to identify and access these funding sources, although there may be room for improvement in terms of efficiency and effectiveness." 4. High: "The PA demonstrates a high level of ability to identify public funding from national and local actors. There are established processes and expertise within the organization for accessing these funding sources, leading to effective resource mobilization." 5. Excellent: "The PA excels in identifying public funding from national and local actors. The organization has comprehensive strategies, strong networks, and advanced expertise in accessing these funding sources, resulting in successful resource mobilization for climate adaptation initiatives."	
International public funding **Question**: Is the PA able to identify international public funding?	1. Non-existent: "The PA is unable to identify any international public funding. There is no awareness or capacity within the organization to access such funding sources." 2. Limited: "There is limited ability within the PA to identify international public funding. While some efforts have been made to explore these funding sources, the organization lacks comprehensive strategies or expertise in accessing them." 3. Moderate: "The PA has a moderate ability to identify international public funding. Efforts have been made to identify and access these funding sources, although there may be room for improvement in terms of efficiency and effectiveness." 4. High: "The PA demonstrates a high level of ability to identify international public funding. There are established processes and expertise within the organization for accessing these funding sources, leading to effective resource mobilization." 5. Excellent: "The PA excels in identifying international public funding. The organization has comprehensive strategies, strong networks, and advanced expertise in accessing these funding sources, resulting in successful resource mobilization for climate adaptation initiatives."	
From private funding **Question**: Is the PA able to identify private funding?	1. Non-existent: "The PA is unable to identify any private funding sources. There is no awareness or capacity within the organization to access such funding from private sources." 2. Limited: "There is limited ability within the PA to identify private funding. While some efforts have been made to explore private funding sources, the organization lacks comprehensive strategies or expertise in accessing them." 3. Moderate: "The PA has a moderate ability to identify private funding. Efforts have been made to identify and access private funding sources, although there may be room for improvement in terms of efficiency and effectiveness." 4. High: "The PA demonstrates a high level of ability to identify private funding. There are established processes and expertise within the organization for accessing private funding sources, leading to effective resource mobilization." 5. Excellent: "The PA excels in identifying private funding. The organization has comprehensive strategies, strong networks, and advanced expertise in accessing private funding sources, resulting in successful resource mobilization for climate adaptation initiatives."	
3.3. Human resources		

Climate unit in charge of adaptation **Question**: Is there a climate unit in charge of adaptation?	1. Non-existent: "There is no dedicated climate unit in charge of adaptation within the organization. Climate adaptation is not specifically assigned to any unit or department." 2. Developing: "Efforts are underway to establish a climate unit in charge of adaptation within the organization. While some initial steps have been taken, the unit is not fully operational or integrated into the organization's structure." 3. Established: "There is a climate unit in charge of adaptation within the organization. The unit has been established and plays a role in coordinating and implementing adaptation efforts, although its capacity and resources may still be growing." 4. Functional: "The climate unit in charge of adaptation is fully functional within the organization. It effectively coordinates adaptation activities, provides expertise, and ensures integration of adaptation considerations into organizational plans and projects." 5. Exemplary: "The organization has an exemplary climate unit dedicated to adaptation. It is well-resourced, highly skilled, and plays a central role in leading and advancing adaptation efforts across the organization, setting industry standards for climate adaptation governance."	
Adequate (qualification and number) Human Resources to research and mobilize funding sources **Question**: Are there adequate (qualification and number) Human Resources to research and mobilize funding sources?	1. Insufficient: "There is an inadequate number of human resources with the necessary qualifications to research and mobilize funding sources. The existing team lacks sufficient expertise or capacity to effectively identify and access funding." 2. Limited: "The human resources available for researching and mobilizing funding sources are limited in number and qualifications. While there are some individuals with relevant skills, the team size and expertise may not be sufficient to fully capitalize on available funding opportunities." 3. Adequate: "There are an adequate number of human resources with the necessary qualifications to research and mobilize funding sources. The team possesses the required skills and expertise to identify and access funding opportunities effectively." 4. Proficient: "The organization has a proficient team of human resources with the qualifications needed to research and mobilize funding sources. The team is well-equipped to identify and pursue funding opportunities, leveraging their expertise to maximize resource mobilization efforts." 5. Excellent: "The organization boasts an excellent team of highly qualified human resources dedicated to researching and mobilizing funding sources. With their extensive expertise and capabilities, they excel in identifying and accessing a wide range of funding opportunities, contributing significantly to the organization's financial sustainability and success in implementing climate adaptation initiatives."	
3.4. Monitoring and evaluation		
Adequate Monitoring and Evaluation framework **Question**: Is there a Monitoring and Evaluation framework for adaptation projects?	1. Non-existent: "There is no Monitoring and Evaluation (M&E) framework in place for adaptation projects within the organization. Monitoring and evaluation activities related to adaptation projects are not established or conducted." 2. Developing: "Efforts are underway to establish a Monitoring and Evaluation (M&E) framework for adaptation projects. Initial steps have been taken to develop such a framework, but it is not fully implemented or operational yet." 3. Established: "There is an established Monitoring and Evaluation (M&E) framework for adaptation projects within the organization. The framework is in place and used to monitor the progress and evaluate the outcomes of adaptation projects, though there may be areas for improvement." 4. Functional: "The Monitoring and Evaluation (M&E) framework for adaptation projects is fully functional within the organization. It effectively monitors the implementation progress, assesses the effectiveness of interventions, and informs decision-making processes." 5. Exemplary: "The organization has an exemplary Monitoring and Evaluation (M&E) framework for adaptation projects. The framework is comprehensive, well-integrated into project cycles, and continuously refined based on feedback, ensuring the efficient and effective delivery of adaptation interventions."	
4. Mobilisation of resources		
4.1. Resources to research and apply		
Available resources to research and apply to climate financing **Question**: Does the PA have available resources to research and apply to climate financing?	1. Insufficient: "The PA lacks sufficient resources to research and apply for climate financing. Limited funding and manpower constrain the organization's ability to dedicate resources to these activities." 2. Limited: "There are some resources available for the PA to research and apply to climate financing, but they are limited. The organization faces constraints in terms of funding and manpower, which may hinder its capacity to fully engage in these activities." 3. Adequate: "The PA has adequate resources available to research and apply to climate financing. While there may be some limitations, the organization can dedicate sufficient funding and manpower to effectively pursue climate financing opportunities." 4. Proficient: "The PA demonstrates proficiency in researching and applying to climate financing, with ample resources at its disposal. The organization has sufficient funding and manpower to actively engage in these activities and pursue various climate financing opportunities."	



	5. Excellent: "The PA excels in researching and applying to climate financing, with abundant resources available for these purposes. The organization is well-funded and well-staffed, enabling it to thoroughly explore, apply for, and secure climate financing opportunities to support its initiatives."	
4.2. Public funding structure		
Strong ability to borrow (also determined by creditworthiness) **Question**: Does the PA have a strong ability to borrow (also determined by creditworthiness)?	1. Weak: "The PA has a weak ability to borrow, largely due to limited financial resources and potentially poor creditworthiness. The organization may face challenges in accessing loans or credit facilities." 2. Limited: "There is a limited ability for the PA to borrow, as its financial resources and creditworthiness may be somewhat constrained. While some borrowing may be possible, it could be subject to certain limitations or higher costs." 3. Moderate: "The PA has a moderate ability to borrow, with some financial resources and a reasonable level of creditworthiness. It may be able to access loans or credit facilities under certain conditions, although there could be limitations on borrowing capacity." 4. Strong: "The PA demonstrates a strong ability to borrow, supported by solid financial resources and a favorable creditworthiness. It can access loans or credit facilities with relative ease and on favorable terms, enabling it to finance its activities effectively." 5. Excellent: "The PA has an excellent ability to borrow, backed by ample financial resources and an outstanding creditworthiness. It can access loans or credit facilities with flexibility and on highly favorable terms, providing significant support for its initiatives and projects."	
Ability to raise taxes **Question**: Is the PA able to raise taxes?	1. No: "The PA does not have the authority or ability to raise taxes. It relies solely on existing sources of funding and does not have the power to implement taxation policies." 2. Limited: "The PA has limited ability to raise taxes, as its authority to do so may be restricted or subject to external approvals. While it may have some taxation powers, they are not extensive enough to significantly impact its funding." 3. Moderate: "The PA has a moderate ability to raise taxes, with some authority and capacity to implement taxation policies. It can generate additional revenue through taxation, although the extent to which it can do so may be somewhat limited." 4. Strong: "The PA demonstrates a strong ability to raise taxes, with considerable authority and capacity to implement taxation policies. It can effectively generate significant revenue through taxation, providing a substantial funding source for its activities." 5. Excellent: "The PA has an excellent ability to raise taxes, with broad authority and capacity to implement taxation policies. It can efficiently generate substantial revenue through taxation, allowing it to fund its initiatives and projects effectively."	
Capacity to conduct Public-Private-Partnerships (PPP) **Question**: Is the PA able to conduct Public-Private-Partnerships (PPP)?	1. No: "The PA does not have the authority or ability to conduct Public-Private Partnerships (PPPs). It lacks the legal framework or mechanisms necessary to engage in such partnerships." 2. Limited: "The PA has limited ability to conduct Public-Private Partnerships (PPPs). While it may have some capacity to engage in partnerships with the private sector, the extent and scope of these partnerships are restricted due to regulatory or institutional constraints." 3. Moderate: "The PA has a moderate ability to conduct Public-Private Partnerships (PPPs). It has established some frameworks or mechanisms for engaging with the private sector, allowing for collaboration on certain projects or initiatives, although the scale and complexity of these partnerships may be limited." 4. Strong: "The PA demonstrates a strong ability to conduct Public-Private Partnerships (PPPs). It has well-established frameworks and mechanisms for engaging with the private sector, enabling collaboration on a wide range of projects or initiatives with significant impact." 5. Excellent: "The PA has an excellent ability to conduct Public-Private Partnerships (PPPs). It has robust frameworks and mechanisms in place, facilitating seamless collaboration with the private sector on diverse projects or initiatives, leading to innovative solutions and sustainable development outcomes.	

Annex 6. FIE survey script

Introduction

- Please notice that the term 'investment' includes debt investments (e.g., into bonds/ fixed-income securities) and equity/stock investment.
- Please refer to investment opportunities located in [*insert country*].
- Green finance, sustainable and ESG finance are used interchangeable in the interview when referring to wider ESG financing activities.
- When referring to climate finance we will differentiate between mitigation and adaptation finance.

Definitions (from the CLIMATEFIT Glossary Nov 2023):

- **Climate finance**: The term climate finance is generally applied to the financial resources devoted to addressing climate change by all public and private actors from global to local scales. Climate finance aims to reduce net greenhouse gas emissions and/or to enhance adaptation and increase resilience to the impacts of current and projected climate change. Finance can come from private and public sources, channelled by various intermediaries, and is delivered by a range of instruments, including grants, concessional and non-concessional debt, and internal budget reallocations. [IPCC]
- **Climate adaptation**: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects. [IIGCC]

PART I

Context Questions

- Name. Position. E-mail address. Organisation Type.

Please note we ask this set of questions on types of investor in order to better understand your company's investments in general and to enable us to categorise and sort answers

A1. What type of investor, investment expert or actor are you?

- Banking
- Insurance
- Actuary
- Institutional investor
- Government (municipal or other)
- Endowments
- Charities
- Developer
- Other

A2. Are you involved in debt or equity financing?

A3. How large are the investable assets (on average) that you are involved in? (€s)

- Investable assets of >1 Mil
- Investable assets of 1m to 50 Mil
- Investable assets of $ 50 Mil
- Investable assets of $ 100 Mil
- Investable assets of $ 100 Mil – $ 150 Mil
- Investable assets of >$150 (g) Other

A4. Do you (your members) (your customers) invest in infrastructure assets or bonds? What flexibility do you have in your investment in infrastructure?

A5. How do you (your members) (your customers) choose your asset or bond categories in general? What flexibility do you have in your investment types?

A6.What timeframes/time horizons do you (your members) use to assess the performance of your/their investments? What flexibility do you have in investment timeframes?

- Short (<10 years)
- Medium (<20-30 years)
- Long term (>30 years)
- All, variety

A7. What type of indicators/criteria do you (your members) (or your customers) use to evaluate your investments?

- Relative returns (that is, returns compared with average returns)
- Returns compared with another threshold level
- Market data / indicators (e.g., growth prospects)
- Company information
- ESG
- Value
- Other
- All above

PART II

Questions on urban climate adaptation/resilience infrastructure investments

The questions here relate to investments which can be related to all climate investment (low carbon investment) and climate adaptation/resilience investment.

GENERAL SECTION (G)

- G1 What do you (your organisation) consider as climate mitigation/low carbon and climate adaption/resilience investment?
- G2. In general, what is your (your members) experience of investments related to both mitigation and climate adaptation /resilience?

BARRIERS

The next set of interview questions focuses on your view of the barriers and enablers to financing climate adaptation.

B1. What do you (your members) experience as the key obstacles holding you (or your customers) back from climate adaptation investment? What are the top 3 obstacles?

- Complex and long administration processes mainly due to market regulations
- Lack of a stable climate change policy frameworks and policy direction
- Policies are in favour of 'brown energy'
- Policies in favour of 'low carbon'
- Constraints on decision making within your companies
- Perceptions that returns for investments are too low and require high initial capital investment
- Requirement that projects need a certain credit rating so that it is possible to invest
- Technology-risk associated with uncertain technologies
- Disclosure on climate related risks and
- Integrating climate risk into financial decision-making
- Lack of standardized ESG-data for adaptation/resilience
- Limited projects with acceptable risk-return profiles
- Lack of liquidity in markets
- Lack of suitable financial vehicles/financial instruments
- High transaction costs and fees
- Lack of knowledge/technical advice on adaptation investment
- Attitudes of the public and resistance of society to investment
- Lack customer interest/demand
- Path-dependency or lock-in
- Lack of financial products
- Lack of advice
- Lack of strategic commitment (government or other)
- Difficulties measuring impacts
- Other

B2. What do you think are specific obstacles holding you (or your customers) back from investing in adaptation?

- Environmental risks
- Political consideration,
- Maladaptation risk
- Knowledge of climate risks/impacts/adaptation,
- Insurance
- Multi-party
- Project pipeline

- Track record
- Other

B3. What would need to be changed in your (your members) opinion so that climate adaptation/resilience investments become more attractive for investors?

- *Regulatory changes*
- *Changes to liability arrangements*
- *Changes to project size (larger or smaller*
- *Better advice*
- *Better impact measurement*
- *More disclosure*
- *Higher return*
- *More liquidity*
- *Other*

ENABLERS

- E1. Has your organisation (your members) undertaken a climate change risk assessment, climate stress testing, TCFD assessment or similar? What is the influence of TCFD? Name these processes/documents and briefly describe how the results are used in your company.
- E2. What is your company progress and influence of the EU Directive, Regulation and Taxonomy on sustainable finance (SFDR)?
- E3. Do you have sustainability screening criteria for investment? Does this include climate risk/resilience/adaptation criteria? If so what does this entail? Can you describe instances that this process has influenced investment decision(s)?

E4. What published strategies set out your company commitments/achievements in sustainable finance, net zero and climate adaptation? Please list.

Annex 7. FIE Survey results

Summary

- Volumes of finance typically supplied by a single FIE vary from under $1M by charity organisations, through under $100M by commercial banks to, in the case of institutional investors, above $150M. There is however a growing recognition that current overall flows of climate adaptation finance are insufficient to meet present demand by PA.
- Literacy and practice of climate mitigation finance is rising across FIE, yet relatively little attention is directed to climate adaptation finance. Incentivized by EU's Sustainable Finance Disclosure Regulation (SFDR), among other reasons, the supply of adaptation finance by FIE is gaining further attention though.
- In line with that, climate risks associated with investments are, primarily, analysed to estimate the climate resilience of invested assets. Exceptionally, some FIE seek the adoption of adaptation plans and measures to reduce climate risks if these are estimated too high.
- When it comes to directly financing adaptation projects, business models of those projects tend to be less clear than of mitigation ones. Relatedly, there is a critical need for monetizing (co-)benefits of climate adaptation projects to generate revenue streams (apart broad taxation that captures benefits of public goods).
- Furthermore, measuring the impact of financing is key to drive more capital towards climate adaptation. Yet, definition of climate adaptation is unclear to many FIE and that associated to the fact that green bonds and other financial instruments black-box what they finance, it is challenging to quantify the extent of adaptation finance.
- On top of the above, rising inflation and uncertainty in the macroeconomic environment, in relation to on-going wars, inhibits investment in new areas.

Banking results

- While all banks are providing debt financing, only about 40% are involved in equity financing.
- Most financing (about 60%) provided by the banks are worth $100M or less.
- Most banks provide debt financing for infrastructure-related enterprises.
- Assessment of performance of credit clients is typically based on a 20-30-year time horizon.
- ESG, relative returns, company information and market data are indicators to evaluate debt clients.
- When it comes to debt financing for climate adaptation, ESG indicators are used to account for impact of climate change on investments.
- Debt for nature-based solutions is perceived as potentially contributing to CCA.
- EU's Sustainable Finance Disclosure Regulation (SFDR) is driving the provision of debt services that can contribute to climate change (adaptation).
- Measuring the impact of debt financing is key to drive more capital towards sustainable finance.
- Definition of climate adaptation is unclear and that associated to the fact that green bonds and other financial instruments black-box what they finance, it is challenging to quantify the extent of adaptation finance.
- Most banks are focused on climate mitigation, while their awareness of climate adaptation is present. There is a general understanding of the emerging importance of climate adaptation.
- Top barriers (chart may be included):
    - Lack of knowledge/technical advice on adaptation investment
    - Lack of a stable climate policy frameworks and direction
    - Technology-risk associated with uncertain technologies
    - Perceptions that return for investments are too low and require high initial capital investment
    - Limited projects with acceptable risk-return profiles
- Top needs (chart may be included):
    - Regulatory changes
    - Better advice
    - Better impact measurement
    - More disclosure

Investor Results

- While investors invest in assets of varied value, assets worth above $150M are the most common.
- Portfolio design of institutional investors is limited by their fiduciary duty, among other aspects, including credit ratings and maturity of emerging markets. Central to investment decisions is risk-adjusted financial returns, in any case.
- Literacy and practice of climate mitigation investment is rising, yet little attention is directed to climate adaptation investment. Generally, there is a growing recognition that current levels of climate finance are insufficient to meet present needs.
- Regulation is perceived as a driver of climate investment, and it is expected that it will keep evolving rapidly in the coming years.

- Caisse des Dépôts Group has been rolling out an adaptation action plan with two components: (i) adaptation of it sown financial and operational activities, and; (ii) adaptation of French territories, under the Banque des Territoires brand.
- Top barriers (chart may be included):
    - Perceptions that returns for investments are too low and require high initial capital investment
    - Lack of financial products
    - Integrating climate risk into financial decision-making
    - Lack of knowledge/technical advice on adaptation investment
    - Lack of strategic commitment (government or other)
- Top needs (chart may be included):
    - Regulatory changes
    - Better impact measurement
    - More disclosure
    - More liquidity

Insurance Results

- Top barriers (chart may be included):
    - Lack of a stable climate change policy frameworks and policy direction
    - Lack of standardized ESG-data for adaptation/resilience
    - Complex and long administration processes mainly due to market regulations
    - Lack of liquidity in markets
    - Lack of financial products
- Top needs (chart may be included):
    - Regulatory changes
    - Changes to project size (larger or smaller)
    - Better impact measurement

Charities Results

- Invested assets value tends to be lower than $1M
- ESG along relative returns are the two indicators mostly used to evaluate investments
- Business model for adaptation projects is less clear than for mitigation projects. There is a critical need for monetizing benefits of climate adaptation projects in order to generate revenue streams (apart broad taxation that captures benefits of public goods).
- Mitigation is also prioritized and recognized as mutually exclusive with adaptation.
- Top barriers (chart may be included):
    - Lack of knowledge/technical advice on adaptation investment
    - Requirement that projects need a certain credit rating so that it is possible to invest
    - Technology-risk associated with uncertain technologies
    - Limited projects with acceptable risk-return profiles
- Top needs (chart may be included):
    - Regulatory changes
    - Changes to project size (larger or smaller)
    - Better impact measurement
    - Higher return

Other Results

- Rising inflation and uncertainty in the macroeconomic environment, in relation to on-going wars, inhibits investment in new areas.
- Climate risks associated with investments are, in some cases, analysed in the due diligence phase to estimate the climate resilience of invested assets (resilience assessment). Exceptionally, some seek the adoption of adaptation plans to reduce climate risks if these are estimated too high.
- Top barriers (chart may be included):
    - Complex and long administration processes mainly due to market regulations
    - Lack of a stable climate change policy frameworks and policy direction
    - Lack of standardized ESG-data for adaptation/resilience
    - Lack of suitable fi nancial vehicles/fi nancial instruments
    - Lack customer interest/demand
    - Difficulties measuring impacts
- Top needs (chart may be included):
    - Regulatory changes
    - Better impact measurement
    - Higher return
    - More liquidity

Miscellaneous Notes

- In 2023, CDP's global database contained 456 projects disclosed by 97 European cities, 31% (142 projects) focus primarily on adaptation/resilience. These are cumulatively worth US$ 8.2 billion and seeking US$ 63.3 million in investment. The largest sectors are Water Management (36%), Other (22%), and Public & Green spaces (15%). 70% of projects are seeking some amount of funding or financing. 17% are seeking full funding, while 54% are seeking partial or additional funding. None of the reported adaptation projects are seeking funding or financing exclusively from private sources. 59% are seeking funding or financing exclusively from public sources, while 9% report seeking funding or financing from a mix of private and public sources. Insights can be found in CDP's Global Infrastructure Snapshot.
- CDP's Cities at Risk report shows how CDP disclosing cities are engaging with climate risk.
- "There is little engagement between public and private sectors when it comes to shared risks and opportunities." (CDP)
- The most successful project at the moment is the Banque des Territories green fund (Fonds Vert). This is a fund dedicated to local authorities that can finance adaptation (public fund of around 2 billion euros).
- For private funds, CDC Biodiversité's Nature 2050 program, which enables the development of nature-based solution projects that can be supported by local authorities and financed by private investment via the Nature 2050 fund or sponsorship. The program calls for new projects in partnership with (private insurance) La Mafi's fund for the living.

Annex 8. FIE Interview script

Introduction

- Please notice that the term 'investment' includes debt investments (e.g., into bonds/ fixed-income securities) and equity/stock investment.
- Please refer to investment opportunities located in [insert country.]
- Green finance, sustainable and ESG finance are used interchangeable in the interview when referring to wider financing activities.

Definitions (from the CLIMATEFIT Glossary Nov 2023):

- **Climate finance**: The term climate finance is generally applied to the financial resources devoted to addressing climate change by all public and private actors from global to local scales. Climate finance aims to reduce net greenhouse gas emissions and/or to enhance adaptation and increase resilience to the impacts of current and projected climate change. Finance can come from private and public sources, channelled by various intermediaries, and is delivered by a range of instruments, including grants, concessional and non-concessional debt, and internal budget reallocations. [IPCC]
- **Climate adaptation**: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects. [IIGCC]**.**

PART I

Context Questions

Name. Position. E-mail address. Organisation. Country. Date consent given.

Please note we also ask you to complete and return the CLIMATEFIT Pre-interview Survey this set of questions on the type of investor and typical investments in order to better understand investment activity of the FIE in general and to allow us to categorise responses. Please note a small number of questions are repeated in this script.

PART II

Questions on climate adaptation/resilience investments

Clarifications:

The questions here can relate to investments related to all climate investment (low carbon investment) and also to climate adaptation/resilience investment

GENERAL SECTION (G)

This set of interview questions focuses on the FIE interviewee's perceptions of financing adaptation

- G1. What do you (your organisation) consider as climate adaptation/resilient investment?
- G2. In general, what is your experience of investment related to both low carbon and climate adaptation/resilience?
- What are your biggest challenges and opportunities in relation to adaptation finance?

EXPOSURE €

The next set of interview questions focuses on the FIE's climate change exposure in general and especially asset and infrastructure investments as well as supply chain exposure.

- E1 What climate hazards are important in your company? Please list and state why.
- E2. Has your organisation undertaken a climate change risk assessment, climate stress testing or Taskforce for Climate-Related Risk Disclosure (TCFD assessment?
- What is the influence on your company of TCFD and the EU Taxonomy and Sustainable Finance Disclosures Regulation (SFDR)?
- E4. Do you have sustainability screening criteria for investment? Does this include climate adaptation/risk/resilience criteria?

COMMITMENT (C)

The next set of interview questions focuses on the FIE's climate change policies/commitments in general and drills down into climate in general and then climate adaptation/resilience investments.

- C1, C2 &C3 Does your organisation have climate adaptation/resilience policies, plans, roadmaps and strategies?
- C4. What is the support for innovative sustainable/climate finance products?
- C6 &C7. Do you have the capacity, capability and resources etc. to progress climate adaptation finance?

MARKETS (M)

- M1. What motivates your company to partake in green/sustainable/climate investment and why?
- M2. What proportion (as an estimate) of your investment portfolio do you devote to sustainable/green investments and then investments related to climate adaptation/resilience? Do you have future targets?
- M3. What is your green bond activity and what proportion of this is allocated to climate adaptation/resilience/? What are your future green bond activity targets?
- M4 Have you considered/progressed other types of bonds (Climate bonds, Adaptation bonds, Social impact bonds, Sustainability performance bonds or other instruments)?
- M5 How important is concessional finance or securitised vehicles in progressing investment in adaptation?
- M6. How do you use sustainability disclosures such as PILLAR III, SFDR, PRI or CDP? What are your future aspirations with respect to these ratings?
- M7. What are your needs in terms of trust signalling, liquidity and track record for these investments?
- M8 & M9 How are you involved and what is your experience in co-investment, private public partnerships (PPPs) and blended finance in these areas?
- M10. Have you seen effective de-risking and or bundling of investment opportunities in these areas? What would you need to see?
- M13. What flexibility do you have in the commercials of an investment in this area: risk return, insurance, income streams, bankability, transaction size?

POLICY (P)

- P1. Are your disclosing on climate risk/adaptation? What does this entail?
- P2, P2 & P4 What the FIE's needs relating to climate policy, how does it affect the company's response to climate resilience or adaptation investment?

KNOWLEDGE (K)

- K1 & K2 How does your knowledge related to climate adaptation/resilience compare with your knowledge on other asset/debt classes? Is knowledge an issue?
- K3. Are there any best practice examples of climate adaptation/resilience investment opportunities you are aware of?

TECHNOLOGY (T)

- T1, T2 & T3. What are your issues in relation to knowledge and use of technology in relation to climate adaptation/resilience investment?

ADDITIONAL INFORMATION

- What are the further important considerations affecting your company's response to climate adaptation /resilience investment opportunities?
- Are there any questions in the Pre-interview survey that you would like to discuss further? Or additional information that related to our interview and research?

CLIMATEFIT One Stop Shop

Intro: One aim of the CLIMATEFIT project is to construct a knowledge platform which combines investor and government needs. As such we would like to talk about how an ideal knowledge platform could facilitate the financing of adaptation.

- OSS1. What knowledge platforms do you currently us in this area (sustainable finance, climate adaptation/resilience) and why? What do you like and dislike about these platforms?
- OSS2,3,4,5 & 6. Do they meet your needs? What do you need? How could existing platforms be improved?
- OSS7. Specifically, what information or functions would you require on the platform to aid you in making investment decisions related to climate adaptation?

CLOSING REMARKS

- Thank you for your participation, your input will be very valuable to our research.

- We can provide you will a draft summary of our findings in March 2024, and it would be great to get your further comments on what we have found.
- We will manage all your input according to how you or your company has indicated on the Consent Form, as a default all your input is anonymised, and your company allocated a code.
- Have you signed your consent form?
- Have you answered the survey?
- Do you have any questions of us and on CLIMATEFIT?
- We have asked on the survey form if you would like to stay involved n CLIMATEFIT. We hope you can get involved. Do we have your permission to add you to our database of FIE contacts? (This is stored securely, and the storage and access is managed according to GDPR rules).

Annex 9. Coded sample of the interview responses

Condition	Condition subcategories	Investor interviewee quotations
Exposure	Climate risk assessment/ Stress test	'We currently evaluate **the climate resilience of our target investments in terms of expected ability to perform under adverse climate conditions.** Such evaluations are performed analysing climate risks associated with each investment in the due diligence phase. If significant risks emerge, **an adaptation plan is proposed and related costs are evaluated**. This approach is particularly significant for greenfield projects, where we have started testing such assessments and adaptation studies. I would like to stress that we currently have no experience with pure climate adaptation finance (i.e. projects aimed at improving climate resilience of a territory/community), as we are only dealing with the resilience assessment of our target investments (which involve renewable projects, mobility infrastructure, and so on)'. (CHAM01_B)
	Climate risk screening	'And adaptation is not on the radar if you look at the screening point of view. It's risk, climate risk, physical risks and resilience. **It's climate risk that you are looking for**. But in some areas where the public are working too much oil and gas investments, that you do it because your customers don't want to have it in your portfolio'. (EU01_O) 'And I think any pension fund has to start looking at **a financial investment thesis of an investment**. Its our mandate. So, it has to be the primary driver because they have the fiduciary duty to do that. But once they have considered that, , then it's around the diversification benefits, perhaps the income generation opportunity from the investment inflation protection and then the alignment of that investment to their investment beliefs around ESG'. (LON10_II) ' [We are **not climate risk screening] in** [our country base], I'm afraid, but typically we would screen every project against a risk filter that considers all the major hazards with just data from an external provider. So completely all flood, river flooding, heat waves, mean temperature increases, droughts, water stress, storms, winds, cold etc.'.(ROM02_O). 'More broadly, adaptation is also being addressed within the Investment Department, with the **integration of adaptation into operational and financial decisions**, with the decision to focus initially on property and infrastructure. These discussions were initiated two years ago within the Investment Department. Adaptation criteria are currently being consolidated internally so that they can be included in the Group's ESG pre-investment grids'. (FR05_B) 'Yes we have sustainability **screening criteria for investment- including climate adaptation/risk/resilience criteria'**. (IT01_B) 'At this moment, we just try to see, for example, in sustainable property, how does this building contribute to reducing emissions or even sequestering emissions? That is now **evaluated in the credit proposal** itself. We want to go a step further there and quantify the impact of investments in building'. (BEL02_B) 'We have mostly worked with real estate. And I would say that that **90% of these real estate companies [assets of banks and pension funds] have done some sort of climate risk assessment** one way or the other and have formulated a strategy to cope with that and some are more advanced and dedicated. - like Fiesta is a good example.. They have done risk assessments, but they have also reserved budgets for adaptation measures and increasing the resilience of their assets. So, they've taken it a step further' (INS04). 'Yes, as far as I know, there are such policies as TCFD. There are strategies in our group. At least on the ESG strategy part, we receive a questionnaire for each deal we conclude in this regard, where we are asked to check everything, we consider that links the business profile and the model of the financed company to this area. We also have a report that the group issues regarding the green bonds that the bank issues to finance those green bonds or whatever they are called. There is also a **TCFD strategy** and an internal regulation, so to speak. There is the sustainability report that the bank presents every year as part of the annual report'. (ROM03_B) 'However, from a process perspective, we are a bit more equipped because, with the logic of climate risk management, we have developed **proprietary methodologies for assessing climate risks** that can impact our portfolio assets. We collaborated with [another] to determine the **potential impact of acute and chronic climate events on our assets** for different scenarios. This work was site-specific to examine how these events could specifically impact the economic variables of our assets, such as asset value and expected revenues. We are applying this methodology not only to the

		existing portfolio but also to new investments we evaluate. So, **we are conducting assessments of resilience and any necessary adaptation measures for all investments** (CHAM01_B). 'Another aspect that we are understanding and verifying also in our European projects is that often **the reduction of the insurance premium alone might not be such a strong incentive for carrying out adaptation investments, which are often very costly, in a context like the Italia**n one that does not tend to give all this value to insurance. So, one element we are reflecting on is that of triangulation with credit institutions that can support the financing of these measures, but for which I imagine that even today finance in the climate context is still linked to the mitigation side, therefore to projects that reduce emissions and make you stronger in the market by reducing transition risk'. (IT04_INS) 'The issue of **climate risks also enters through the sustainability risk framework according to SFDR**, which includes those sustainability factors or events that can have a materially financial effect on the value of investments. In particular, we have a policy for managing products for sustainable finance where these risks are taken into account, including physical risks measured through the exposure (location-based) of the turnover of the companies in which we invest to climate risks. We would like to develop policies with specific objectives on physical risks and transition risks at the corporate level, setting goals. We did not include this in the action plan, so our main need remains to have data. We start with data, mainly on the decarbonization trajectories of companies, so Scope 1, 2, 3 in absolute value and in GHG intensity, and from taxonomic alignment to then set these objectives.'. (IT01_AM ''There is there is certainly a trigger. There's a now a regulatory requirement, which is to run clarity in various climate scenarios **and attach a value of a risk value to to your overall portfolio.** And we are similar to many other organisations in that this is a new regulator, therefore, where we're figuring out how to do this and therefore we are engaging external, external experts and providers to help us be able to do that from . From the modelling perspective. So that is a way to get to bring it in from a regulatory perspective. Our intention then is also to once we have once we become much more comfortable with the outputs of that and what and how the and how things move and what the various providers are and therefore what the most, what the, what the key levers are. . It's then to be able to integrate that more closely into our own I guess strategic level decisions and also begin to challenge our investment managers of what they're doing as well. So it's, it's very much a work in progress, but for ourselves and the rest of the investment industry, we need to be able to do this by next summer' (LON09_II).
Industry Structure	Leadership and power	'Once someone can crack the **problem of how to develop a financial product that monetises the value creation potential**. . And then develops a stable revenue stream then then that, then that market will unlock and that will unlock innovation that may, you know, that may require some level of state innovation, you know, state to state and state intervention or support'.(LON11_AM) 'It's very focused, is more focused on transition than they are on the physical' (LON05_B). 'UPS Bank and in the Netherlands -they're a **very good example**. . Where their financing, not all of it, but you know, a good sort of 30% is actually the financing of the dikes in the Netherland'. (LON05_B)
	Commitment	'Well, for the local authority pension funds, I think the **action groups** have been a catalyst'. (LON10_II) 'Then the councils themselves declaring net zero policies, which they then look to the pension fund saying, we want you to be aligned with council policy. So, I think **that's what's driven the local authorities.** The corporate schemes are slightly different'. (LON10_II) 'So, there are you know, there's a very small proportion of very well-informed customers and who are willing to like to engage the vast majority of pension savers don't engage at all on anything. . So, there is there is a knowledge gap on, on the individual side as well'. (LON09_II) ' is still very, **very nascent because it has all been about immediate mitigation**. , it's just it's easier to see and invest in something that is mitigation versus adaptation slash resiliency. . The conversation around a just transition is beginning. . And that does lend itself much more to the resiliency side, the adaptation that in addition to, to, to mitigation. And so, there is still a gap, but I do see it closing as well. (LON09_II)
	Discourse and vision	'So, we've had a **few generations of climate adaptation finance tracking** and we work with the other multilateral development banks to align on how we'll be tracking it. We had at one point tracked the incremental volume of finance spent and at one point we considered that climate resilience outcomes associated with the spending and how significant they were and now we're in a bit of a hybrid space where we're looking at whether a project is focused on making an investment adapted so just

		mainstream the higher resilience standards, or if it's a more enabling investment where you're the dedicated activity is adaptation investment'. (ROM02_O)
	Networks and partnerships	'The UK has quite a **strong green investment network**. I mean, you know, if you look at companies like Impax and others, there are lots of sort of investor web. There are lots of investment firms that have emerged in recent years that have a sort of **very strong green focus**. The dominant market paradigm is still shareholder primacy-financial return promise. That causes the problems in the first place'. (LON04_AM) 'And of course, there's one which is something like a **global network of adaptation investors** or something and that. And then one on the public finance or sort of catalysing private finance there's a network and called **ARIK** which is an **adaptation/resilience investors coalition**. The big and public financial institutions that get together to talk about how to catalyse private finance for adaptation. I'm sure there must be [something] in the UK for that'. (LONA01) 'The third area is as a founder of NFS, which is the **Network on Greening Financial Institutions** and here we've done some work on **blended finance**. We produced a technical note [with others and MAS -the Monetary Authority of Singapore]. It covered: What is it? Why is it important? Why is it not being scaled sufficiently? Is there something in regulation that should be done about it? What can SIBs do? What can MDBs do? At the moment, it's more a multinational development bank focused, but we can use the experience of that - this initiative could lead to more climate adaptation and also lead into the working group on climate adaptation. It's been a very interesting exercise.'(REG0)1 ' 'Within the **Global Impact Investing Network**, we have noticed an increasing attention to the need for developing **taxonomies on adaptatio**n - discussions on this topic are starting to emerge'.(IT01_AM) 'Again, they're ready to go. They want to go. They want to invest now, the problem is, it's just not unified. It's **not standardised**. There's no impact networks. It's all the same thing. It's circular. So until that gets sorted, it's really hard to move private capital'.(LON05_B) ' 'We put out a paper on this problem [**aggregation]** it looked at supply and demand side aggregation, everything from, you know, a bond is essentially a way to aggregated smaller investors. . If you can't get a single investor for a project size but also things there's a network of Argentinean municipalities -called RAMSI, CMC. And they have a fund that each municipality pays into and they do joint procurements'. LON06_O)
	Coordination	'So the [our initiative] it's a network of all different types of stakeholders that are involved in climate finance. We have got four different constituencies that we link together, the suppliers of finance, which are public and private financial institutions, the enablers which are NGOs, government agencies or ministries that don't provide finance, but they provide technical assistance, research, information, the national governments that create the regulatory frameworks and the demands for finance, which are represented through city networks. And so our role is really as a **knowledge sharing and collaboration** venue, which we do through connecting members, having joint activities. And then as the Secretariat, we also do research on topics that are of interest to our members. So it's member driven, but we, we actually do produce not really primary research but synthesizing and taking information and putting it into a more accessible, actionable format for the members that are directly working with cities or project developers'. (LON06_O)
	Legislation and policies	''Depends on whether **regulation strengthens in the UK**, certainly everything seems uncertain in government at the moment. If you look at, for example, the new environmental regulations that are due to be coming in and the biodiversity side which has strong links to adaptation - that will push firms to invest more in environmental protection'. (LONA01) ''That is also the direction of travel from **customers as well as regulators**. Let's get in front of it as opposed to getting steamrolled. So there's a whole that there's many different influences, customer outcomes being primary, but there's also regulatory direction and customer demand, which all feeds into providing a value for that customer based on what their with their pension investment. So it's a whole lot of things that are mixed together (LOM09_II). ''We've talked about potential regulatory changes to allow investment into the illiquid. There is also the relaxation within that would be the relaxation or of what is what is meant by fiduciary duty or what people understand to be fiduciary duty is to incorporate other what might be seen as non-financial elements, but ultimately they are financial. If you extend the time horizon sufficiently. So here is that element and project sizes or the likes of an asset owner. , we need scale. And on that side we're talking you typically tens of millions of dollars if not hundred. f it's an institutional investor looking for a financial return in an adaptation project. None of these really

		apply. So for me, It's how are those how are you going to get a **cash flow from an adaptation investment**? And this is where governments can use investment in a very different way than a financial institution would use investment. And yes, there will be social returns. But that doesn't help me to provide a pension return for our customers. So it's that **cash flow** - where's it going to come from? From. And it's purely adaptation. And again, that's going to depend on what that adaptation measure is. If it's invert, you know, if it's investing in a company that is providing services to develop adaptation, well, then we can invest in that company because we can get the financial returns from that because that's where the cash flows will be coming from'. (LON09_II) 'Would it be fair to say you could go through the **mechanisms that are being applied to for carbon** that and they're basically to **incentivise this and look at the disincentives** and you could almost find a mirror of that or a similar thing that would need to happen in adaptation. So it's the building standards, building regulations. So what are some of the policy things that you've seen as being effective for carbon?'(LON12_O) 'I think **stable climate policy** is the most important thing. Adaptation policy - I don't know whether it really helps, because I think you can work out how you're going to adapt once you understand what the long-term policy is.. I'm just talking from my own understanding -stability is the most important thing. Because if you're looking to invest or you're looking to insure or whatever, you need to know that you've got a long term, **Things are chopping and changing all the time**. It becomes very difficult for any organisation to make any kind of move on that piece. So if you know everything's net zero in 2030, does it make sense? Probably not. But it gives stability because you've got a target to aim. If that target suddenly moves five years forward or five years back, it becomes very challenging for any organisation to react because your investment suddenly becomes worthless - difficult stuff. (INS01) 'Question is **how big is the challenge and what is the link to the state investment banks core tasks in terms of financial stability**. And this links to also the stress testing work that we've been involved in and working with financial entities in the Netherlands. We need further research and new analysis,- for the first time we will use different adaptation pathways. This would be a first for us - different adaptation pathways using new analysis on floods and its impact on financial stability in the Netherlands'. (REG01) *it's **the asset managers** who are talking about this stuff. So people like in size investment and they're the one who spoke recently, but there are others as well. Federated Hermes - they've talked about it. So the asset managers are just starting to talk about kind of sustainable stability. But for the **pension funds, it's a fairly new topic**. And interestingly, attendance at the discussions on this topic is probably lower than engagement on broader strategic decisions, **The IGC's resilience and adaptation framework** discussion is of huge interest because they all are thinking, how do we go about taking this into account. What's that mean for our investments'. (LON01_B) 'I have a **really hard time seeing how you get any kind of significant private investment in adaptation** without using blended finance. I can see where you can use public money to de-risk things and structure them in a way. Makes it interesting for certain types of private investors. Like barring some really innovative. **What are models to capture value from avoided losses**.? Then you have. Investment from. like large companies where they see it as like a broader stability of having an area of play operating in an area that's resilient- it is going to benefit their business. like Coca-Cola has made investments in water security. That don't necessarily directly impact their factory operations. But there's a very clear interest for them to operate in areas with secure water supplies. So like in those cases I think you could see it, but. **In general, I think adaptation is largely a public good.** And so there's going to need to be a role for public finance to support those investments. And you can hopefully leverage public money to draw in some private money so that you can have a have more impact given the public resources that are available'.(LON06_O) 'So that as you have **regional governments**, they actually have a as a **unified or a standardised procurement**. Yes. As that starts to get financed into the public markets where we get institutional investors along. And if we have the impact metrics and the whole thing aligned and it's going to be much easier to convert this into something that is sellable and comparable'. (LON05_B)
	Regime change	'There are discussions about that **changing the financial regulation side [of infrastructure investment],** that prevent companies from taking on these sort of longer-term risks that were associated with adaptation'. (LON_A01) 'I think there genuinely is the realisation that this **issue of physical climate change, if not quite existential**, it's not too far away from it [….] You actually realise you cannot

		do business in cities if you know a good chunk of your customers assets and yours are kind of floating down the streets in a flood or, you can't go to work because it's too hot. […] I'm realising is it even altruism or is it **performing self-interest**? The issue needs to be addressed for us to have healthy economies and healthy cities'. (LON13_O)
	Regulatory framework stability	'I think **regulation** is part of it. […] You can make sure that there's information out there, you can make it easy to get risk information, you can provide information on how to build resilient buildings, you can require like risk disclosure labelling, but the strongest thing you could do is you have **building codes** that make it mandatory to do certain things. […] That's the way to get a systemic shift'. (LON06_O)
	Risk/ Return	'Like if you think about its i**nefficient to issue a bond and for a UK local authority because they can access loans and cheap finance much more cheaply** than exposing themselves to a private market where the risk will be properly priced. And so, it isn't efficient to try and introduce bond financing into the UK. I mean, this whole thing because of the structure that's already there'. (LON_10_II) ' 'I think a lot of these are probably more relevant outside of the UK actually, there are specific things that I hear around and financial regulation in the UK and how that **disincentivises investment in adaptation**. So particularly from insurance companies. […] because of the nature of their assets and liabilities. And if you're looking at an **infrastructure in the UK and the complex and long [infrastructure] administration processes**, I think it will be a really big one'. (LON_A01) 'Because this is the public sector […] in order for companies to be implementing it has to go through their investment committees. In order to do that, you need a set of financial terms that meet financial return hurdles. **It's not financial regulation, it's broader policy to incentivise companies to make these investments and ensure that there's an adequate return**'. (LON04_AM) 'And I mean not many people talk about changes to the foreign financial regulations would have any impact. I can't see how it can. I mean, really, because **this is a public sector.** […] So in order for companies to be implementing it has to go through their **investment committees**. In order to do that, you need a set of financial terms that meet financial return hurdles. And so that's how I guess **it's not financial regulation that wanted, it's broader policy to incentivize companies to make these investments and ensure that there's an adequate return** for them to do that. I don't think it's financial regulation that changes that'. (LON04_AM) 'For our business model, we have **little flexibility; we need to generate risk-adjusted returns**. Therefore, it is precisely from this perspective that the framework we are developing for evaluating investments in adaptation is focused on the dimension of financial materiality. It is important for us to understand the risk that a company may have to suspend production in the face of drought or that the company's suppliers may fail to deliver essential production inputs, leading to production suspension' .(IT01_AM). 'I think it's important. And again, we have talked about it. And you can make a green bond where, nine or in 7 or 8 or 9 or 10 assets. They are the pure vanilla, in mitigation. And then you can put it into, into that, you can put some adaptation projects. I think there are native and you can also get a portfolio of real estate where, where e, some of it is pure vanilla. I mean, there's no risk- climate risk at all. And then you have 1 or 2, buildings where you have to do some, some adaptation, but then again, if you do it, you expect to have higher returns and **you put it into the whole portfolio and then in that way you de-risk** or at least the risk becomes very much smaller. A lot of a large volume. So the financial sector is used to this way to operate.' (EUR01_O) 'I think the elements of climate adaptation are much more internally than externally. **It's harder, I think, to put targets on climate adaptation** yet. But we are adjusting, for instance, our credit policy. If you look at the risk part of our external reporting, you will find some actions to cope with climate adaptation. For instance, we have adjusted our flood maps for financing and insuring real estate because the real estate which is still built in zones which are at higher risk of being flooded, will have difficulties to get insured. It's in the risk domain, in the risk policies, that we see the most direct impact of climate adaptation. Something in terms of target setting**, it's harder to quantify**. (BEL01_B) 'Giving a possibility to do a certain volume and lending at reduced return and higher risk appetite, that's an important point, I think. Also, providing resources like people working on this. We have a working group that works across all branches. We call that an impact hub. There's also an impact board that supports the impact hub. Within the organisation, we feed up work time and resources. Those are the most important

		things we're doing now. If you have interesting **new business models**, we can present them, we can discuss them. There's plenty of room to to do that' (BEL02_B). 'Track record means that there are a lot of examples, and you know what the return on that has been, and that it's been secured, it's been as predicted. Respondent: It's really important. Especially as a bank in the lending activity, investment is something different, you have a different risk appetite with higher returns, but on lending activity, you're looking for certainty. **Reliable business models with a good track record are essential**. That's what is making this difficult at this moment. I think they don't exist. We don't have examples'.(BEL02_B) 'Speaking of investments for adaptation, the challenge is how to **reconcile the need to ensure constant and stable returns for our shareholders and partners over time with assets that are subject to a climate** that will evidently not be the same in the next 5-10 years and beyond. Therefore, the approach we have adopted, even with a certain meticulousness, is a quantitative one. The goal is to incorporate this approach into the financial models we use to create our business plans and stress test them to understand if investments remain viable even under significant climate stress conditions. Our de-risking logic is implemented in this way: we estimate the worst-case scenario, with all the limitations of this approach since the methodologies are not standardized at the moment'..(ITCHAM01_B) 'At the moment, **analysing the return on investment and identifying these investment opportunities is a bit challenging'** (IT04_INS). 'So I think I mean, I always come back to the spectrum of capital and saying, you know, at the far end you've got philanthropy or government intervention funded projects. Yeah, I think private capital has a role right up to the impact investment where you're not, but you're still earning market rate risk adjusted returns'. (LON10_II) 'What how do you value what is adaptation value at risk, you know, given a national footprint. one element is on a national macro level, providing a framework which is allows people to quantify and prioritize. You know, and again, it will involve sometimes trying to put a number or some kind of ranking on to social factors or other factors which aren't always readily more measurable. But you still have to do that. It is a tool and a mechanism which is necessary to do that assessment or the economy wide countrywide level. But then there's something which comes down to see, look at an individual asset level. How do you measure the returns to, you know, to the risk to that particular asset given the way in which physical climate change may happen, therefore required me kind of adaptation mechanism? if you're building a dam, you know, how do you put in the extra degree of kind of concrete because it's going to be more flooding and higher water pressure, you know, our sewage system, etc., etc.. And the need and this is where the sensitive finance have to come together, quite perform very important rooms. And **it's built in the knowledge building the frameworks, building the common language, building common standard building and disclosure standards around that.** Which are really, really important but have been missing, you know'(LON13_O).
Market/ Finance	Adaptation financing	'So, on a project basis, **74 projects had an adaptation component within them**, which is about six, **15 16% of all the projects**. In terms of the finance allocated though, it's a much smaller percentage as there's a positive way, I suppose maybe they're cost-effective mainstream investments, I think it's somewhere between 4 and 5% last year, but it varies quite widely, If we get a big infrastructure investment in adaptation'. (ROM02_M) 'In 2023**, 70% of thematic investments were in climate and nature-related themes,** which is a significant portion. This 70% is classified into macro-categories, including energy efficiency linked to mitigation, as well as sustainable mobility. There is also a part related to sustainable forest management, which could be more attributable to adaptation. Another category that could be linked to adaptation is investments in the water network system'. (IT04_INS) 'I would say adaptation is gaining both **awareness and also track record**. Most of the project are focused quite a lot on mitigation, so this would be an aspect, but it also depends on a case by case of the investment projects that we do and if adaptation is suitable or not at that stage and also on the public space. Romania is taking steps to improve the adaptation strategy. I think at national level work is being done on the adaptation strategy of the country. I think we do play a very important role in creating markets in general. I'm not just talking about adaptation, but most of the projects that we support are, you know, either first of its kind in the region or the country, in order to be financed, we have to identify very **strong transition impact and additionality angle**, whether **it's financial additionality or non-financial additionality**. It to be complementary to what the other financial institutions are doing in the market and the projects that we support have a demonstration effect or they are kickstarting markets and encouraging potential market players too to invest in this kind of … so there is **a role there for IFIs to play definitely and also maybe to bring in**

		showcasing how private sector can play a role in in this space. Nothing that was directly targeting related. I believe there was a water infrastructure project that had efficiency measures that could enhance resilience through water savings, I'm thinking because we have this **Green Cities program, which is a regional financing framework**, about €5 billion where we provide financing to cities, but we also support them with technical assistance and capacity building to look into Green City action plans. And we also work with five or six cities here in Romania. And part of this exercise, cities are working with consultants to help them identify the priorities in terms of policies, but also investment opportunities and this includes, among other things, also the climate adaptation angle. So, I think going forward through these Green City action plans that will be opportunities identified' ' (ROM02_B) 'You have one to say we're going to do it [adaptation], but it needs to be everyone, because otherwise it just gets stuck. So you know we can say we're going to do this and we can do it -we may be a very large company, but it's still tiny compared to the rest of the world. Everyone has to do it. Or at **least 50% or 60% of entities have to come in and say, right, we're going to do all this [adaptation]** , this is the direction we're going. But at the moment it's just there's not mandated. I guess they think they just don't need it. They have the investment, they have cash. It's up to government to do it and they don't'. (INS03) 'It seems to be very lagging behind in Europe and also in the US. It's like most of these products in the US are for protecting businesses if there's a cyclone and it affects their assets. It damages something - the view is for the protecting against the economic activity, the challenges this, in setting the insurance field in this. It's much bigger in the developing world where insurance is less about covering assets but more about protecting economic activity. And then you get these **big programs where governments realise that if there's a big weather disaster problem and it's going to affect the whole country -the economic activity of that countr**y. There's a program in Mexico where they buy insurance against tropical cyclone and earthquake. Similar programs exist in the Caribbean - big programs. But in the Western world it's less important. There might be an instrument that the government buys, for example in the UK there's something called FloodRe where the government have set up like a reinsurance pool. I think there would be similar ones in Europe, but that's it. There's nothing really. But as I always say, the challenge is it's not very politically viable to do a lot of this stuff because if a government buys an insurance policy and it doesn't pay out in that term, then they haven't done anything, and they've lost out. But if it does pay out a lot of money and they could use that money to do something else. Or if a government invests in resilience measures for the next ten years, it's expensive and there's not much motivation to do that kind of stuff'. (INS01) 'I believe there was a **water infrastructure project** that had efficiency measures that could enhance resilience through water savings, but I think that was it.: I'm thinking because we have this **Green Cities program**, which is a regional financing framework, about €5 billion where we provide financing to cities, but we also support them with technical assistance and capacity building to look into Green City action plans. And we also work with I believe five or six cities here in Romania. [....] and this includes, among other things, also the climate adaptation angle. So, I think going forward through these Green City action plans that will be opportunities'. (ROM02_B) 'I think we do play a very important role **in creating markets** in general. I'm not just talking about adaptation, but most of the projects that we support are, you know, either first of its kind in the region or the country, in order to be financed, we have to identify very strong transition impact and additionality angle, whether it's financial additionality or non-financial additionality'. (ROM02_B) 'For the moment, only the offer for the adaptation of coastal and overseas territories has been published, while the offer for cities should arrive in 2024. The adaptation strategy will therefore be closely monitored. Adaptation is a strategic priority.. Work is underway to consider organising a "public adaptation service" for public and private players, following the recommendations of I4CE' [work in France].(FR04_B) 'Many of our projects meet climate change adaptation criteria. ..... The aim of our program is to finance several **nature-based solutions in France through private finance.** They are looking for local projects with biodiversity and climate adaptation criteria in France which can benefit local populations using [.....] we have a **list of their criteria to select a good project** We believe that our program meets the criteria for adaptation to climate change. It basically helps to give private money to projects with huge advantage on nature and biodiversity. These projects can be good solutions to strengthen adaptation strategies. It is not an investment project but it's sponsorship from private funds. This is particularly the case for projects in flood-prone areas, or the fight against urban heat islands'. (FR01_O)

		'Being an analyst team, we look at data, which requires basic skills in data processing, inevitably leading us to reason through somewhat technical language. So, we have various data providers and try to obtain **adaptation data** from them, such as the assessment of the **portion of companies' revenue derived from areas with high water or drought risk,** and so on. These are quantitative data that we obtain from external providers'. (IT01_B) . 'Defining specific investment areas on the topic of adaptation is difficult because until now, adaptation has been interpreted as everything related to Nature-Based Solutions, which was studied during the Derris project. This will increasingly intersect with analysing nature-related risks and opportunities. Adaptation, therefore, includes both issues related to climate change and those related to nature. (IT04_B) 'Between 2015 and 2018, we coordinated a [project] on the theme of adaptation with the aim of helping Italian SMEs adapt to climate change. One element of the project was to identify innovative financial mechanisms to finance adaptation since it was a public-private partnership project. However, we struggled to identify financing mechanisms for adaptation. Additionally, after Derris ended, we initiated an ongoing project on adaptation called 'LIFE Ada'.'. (IT04_B) 'Some sectors that are **closer to the adaptation theme, such as the water sector**, are quite critical. [.....] We have explored the desalination plant sector, which is one of the technologies that, although the energy efficiency needs to be understood, can aid in adaptation, especially in contexts with high water stress. However, there is also an issue with private access. Other types of investments are not on our radar; [....] In this sector, concessionary approaches are not visible at the moment. So, while we are generally open to these types of investments, we **do not currently see significant opportunities**. The reason we participated in this project is also to understand if there is something we might be missing and if new perspectives can open up' (CHAM01_B). 'It's a difficult one because often you're in the **grey zone of adaptation and mitigation**. We have a clear focus on mitigation and not on adaptation because we say the carbon budget, there's no room left, so you have to tackle the carbon emissions first and that's really important. We still believe that 1.5 degrees or two degrees are still achievable if you act now. [....] Nature-based solutions are a priority. We're not going to technological solutions at this moment. We try to do it the natural way. What we already did is **financing some peatlands or wetlands** in Scandinavia. In the UK, we financed some estates and their proceeds come from carbon certificates'. (BEL02_B) 'We also have the a '**Regenerative Money Centre'**. It's a kind of a playground we have within. It's a separate entity where we can do some more experimental financing. It is small. We there look into what we can do with nature-based solutions. We also have a limited budget specifically for nature-based solutions, which **we then can finance with a bigger risk appetite and a lower return on equity** than we would normally have. Those nature-based solutions are still in a discovery phase.[....] It is easier to find projects in, for example, the UK than in Belgium because of the lack of forests in in Belgium. We see that our UK colleagues have done some projects in nature-based solutions'. (BEL02_B) 'Maybe I know. I think from a political perspective, it's easier to **give money away [to a nature investment] as subsidy** than to be a structural shareholder of a certain company or investment vehicle. If you give it away, ok, it's all gone. If you're a structural shareholder also in terms of your engagement over the longer periods, it is something you're more committed to. It's not embedded in a political governance anyway. It's also because it's never been done. The administration is not adapted to that. The decision bodies are not adapted to that because deciding on granting a subsidy is something totally different than deciding on taking an equity participation in an entity where you end up being a shareholder of, and where you have to manage your portfolio of entities where you have shareholders, because there **is no portfolio management available in government department**s, so they cannot cope with it I guess'. (BEL01_B) 'Sort of a split because between bonds and equities, equities, it's names like companies like Advance Greenwich in the US and they do stormwater management, the **leading stormwater management company in the United States. They play an important role in terms of adaptation for local governments.** So that's an example. , very rare example I would say in adaptation on the equity side is as it is because it's very project specific and tends to be government funded. So you'll have less equity opportunities. That's where **bond investing** can come along. You see it in the meetings with the municipal market in the United States. You see it in the green bond markets in Europe, a little bit - in sovereigns and for some sovereign carbons in your bank and so forth'. (LON04_AM)

		'I would say, definitely **awareness is strong.** Why don't do it is renewables is kind of our core business, [**adaptation] not core focus and you know, some strong opportunities in some other areas** - such as waste management. We are involving ourselves in a number of new emerging market sectors that are associated with climate finance' . (LON11_AM) '**Not [really investing in adaptation] as part of the Green Investment Group** business. We have to look at the resilience characteristics of the investments. As I we said its one of the things that we're currently looking at is a nature-based solutions'. (LON11_AM) '**It's far from and it's significantly below where it needs to be**. Because people have taken a binary approach thinking that it's mitigation or adaptation and mitigation should be prioritised. Therefore, it is a shortage of the amount of money that should be grown into it, you know, significant shortage of money'. (LON13_O) '**And a lot of the actions that need to be taken** is about helping us understand that you know, on a national level, what are the valuations? What how do you value, **what is adaptation value at risk**, given a national footprint. One element is on a national macro level, providing a framework which is allows people to quantify and prioritise. il will involve trying to put a number or kind of ranking on to social factors or other factors which aren't always readily measurable. But you still have to do that. It is a tool and a mechanism which is necessary to do that assessment or the economy wide countrywide level. But then it comes down an individual asset level. **How do you measure the returns to, you know, to the risk to that particular asset given the way in which physical climate change may happen**, therefore require some kind of adaptation mechanism? if you're building a dam - how do you put in the extra strength concrete because it's going to be more flooding and higher water pressure, etc'. (LON11_O) 'In 2023, **70% of thematic investments were in climate and nature-related themes**, which is a significant portion. This 70% is classified into macro-categories, including energy efficiency linked to mitigation, as well as sustainable mobility. There is also a part related to sustainable forest management, which could be more attributable to adaptation. Another category that could be linked to adaptation is investments in the water network system.(IT04_INS) 'It's the **asset managers who are talking about this stuff**. So people like in asset investment and they're the one who spoke recently, but there are others like Federated Hermes, They've talked about it. So the asset managers are just starting to talk about kind of sustainable stability. But for the pension funds, it's a fairly new topic. And interestingly, attendance at the discussions on this topic is probably lower than engagement on broader strategic decisions, The **IGC resilience and adaptation framework** discussion is of huge interest because they all are thinking, how **do we go about taking this into account**. They've not yet got to the point of saying Right. What's that mean for our investments'. (LON10_II) '**We definitely finance those things if they're invested by others**. We do not invest ourselves in that. There you see some example of some financial institutions, to name one, Ethias in Belgium, who is investing itself in a **natural park to absorb water and to support the natural development of nature in a certain area**. They do it as an **investment in nature**. That is something we do not do, not from our banking perspective, not **from our insurance perspective**. We're not investing in nature as such. But we are financing those who invest in it. But of course, it's a loan, it needs to be repaid. It's not an investment as such. Everything that is happening in the market inspires others to do the same if it makes sense. If there is a real market for it, especially if you go into bigger size projects, it's also from a liquidity perspective and a market perspective, good that there is more of that in the market. Then you can also trade on this debt and have syndicated structures where multiple banks are involved, or multiple financial parties, because then it could also be taken on by, for instance, insurance companies pension funds or other capital available in the market, both from a lending and from an investment perspective.'. (BEL01_B) 'It's a difficult one because often you're in the grey zone of adaptation and mitigation. We have a clear focus on mitigation and not on adaptation because we say the carbon budget. not easy determine. Nature-based solutions are a priority. We're not going to technological solutions at this moment. We try to do it the natural way. What we already did is financing some peatlands or wetlands in Scandinavia. In the UK, we financed some estates and their proceeds come from carbon certificates'. (BEL02_B) 'We also have the a [Centre**]. It's a kind of a playground we have within our company**. It's a separate entity where we can do some more experimental financing. It is small. We there look into what we can do with nature-based solutions. We also have a limited budget specifically for nature-based solutions, which we then can

		finance with a bigger risk appetite and a lower return on equity than we would normally have. Those nature-based solutions are still in a discovery phase. We are still looking at what can we do there. is active in five countries and we see that it is easier to find projects in, for example, the UK than in Belgium because of the lack of forests in in Belgium. We see that our UK colleagues have done some projects in nature-based solutions.' There's a lot of knowledge, but we do see that there's a gap between the knowledge that is there and people in the field that must deal with the projects with the clients. That's a big challenge', (BEL02_B. 'Eco passages have been created. Entire sections of nature reserve have been recreated. A reed swamp has been created. There are cycle paths that run everywhere along and under the motorway in an ecologically responsible manner. There are water features. You then have to look at the whole thing, and even though construction has had a heavy impact, you should be able to conclude after a number of years that it has been mitigated; that it serves the function it is supposed to do, and that a lot of supporting measures have also been taken that try to largely mitigate the other disadvantages or perhaps even lead to improvements'. (BEL03_B 'They are two different things we do. The first thing you started with is that we give loans ourselves, that happens. We usually invest in capital, but we may also provide a shareholder loan in addition to that capital. There are a few projects, but they are a small minority that we only provide loans to. Second, how do we finance ourselves? That is our **Sustainable finance framework** – it serves this purpose and is intended to enable us to issue financial instruments ourselves to attract money that we can then invest back in our portfolio. That framework is intended to do this in various forms, such as raising debt financing, which could be a public issue of a bond, which could be a more private bond, which could be a bank loan. The framework is also checked by an independent party, has been created within which this issue can take place. That's one of our branches. [….] When it comes to truly fundamental adjustments to the public space in the context of climate adaptation, you have to look at the government, private parties are not the driving force for that. Yes at the moment, but if financial models emerge tomorrow, we may well look into that. But today there are no financial models, at least not aimed at creating the forest or something like that. But that may come. **If the government also develops models for this, that is certainly something we could look at**.'. (BEL03_B) '**Some sectors that are closer to the adaptation theme, such as the water sector**, are quite critical. The water sector is quite peculiar in Italy, with a referendum determining that private entities can enter but in reality they cannot enter. There are territorial entities responsible for managing the integrated water service, creating a regulatory challenge for a private operator like us trying to invest in it. We have explored the desalination plant sector, which is one of the technologies that, although the energy efficiency needs to be understood, can aid in adaptation, especially in contexts with high water stress. However, there is also an issue with private access. **Other types of investments are not on our radar**; we are aware of the needs for hydrogeological protection in the Italian territory, but this falls under the category of so-called "cold infrastructure," typically carried out by the public sector with public resources and extremely sparse maintenance over time. In this sector, **concessionary approaches** are not visible at the moment. So, while we are generally open to these types of investments, we do not currently see significant opportunities. The reason we participated in this project is also to understand if there is something we might be missing and if new perspectives can open up in this regard'. (CHAM01_B) 'There's the big thanks to **Glasgow Climate Hub -** they've done a lot. They have done more projects which are much more science based, resilience-based adaptation than necessarily solely for mitigation. [….] So there is a mitigation first and emphasis there, but also on the understanding that there's just a lot of other co-benefits too.. So it does seem to be that **the bank is willing to do this with and with local government** and […] it needs to happen and the bank will almost take a break, even type return as opposed to a. (LON09_II)
	Income stream	'And I think any pension fund has to start looking at a financial investment thesis of an investment. Or mandate. So that has to be the primary driver because they have the fiduciary duty to do that. But once they have considered that, , then it's around the **diversification benefits**, perhaps the **income generation opportunity** from the investment inflation protection and then the **alignment of that investment to their investment beliefs around ESG**'. (LON_10_II)
	Liability	'We are generally/typically **quite hesitant to push the boundaries on that side**. And being rather **risk averse** as well. If it goes against us, then that's a huge potentially a huge **liability**'. (LON09_II)
	Project bankability	'But I think the like the overarching one is **there's a mismatch and a lack of capacity on the project developer side [public authority]** to speak the language of investors. And then there are very few investors that are willing to try to figure out the language of the cities are speaking and are able to get to where the cities are'. (LON06_O)

		'An institutional investor looking for a financial return in an adaptation project. None of these really apply. How are you going to get a cash flow from an effort, from an adaptation investment? And **this is where governments can use investment** in a very different way than a financial institution would use investment'. (LON09_II) 'So, there is a mitigation first and emphasis **[a mitigation bias],** but also on the understanding that there's just a lot of other **co-benefits too'**. (LON09_II)
	Fund/finance availability	'Generally, **there isn't enough investment**. You know, **the gap is huge for adaptation'**. (LON09_II)
	Project pipeline	'I think you do the latter things like just **how do you even start, you know, what is that public pipeline? The ticket size is it can be too small'** .(LON_A01) 'I think **from the investor perspective, the project pipeline, there's just not a lot of investable projects**. There's lots of things cities want to do, but not that they have structured in a way that you can invest in it. I think adaptation is probably a VAT problem, but even worse. Where we see it's a fraction of the overall climate investments. And **the business model for adaptation projects is much less clear, much less developed**. Where there's a clear business model, you know, it can be financially sustainable, you can get returns, there are permitting, citing supply chain. There's still roadblocks for sure, but nobody's trying to figure out how do you make a market. But the same is not true for nature-based storm water projects or urban heat resilience, where there are very clear benefits. They can be monetised but how you link that to a revenue stream apart from broad based taxation that captures widespread social goods, which is something that in cities we know works but that it's either for regulatory reasons or capacity reasons, a lot of cities are unable to do it'. (LON06_O). 'I think from the investor perspective, **the project pipeline, there's just not a lot of investable project.. , there's lots of things cities want to do, but not that they have structured in a way that you can invest in i**t'. (LON06_O) 'Well, now that we're becoming increasingly interdependent, , **we're starting to see a lot more enlightening, positive conversations bringing people together. But where is that point at which UK infrastructure aligns its pipeline** and, you know, does it in a sensible way that, you know, because all you hear about is, oh, we've got this massive pipeline, we don't have enough people to deliver it. You know, the next day say, oh, governments going to call the pipeline back, you know, it's like where what are we actually doing? What are we going to focus on and how do we bring'. (LONA01) 'Yes it is. We, we put out a paper on this problem **[aggregation**] …….. we looked at supply and demand side of aggregation, everything from, a bond which is essentially a way to aggregated smaller investors. If you can't get a single investor for a project of size but also things there's a network of Argentinean municipalities- they have a fund that each municipality pays into and they do joint procurement'.(LON06_O) 'And they will, they will lose opportunities because you have to remember, there's so much going on in innovation right now. We've got all these projects that I can't talk about, but those things they're happening in private markets. There's still many **pension funds that are quite old fashioned.** They focus on unlisted markets, but the growth companies don't list as quickly anymore. Changes to project size, smaller ones would for us it doesn't matter because we tend to go with the larger schemes, but we have one of our own aligning climate so we get a smaller property, local affordable housing deal for them, not for the whole pool, but for them a bespoke deal which was smaller, that they could do without having to. Well, often adaptation projects involve **multiple parties**, so, you know, they might involve property owners, individual residents, the several municipalities, the road authority. And then you've got the investors, if they're coming in to the. So it tends to be multiple party'.(LON08_II). 'I think **it's bundling**. Because you can't pull out those figures without a massive, big project and it is **also part of perceptions and, and biases and positioning**. There was a really good piece actually on the Danish news last night about Danske Bank, and they were basically really criticizing them for a very small portion of the whole bank's business is green. That's the first time I've seen that'. (LON05_B). 'How do you value, how do you identify [..] what are those **critical pieces of national infrastructure that may be more vulnerable to physical climate change** and therefore most need of adaptation finance to make them resilient, This is why enabling frameworks is very important. One of the things is to really understand the inherent risk. Every project that is cash flows. And then seek to get a return in excess of the cost of capital'. (LON13_O)

		'I wouldn't rely too much on private capital for adaptation, at the end of the day, these are adaptation project that don't really produce an output. They don't produce return. I mean they may. reduce the cost after an extreme weather event, but we don't know when that's going to happen. I wouldn't rely too much on private capital to fund adaptation projects because at the end of the day, these are projects that impact the public. I mean, I would say most of the time they don't produce much, but they prevent risk. That is not visible immediately, so I would say that's the **role of the of public actors,- local authorities, but also national authorities to promote**. I think that's a common theme around climate change that governments are not doing enough.' (LON07_B). 'Well it's always going to be a **multi-party solution** and that's perhaps not how we're set up to solve problems or set up for this group to solve these problems.. Well, now that we're becoming increasingly interdependent, we're **starting to see a lot more enlightening, positive conversations bringing people together**. But where is that point at which **UK infrastructure aligns its pipeline and, does it in a sensible [resilient]** way. All you hear about is, oh, we've got this massive pipeline, we don't have enough people to deliver it. And the next day the government's going to call the pipeline back- what are we actually doing? What are we going to focus on and how do we bring that connectivity across multi parties to get some of this done right?' (LON11_AM) **'I think it's important. And you can make a green bond were, nine or in 7 or 8 or 9 or 10 assets.** They are the pure vanilla, in mitigation. And then you can put it into that, you can put some application projects. I think there are native, and you can also get a portfolio of real estate where, where some of it is pure vanilla. I mean, where there's no climate risk at all. And then you have 1 or 2, buildings where you have to do some, some adaptation, but then again, if you do it, you expect to have higher returns and you put it into the whole portfolio and then in that way you de-risk or at least the risk becomes very much smaller. A lot and a large volume. So, the financial sector is used to this way of operating. No, I, said early on that we really have to be built up and you have to have projects like this and other things, you have to have also to build up **a literature and, and examples** because that's what people what moves people.' (EU01_O) '**Everything that is happening in the market inspires others to do the** same if it makes sense. If there is a real market for it, especially if you go into bigger size projects, it's also from a liquidity perspective and a market perspective, good that there is more of that in the market. Then you can also trade on this debt and have syndicated structures where multiple banks are involved, or multiple financial parties, because then it could also be taken on by, for instance, insurance companies pension funds or other capital available in the market, both from a lending as from an investment perspective. So far, not to my knowledge in the domain in climate adaptation, but that might also be by **lack of knowledge** or by **lack of tracking of what adaptation is**. I really believe **in blended finance**. But there is so **far hardly any blended finance available** in Belgium at least. I see some blended finance structures as it comes to developing countries and projects in developing countries. I think it's something Europe should reflect upon. Instead of giving subsidies to certain projects, I think it could make much more sense to contribute from a government perspective that same amount of money in equity form, in a blended finance taking the first risk, and enable leveraging upon that equity by additional debt. I think that could generate much more financeable projects in the market than currently done by granting subsidies'. (BEL01_B) 'I think from a political perspective, i**t's easier to give money away as subsidy than to be a structural shareholder of a certain company or investment vehicle**. If you give it away, ok, it's all gone. If you're a structural shareholder also in terms of your engagement over the longer periods, it is something you're more committed to. It's not embedded in a political governance anyway. It's also because it's never been done. adaptation in my mind is much closer to risk management than mitigation'. (BEL01_B) 'Adaptation is looking at what are new consequences coming up due to global warming and reduction of biodiversity. Because it's not only global warming, but also biodiversity consequences. What should I do different or pre-empt to make sure that I do not suffer from consequences of it? **It's much more in the risk domain.** The more visible and the more frequent the consequences will become; the more investments will be done out of risk management. If your home is flooded once every 50 years, the chance of you making investments to avoid that is lower than if it would flood every five years. If you look at our credits, we are financing investments of companies who are doing investments for climate adaptation, who are protecting themselves from floods or from droughts. Adjusting their real estate, for instance; to make build water buffers, for instance, in food industry to overcome longer dry periods; or access

		to water, which could hamper their food production or processing. What kind of investments we do finance, we do finance governmental investments, communities and so, on their infrastructural works. **But so far, we do not really label it as this is green financing.**.' (BEL01_B).
	Financial instruments/ mechanism/ tool	''**So we don't have market, we don't have a culture for this kind of instruments** and we are currently testing with a hypothetical products that our customers are willing to buy or are they interested such a product and if there is such a interest then we could start the process to make those products legal and possible for us to sell'. (INS03) 'Here's its somewhat linked here, lack of financial products from on an illiquid infrastructure, investment not at a scale that we would require. So with those figures this also falls into the limited projects. There's just not scale there. And also the product. So that's the point where the **transaction costs are high'**. (LON09_II) 'So I think I mean, I always come back to the **spectrum of capital**, at the far end you've got philanthropy or government intervention funded projects. I think private capital has a role right up to the impact investment where you're not profitable, but you're still earning market rate risk adjusted returns' (LON10_II) 'One of the case studies was a **South African municipality that bundled a bunch of water system improvements**.. And so then they issued a a green bond for the water system, not for the specific projects as a way to reduce transaction costs'. (x) '**Sus finance framework of company. We have not made any issues yet.** We have created the framework, but we have still issued issues for the time being. The framework has been in place for less than two years, since 2022. This has to do with financial planning. There is no point in issuing instruments if the money cannot be used immediately. At the moment we still have sufficient cash to finance our activities, so we will see how that evolves in the near future. But **adaptation is just a lot more complex to communicate**. So in addition to the financial impact of the project, what's the climate impacts? I mean, in a lot of cases you can't say. We know it's going to save this many lives and this much avoided damage [----] . Most of them are public or they have some kind of environmental social mandates. The climate impact, whether that's adaptation or mitigation, is well a critical criteria. And returns compared with another threshold level. **Is this a business model for the project?** And that gives them confidence that even if it's concessional, that they're going to get their money back. So seems like there's sort of **a dual filter**. And items like climate and then there might be like requirements around a gender or social inclusion. And then, is it going to have market rate returns, is it going to be financially sustainable?' (LON06_O) 'I would think about the example of a **syndicated loan**, which I mentioned we have experience with. Certainly, when compared to a single bank committing to finance the entire risk for a borrower or a company, it is very likely that the parameters or criteria requested from the borrower would be stricter and more burdensome for them. In the case of bundling, or the involvement of multiple banks, if more eyes focus on the funded business model, the risk is shared. **If there are two or three financial institutions already, this burden with risk is significantly reduced**, and this undoubtedly translates into a more relaxed indicative offer in a financing proposal, which is much more accommodating for the client. I am convinced that this simple principle applies in the field we are discussing, and probably this risk reduction could be addressed especially in those higher-value projects. The involvement of multiple banks, each bringing its know-how and its own experience, either locally or from the banking group to which it belongs, would greatly ease the process. So, I noticed. The answer is yes, it has been noticed, but not necessarily in this area of climate change, but in any other funded area'. (ROM 03_M) 'However, as we mentioned **sustainability-linked bonds**, we have an active sustainability-linked loan in the sector. The loan's interest rate is linked to various Key Performance Indicators (KPIs), such as the number of electric charging stations installed yearly throughout the loan's duration or investments in infrastructure for pedestrian and cycle mobility, and the digitization of access and payment procedures, including ticket dematerialization. However, even this is primarily focused on mitigation. We also have **projects financed through project finance following the International Finance Corporation (IFC) standards of the World Bank, covering the eight classic IFC criteria**. These are part of the financing contract and can lead to default clauses if the corresponding covenants are not met. Still, regarding the green bonds we are considering, we are leaning towards the European regulation. We currently **evaluate the climate resilience of our target investments in terms of expected ability to perform under adverse climate conditions.** Such evaluations are performed analysing climate risks associated with each investment in the due diligence phase. If significant risks emerge, an adaptation plan is proposed and related costs are evaluated. This approach is particularly significant for greenfield

		projects, where we have started testing such assessments and adaptation studies. I would like to stress that we currently have no experience with pure climate adaptation finance (i.e. projects aimed at improving climate resilience of a territory/community), as we are only dealing with the resilience assessment of our target investments (which involve renewable projects, mobility infrastructure, and so on).'. (CHAM_O1_B) 'Climate bonds, Adaptation bonds, Social impact bonds, Sustainability performance bonds or other instruments- For the moment**, there's no appetite internally because of the return on investment.** But it could be taken up at some point. We do other types of bonds**: Sustainability Linked Loans Bonds, Social Bonds**, etc. .For these bonds, the market has been able to find a balance to solve the problem of profitability in these areas'. (FR02_B) 'On **bonds I believe that they will become fundamental financial instruments, especially for climate change adaptation**. Today, they are not, and there are still significant knowledge barriers in the market. In the absence of data, we are developing climatech applications aimed at building an informational base that can be used operationally in investment decision-making processes'. (IT01_AM) 'I think the bank already is deploying some instruments. We try to complement our financing with technical assistance for clients and support them for instance, with upgrading of their climate corporate governance. We're investing in bond issuances, whether it's green bonds or sustainability linked bonds by our clients or corporates or banks. We're also looking into municipal green bonds market and how this can be expanded'. (ROM02_B) 'Probably **for adaptation there is a need for concessional resources**. Probably in some sectors more than in others, just to compensate for the market barriers or the risks, or the perceived risks. And we know that **international donors are looking at allocating more resources to climate adaptation**. So in our Climate adaptation action plan we note that there is a role for concessional finance'. (ROM02_M). 'The World Bank, which has their own **catastrophe bonds.** It's more going for disaster recovery. And then there's been the OECD put out a **compendium of land value capture instruments** this summer. That's a lot of the conversation there is using land value capture as a way to generate revenue streams you can use for adaptation. There's a lot of conversation like on the fundamentals of where are you bringing in revenue?. Then are you going to use a bond based on that revenue to raise capital upfront, which I think in the U.S. that's because we have such a strong municipal bond market. That's the way you would typically do it. But I think a big challenge with bonds is just that lots of **municipalities aren't creditworthy** either because they aren't allowed to borrow or because they have such a weak fiscal position that they can't borrow and. Like right now we're working on something on basically strategies like - what do you do when you're not creditworthy. A lot of the cities - our members are trying to figure this out. So I would say its of the key things that we tried to focus on is linking supply and demand. 'I am the coordinator for a project preparation, the action group, which are the working group for members that do pre-development work feasibility studies. So very much on the **demand side, getting bankable projects** ready to access finance. But we also have we call it the **Financial Toolbox Action Group,** which is focused on **what are the financial instruments and mechanisms. And that's looking more at innovation on the end. It's more supply side.** Focused with the goal of really trying to create the link between them. But primarily our members are more involved with the demand side or tend to be public finance focused'. (LON06_O) 'And a **Climate Policy Initiative is the lab - an accelerator for climate finance instruments and idea,** - they can range from very early stage, very innovative to more of a doing something we know works in one context and putting it into a new context. And one of the instruments that is one of those very early innovative ideas is called the **climate reinsurance link resilient structure** - it's an aggregation of municipal insurance for specific climate hazards.. Think they were starting with flooding and extreme heat but then linking it to an **investment fund** that would so you would get better terms on your insurance if you were investing in specific adaptation. Y. And that the final report on that will be out at the end of September. But there are a couple of other adaptation linked instruments that use some different strategies like that- the Subnational Climate Fund was the lab instrument a few years ago'. (LON06_O) 'A significant aspect from this point of view could be related to the **insurance** side, that is**, the role that the taxonomy assigns to insurance**, because the goal of the taxonomy is to design insurance as a subject capable of supporting the growth of awareness among actors on adaptation issues and also of incentivizing them at the pricing level. However, at this stage, there are still somewhat conflicting stimuli from

		this point of view, because even EIOPA (European Insurance and Occupational Pensions Authority) did not feel able to give policy advice to the Commission to include adaptation from the subscription point of view as a factor in reducing Capital Requirements, saying that there is still not enough evidence that risk reduction is very significant because there are few insurances, few projects, few data, and few historical series. It is clear what our role as an insurance company could be, but the set of conditions and therefore the data showing the effectiveness of adaptation measures in risk reduction is not yet fully complete. Another aspect that we are understanding and verifying also in our European projects is that often the reduction of the **insurance premium alone might not be such a strong incentive for carrying out adaptation investments**, which are often very costly, in a context like the Italian one that does not tend to give all this value to insurance. So, one element we are reflecting on is that of **triangulation with credit institutions that can support the financing of these measures**, but for which I imagine that even today finance in the climate context is still linked to the mitigation side, therefore to projects that reduce emissions and make you stronger in the market by reducing transition risk'. (IT04_INS 'In this a second European project on **agriculture**, we had in mind a very clear design that starts from creating risk awareness to then provide information on adaptation measures and information on short-term, medium-term, and long-term cost-benefits. However, we encountered issues in the initial part because it presupposes a long-term vision, while the sector continues to be underinsured and even the national fund that supports these insurance mechanisms in the **agricultural sector has no minimum incentive for adaptation**, which is something extremely short-sighted for me, despite the devastation of this year, so one would think they would want support and tools but they don't. This is why we are **considering integrating a partnership with a bank** because we have understood that there is a missing piece in agriculture. With small and medium-sized enterprises, however, it went better, despite starting earlier, because there is probably a different level of awareness. Defining specific investment areas on the topic of adaptation is difficult because until now, adaptation has been interpreted as everything related to Nature-Based Solutions. This will increasingly **intersect with the theme of analysing nature-related risks and opportunities for adaptation**, therefore, includes both issues related to climate change and those related to nature. I feel confident saying that they have been absolute innovators and we continue to do so a bit'. (IT04_INS) 'I think the main **obstacle is the novelty of this field**, meaning the lack of proven experience over time regarding the standardisation of these financings in a way. As I mentioned, each project is discussed case by case and comes with an analysis of **the entire administrative process that needs to be considered, considering the market regulator, i.e., what the legislation says and what the limitations are in this sense**. There are standard offers from our colleagues. We are closest to our colleagues in Bratislava who have a **dedicated department for this type of financing, where there are some very good specialists**. Of course, they have an idea they have formed based on all the projects already funded. I can come up with some standard offer drafts, as they like to say, but from project to project, they need to be adapted without a doubt to the specific project discussed, so everything is refined in relation to the borrower and following the discussions we have with them.'. (ROM03_M) 'We would also like to highlight the **"Nature pour le vivant" - Maif (ecological dividend).** This is an innovative solution for financing projects that have strong co-benefits for biodiversity and can meet the needs of climate change adaptation. MAIF and its subsidiaries devote part of their profits to the protection of biodiversity and climate solidarity via the ecological dividend. In 2023, this will amount to €8.2m, of which €4.68m will be allocated. The remainder will mainly be allocated to solidarity actions for members most exposed to the risk of flooding. 10% of Maif's annual income is devoted to the ecological dividend. 100% of the projects in the program are dedicated to financing sustainable and green projects. Today, the [program] represents the largest funding program for Nature-based Solutions in France. The 05 priority action targets for the projects are: marine and coastal ecosystems, restoration of wetlands, agricultural and forestry transition, ecological continuity, biodiversity in cities. And at the beginning,. At the beginning public companies gave us money. Now, we are **no longer in this 'blended finance' position, since all our projects are financed by private companies.** The aim of the program is to finance several nature-based solutions in [our country] through private finance. They are looking for local projects with biodiversity and climate adaptation criteria which can benefit local populations. We believe that our **program meets the criteria for adaptation** to climate change. It basically helps to give private money to projects with huge advantage on nature and biodiversity. These projects can be good solutions to strengthen adaptation strategies. It is not an investment project but **it's sponsorship from private funds**. We started in 2016. What motivated our presidents was to finance projects that did not have enough public funding and to be able to make up for this shortfall. However, the aim is not to replace public funding. We believe that it remains fundamental in financing nature-based solutions and, more generally,

		adaptation. Some of the projects we fund also receive public money, but these are still in the minority. This is applied on a case-by-case basis. Each project has its own financing balance. For example, some are 50% funded by our program and the other part comes from public funds. But we haven't thought about increasing our blended finance partnerships. That's not our objective. From 2016 to 2023, we raised between €12 million and €14 million to fund Nature-based Solutions projects. We currently have 82 projects in 2023, and we will have financed more than 100 projects by the end of the year. However, we are working on projects that are sometimes innovative, such as a fire-resistant plant project in New Caledonia'. (FRO1_O)
	Business model	'The **lack of data** is certainly the first barrier. The second is the **business model**, i.e., what is the model for making investments for a private operator in infrastructure or investments oriented towards adaptation. In the third place, I would put a whole series of considerations typical of our investments, primarily bankability, then counterparts, coverage, market, return, etc. As already mentioned, we are flexible on this because we reason about the size, but there are still the characteristic risks of an investment, among which I would place bankability in the first position'.(ITCHAM01_B) 'I think that has to do with the **lack of business models**. For a profitable investment you need an underlying market. For example, if one were to compensate tomorrow for the number of trees on a piece of land, a business model would be created around that. I now think there is a positive drive to include those things in projects, but they are not the main focus. I think that you will now see in many projects that construction will take into account a number of measures that indirectly respond to climate adaptation, such as green areas in a much more fundamental and thorough manner than I think ever happened before. That's true, but what hinders pure investments in adaptation? That is the business model you must have'. (BEL03_B)
	Transaction bundling	'There's an issue of **scale and aggregation**, […] We focus on large infrastructure projects because we're generally deploying over $800 billion, … if you could demonstrate adaptation finance as a proof of concept on **large infrastructure projects that would attract capital** … kick off the market, bring more liquidity'. (LON11_AM) 'If we were better at bundling. And because it's not aligned and standardised or homogenized, you're kind of chasing your tail to make it scalable. You know what I mean? And I mean scalable into the public market. Scalable into the bank. I mean it would a program of works from a municipality that is by aggregation then a whole.. So **instead of one project it's all the programme of work is all put together**. So there's the there's another standalone fund. It's the **Subnational Climate Fund**. That is it's blended. But they are getting they have a commercial tranche that is they invest in renewable energy, but they also they have a focus on nature-based solutions. And that's not really a traditional investor. They're **combining GCF concessional equity with commercial to invest in either adaptation or they're trying to integrate adaptation and mitigation** so they have renewable energy piece to a project and also nature based. They are based in Luxembourg. There is growth, but it's not rapid growth in overall investment flows. There's lots of interest and appetite from investors and there's lots of need from cities and utilities and other institutions that develop urban infrastructure. But those two things aren't coming together to have the catalytic or exponential growth that we need to get to the investment levels to meet the goals of the Paris Agreement or to hit the national climate targets. So I think it's really it's a sense of there's **lots of pent-up demand** and I think **a pent-up investor appetite** as well. But. We haven't solved at scale roadblocks between the project developer and the investor so that they can come together with bankable projects and terms that work for the project developers to have investments at the scale of the need. I think changes to project sizes here that small ticket sizes, transaction costs are huge barriers, aggregation is something that we've been doing research on as a strategy to get around that but there's a lot of interest in. But I think the overarching one is there's a mismatch and a lack of capacity on the project developer side to speak the language of that investors are. And then there are very few investors that are willing to try to figure out the language of the cities are speaking and like where the cities are able to get to.' (LON06_O). 'And then probably **better disclosure** because all of this comes together, right? I don't worry that the liquidity is there.. The returns right now, undoubtedly they are being questioned. […] Now that makes it very unattractive for institutional investors or banks to get involved. But that entity is going to run out of steam, right? Just because the government doesn't have enough financing.. (LON05_B) 'Well, I think I think you need investing in bonds these days. You need the size of a bond to be at least a couple of hundred million. , probably the 300 million, actually. Just because liquidity in bond markets is getting more and more challenging. And so you need a you need to have a significant size pipeline. And not only in size, but then also investors want to know that there's probably going to be ongoing supply'. (LON04_AM)

		'**Everything that is happening in the market inspires others to do the same if it makes sense**. If there is a real market for it, especially if you go into bigger size projects, it's also from a liquidity perspective and a market perspective.. Then you can also **trade on this debt and have syndicated structures where multiple banks are involved, or multiple financial parties**, because then it could also be taken on by, for instance, insurance companies pension funds or other capital available in the market, both from a lending as from an investment perspective'.(BE01_B) '**Returns, project size and regulation all important.** I think changes to project sizes here that small ticket sizes, transaction costs are huge barriers aggregation is something that we're we've been doing research on as a strategy to get around that but there's a lot of interest in. I mean higher returns would definitely overcome a lot of the barriers. How you get those higher returns - I think is the crucial question? But I think that, **a regulatory environment that really incentivizes or it requires adaptation to be a consideration in everything that you do**. Well would be a big help'. (LON06_O)
	Scale/ Replication	If we were better at bundling. And because it's not aligned and standardised or homogenized, you are kind of chasing your tail to make it scalable. You know what I mean? And I mean scalable into the public market. Scalable into the bank. I mean it would a program of works from a municipality that is by aggregation then a whole. So **instead of one project it's all the programme of work is all put together**. So, there's the there's another standalone fund. It's the **Subnational Climate Fund**. That is, it's blended. But they are getting they have a commercial tranche that is they invest in renewable energy, but they also they have a focus on nature-based solutions. And that's not really a traditional investor. They're co**mbining GCF concessional equity with commercial to invest in either adaptation or they're trying to integrate adaptation and mitigation,** so they have renewable energy piece to a project and also nature based. They are based in Luxembourg. There is growth, but it's not rapid growth in overall investment flows. There's lots of interest and appetite from investors and there's lots of need from cities and utilities and other institutions that develop urban infrastructure. But those two things aren't coming together to have the catalytic or exponential growth that we need to get to the investment levels to meet the goals of the Paris Agreement or to hit the national climate targets. So, I think it's really, it's a sense of there's **lots of pent-up demand** and I think **a pent-up investor appetite** as well. But. We haven't solved at scale roadblocks between the project developer and the investor so that they can come together with bankable projects and terms that work for the project developers to have investments at the scale of the need. I think changes to project sizes here that small ticket sizes, transaction costs are huge barriers, aggregation is something that we've been doing research on as a strategy to get around that but there's a lot of interest in. But I think the overarching one is there's a mismatch and a lack of capacity on the project developer side to speak the language of that investors are. And then there are very few investors that are willing to try to figure out the language of the cities are speaking and like where the cities are able to get to.' (LON06_O).
	De-risking capital	'Recently, we interacted with the insurance companies in which we invest to assist them in drafting the materiality matrix for the SFDR, and adaptation strategies are at the top in terms of financial materiality. We believe that the development of products that allow for de-risking could come from them to a significant extent, at least on a sectoral scale. Currently, **there are no such tools**, and we do not see any on the horizon. **Risk transfer products could involve parametric products**, which we emphasize when talking to insurance companies, but at present, we do not see a flourishing market in this regard. In fact, we see that insurance companies may be stepping back from catastrophic risks that, due to their new frequency and intensity, are becoming uninsurable. (IT01_B) 'It's that mixture between, **consistency and proper policy, proper consistency of approach** and like **a carrot and stick** kind of way – but needs to be enough carrot to get people to do it. Because if it's just all stick, then it just becomes a big thing. But for it to actually mean anything for example like carbon credits it's great. But people talk about carbon trading, but there's so many different pieces that have to be put in place before carbon trading actually explodes. It's not just about the fact that you have a tree, and you have a credit and someone wants to buy it off you. The whole middle of it is important. How can you trust the credits there? How do you know that the long-term investment of credit when it's 30 years? There are all these different pieces around that have to be put in place. So, it's more about the infrastructure. It's great to have these concepts of this money, but unless **the whole chain is consistent and credible**, nothing works. So, unless it's all linked together in a consistent and credible way, then things collapse. And then it would, just be individual groups or companies working separately. And then there's no systemic change. It's not **replicable/scalable**. It can't be replicated. And that's the thing we need – we constantly get hit**. Is it scalable? Is it replicable?** If it's not scalable the people, then corporates wouldn't be interested because they're not going to make any money. It's not going to grow, it's not worth doing and it's not replicable. But the what's the point of doing it if you can't do it in more than one place? So that's where you're getting the

		challenges. And currently **we're not there yet.** Currently **we have replicable things which aren't scalable and scalable things which aren't replicable. So that's where we get stuck**'. (INS01) 'So there is a **good enabling environment in the Netherlands**. The **Dutch central bank** has just done a report on climate risk, and there is also a **Working Group on Climate Adaptation**. So Acme have also done a report. They're one of the most proactive of the, FIEs the Netherlands. And **APT also a very active**. It is a repository now for data on the real estate sector and for use by asset owners and managers of property in the Netherlands. And there's a high percentage use of across the sector now with a good percentage that are using it - 90% are using this platform to do their assessments. They do it in very different ways and to very different levels of detail. But there is that **one level playing field** and the climate proofing is accelerating now across the sector. And we've seen this change in the last 3 to 4 years in the Netherlands. There's an increase in those who are becoming very interested in climate proofing their properties. The central banks and the regulators are also becoming more interested and we'd be very interested in ideas on replicating this approach in other territories. , now that there's been a proof of concept'. (INS04)
	Co-investment	'I have a **really hard time seeing how you get any kind of significant private investment in adaptation without using blended finance**. , I can see I can see where you can use public money to de-risk things and structure them in a way'.(LON06_O)
	Disclosure	**'We're working on stuff on the building sector (disclosure regulation] specifically, and it's looking like how do you increase private investment in low carbon and resilient buildings**? You can make it easy to get risk information, information on how to build resilient buildings. You can require like risk disclosure labelling, but the strongest thing you could do is you have building codes that make it mandatory to do certain things. But that's the way to get a systemic shift'. (LON06_O) 'As a result of TCFD recommendations some new investment practices like the climate change adaptation to a designated officer. The taxonomy requirements now and under the equator principles – it was the first to place principles on finance institutions to undertake climate change. The understanding of climate risk in infrastructure investments has increased a lot. I would say a lot of the market has a lot of catching up to do. So, in my personal experience the technical advisors don't often have the capability. They pretend to have expertise in climate resilience, climate change, risk assessment of climate resilience and adaptation. I've frankly seen some absolutely **dreadful climate change risk assessments** that that sort of illustrate the complete misunderstanding of the exercise. So, there is a lack of technical expertise in the finance sector'. (LON11_AM) 'It's a necessary prerequisite . To drive disclosures and to, again, to make sure the **TCFD has to move**. To see if there's a big focus on obviously transition dimensions. Obviously it talks about physical risk, but people have not really started to look at that. People focus a lot more in emissions, but this is going to be a really important mechanism of disclosure to make it happen'. It [the EU Taxonomy] also should be important. It's necessary. But the EU taxonomy has become tarnished by being political rather than technical and scientific. And important areas that you know - you run the risk of mal adaptation'. (LON13_O) 'How people have to move forward is we have to **comply or explain** and whilst at the moment it's for funds that are 5 billion or more and then next year I think it's 1 billion or more. We encouraged TCFD because we helped draft the, we have the development of the TCFD guidelines. We did say we really think you should include smaller funds in that because you don't want them to be left behind. (LON08_II) *More information than physical risk. I think it's worth taking it through that. I think that's your better bet is the climate risk- corporate climate change risk assessments are a better way because TCFD to some extent it's being legalised, but at the same time, it's still very rudimentary (LON05_B) 'Well think **taxonomy finalization is super important**. What we're doing at the moment around TCFD - we're going to do now is the national consultation group. So I think basically when it comes down to nature, we are way behind the curve and we're trying to catch up - we launched the national consultation group - we've got some really good people joining but it was so many financial institutions. It was loads of consultants and sort of people that have some data and things that they can sell to companies. But it was very few of the food manufacturers, the forestry paper manufacturers, the biofuels, the biotech companies, all of these, you know, the actual, the textile guys- they're not, there yet. So there's a long way to go because all of these guys are using obviously in natural capital and. .(LON05_B)

		'Disclosing on climate risk/adaptation? What does this entail? On the climate aspect, its in SFDR, Article 29 of France's Energy and Climate Law, TNFD. **Not yet on adaptation'**. (FR02_B) 'At the at the moment TCFD it's a requirement. We put stuff out. **Is it actually helping make investment decisions? I would argue no.** And conversations with some of our clients would also indicate what? What gets produced by corporations because of TCFD doesn't really help them. In addition to what they already know about what climate related risk would be is to that company. And let's see where that goes. **TNFD is going to be even more of a challenge (we have a metric tonne of carbon). But when we're talking nature how do we measure that**? How do we monitor, how does that then get transferred into something that the regulators really seem to like is a number of something. Because they think it's useful to go into a financial model. **What metrics are used that are relevant** and they're just not going to be the same as it is for climate and carbon? So ultimately as important as TCFD but rather more challenging. So we're all kind of looking forward to seeing what comes out from the ranking, from the recommendations on this and how it fits, how they're structuring it, which is very similar to TCFD. That's great because we're using something that's already there. I'm unfortunately a bit pessimistic as the short-term usefulness. It gets people thinking and you need to start somewhere. So, this is a good start, but **it's not going to be sufficient, I don't think so'. (**LON09_II) 'And I do think we're going to get that in the **taxonomy** and other things' (LON04_AM) 'So we were founded in the UK government undertook a **Green Finance Strategy** review process back in 2018. And at the end of that process, one of the action items was to establish **an organisation that was sit in the in between the nexus as we call it, a public and private space**. So an organisation is able to both have access to government budget into government, but also be a neutral party to the private sector to ultimately unlock the barriers that were stopping finance spending in the real economy to decarbonize various sectors. And so these sectors that were not for profits at the moment, and we have been working in the building sector, in the nature sector fairly recently, in the road transport sector, looking to get finance to flow in the real economy, to ultimately in the building sector, for instance, to get people to retrofit their homes. And that is where we sit. We then work with financial planners. We set up coalitions across the sector, key players being the finance sector, but also, you know, supply chain actors, academics, engineers, etc. but understand the barriers to sort of retrofit finance for building perspective and these coalitions that we convene them do the legwork as that mutual party, but we're staffed by bankers, so we kind of understand finance. And then ultimately we innovate into the financial products that are required or the data enablers or maybe some of the tools to allay the fears of greenwashing. So we that's ultimately what we do in this. Our buildings work is the most mature we are. We started the transport work in the last year. **Nature is very new to us.** We also running into **Green Taxonomy Advisory Group for the UK government**. Well think look really I mean we touched on so many things I really taxonomy finalization is super important. we touched we touched on that. Um, I think what we're doing at the moment around TCFD And, and what we're going to do now is the national consultation group. So I think basically when it comes down to nature, we are we're way behind the curve and we're trying to catch up obviously. But um, you know, this, we launched the national consultation group this that the work on 14th July this year we've got some really good people joining but it was so many financial institutions is great. It was loads of um, consultants and sort of people that have, that have some data and things that they can sell to companies. But it was very few of the food manufacturers, the forestry paper manufacturers, the biofuels, the biotech companies, all of these, you know, the actual, the textile guys, um, you know, they're not, they're not that enjoying yet. So there's a long way to go because all of these guys are using obviously in natural capital and our utility is going to come along that they're going to be needed to do something about it, but you can let them to influence how it goes up. And so that's a big piece of work. So there's a lot of head scratching around. What does that what does that mean and how do we make it? So they're thinking about that, which is good. we have our taxonomy is, is yet to be defined and so you know organisations haven't done that yet, but the bad thing about that is ultimately is that rather than actually because of where I come from, what we're trying to get money into the economy, that's not happening so much because they're all sort of looking at a, well, if I were to do this, what does it mean for the taxonomy perspective but also taxonomy perspective now and the taxonomy because these if you make a 15 year investment, what does it look like in five years, ten years, 15 years' time when maybe it's starting to incorporate things, circularity, sufficiency, imported carbon. These things that the on the data allowance on that stuff isn't particularly great at the moment. Does that come in during the course of your investment, which means you're now no longer taxonomy aligned? So that's the stopper, even though it's even though it is. These are good things to be working through. (LON12_O)

		'I think we are already **making investments that meet the criteria for adaptation to climate change. But for the moment we haven't identified them as such. My aim internally is to map out the different actions that can be taken to adapt to climate change**. For example, our core business is financing agriculture. Adaptation is a very important issue in the agricultural world, which is why we are trying to diversify our financing. In particular, to finance organic and eco-friendly farming. We are also heavily involved in the energy renovation of buildings, which accounts for a significant proportion of our investments. More broadly, we are a member of the **Net Zero Banking Alliance** and we are seeking to transition away from fossil fuels. Other parts of our group are also signatories to the **Glasgow Financial Alliance for Net Zero**, such as […] our Asset Management and Assurance branch. Other branches have not yet given any thought to adapting. More broadly, I know that PRB (Principles for Responsible Banking) have been working on adaptation target settings for 2023. See this report published in 2023'.(LON08_II) 'Our biggest challenges and opportunities in relation to adaptation finance- we are one of the banks with the strongest local presence. This is an advantage if we want to deal with adaptation tomorrow. **As far as the challenges are concerned, we need to be able to alert our in-house teams to this issue, to understand it and to know about it. There is a lot of confusion on this subject.** The second will be to identify what is being done within the Group that can already be adapted. Finally, I don't yet see how these investments can be profitable for the financial players, including the banks. For the moment, adaptation is only seen as a cost, unlike other low-carbon investments, some of which are beginning to be more or less profitable. Adaptation is often seen as a public rather than a private matter'.(LON08_II) 'So I think, I think the EU Directive actually does do a lot in that direction. , they actually take it into consideration, I'm curious to see if the UK taxonomy does that. Some have said. I mean, it's a **bit too early, and that there isn't, as you know, enough guidance on the adaptation component of the taxonomy yet**.'. (LON05_x)' 'It also should be important. It's necessary. But **the EU taxonomy has become tarnished by being political** rather than technical and scientific. And important areas that you know - you run the risk of mal adaptation'. (LON13_O)
	Vesting value	'And I think the one thing. I guess that in my opinion they're using very much to guide what they're doing, but is either the **actual carbon price or the or the other trading system**?' (LON12_O)
	Impact measurement	'And increasingly our clients are saying, **we want to see outcomes** rather surreally. That's you know, we're so used to having classification as well as the classes and what returns you're getting on that asset class. But what outcome does that have for the real economy and for the real planet? Are we getting anything out of that?' (LON08_II) '**Measures that everyone sort of understands** when I see it to people now I certainly understand. Okay scope one to measure or footprint for a company. . But then again the next stage is is actually what are the outcomes from investment activity. And that's still very sort of sporadic. So consistency across most of the board. So I mean, the more standardized approach to be useful'. (LON04_AM) '**So we actually went through what we where we placed bonds and what the eligible categories are and actually tried to quantify that**.. But undoubtedly like I said, it's definitely a much more difficult because it is nuanced that we've aired on the side of conservatism.. I think it's just people haven't focused enough on it. **I'm spending a fair amount of time also looking at the government, at the sovereigns, and what is the risk that they run**? And what impact physical risks is going to have on their on their financing in the future Impact. So for example, we will work with an entity such as the Netherlands branch.. Where their financing, not all of it, but you know, **a good sort of 30% is actually the financing of the dikes in the Netherlands.** . And that obviously is a direct adaptation. But of course, when you start to see and if you look at the impact reports, they actually tend to call out how much is put into adaptation. So you can see their allocations. So do you see what I'm saying? What happens is we track the bond and the categories. So you're asking how we get to this number?. You track the categories. And if there's an adaptation category, we would be able to say that that bond could potentially go to adaptation. The challenge for us is then to actually say the money, **I think until we get some of the standardisation in place and the impact metrics, the market doesn't react, you kind of need to feed the market'**. (LON05_B) 'When you talk about **PPPs,** it is about a piece of infrastructure that the government believes should be created and we respond to that. If you respond to this, you will notice that in the straight line there are a number of impacts that can be both positive and negative. Here you see a sample of what those impacts could be. It is less of an aim of the assignment to argue that this is mitigated, because then you are partly engaging in greenwashing. Some are mitigated and some are not. How should you

		read that? You should not add red balls and then add the green ones, and then decide that, for example, it is more red than green, that is not the intention. **The intention is to gain a helicopter view of the project and understand where it could have an impact.** If you build something, especially in that construction phase, you naturally have a negative impact. You have to build, you use materials, you take up a piece of land. That can have an impact on the ecosystem, biodiversity, and so on'. (BEL03_B)
	Responsibility	'So I think that's where we're at in **the pension funds is that most of them are thinking about climate. And most of them are thinking about net zero goals**. Some of them are declaring publicly net zero targets and interim goals. And now they are at the point of rolling those that out in terms of investment strategies. So that's so they've moved beyond responsible. They've definitely gone into sustainable and some are going into impact investments solutions. **But in terms of just going to something, say like a Green Bond portfolio, I'm not seeing so much action. There's a lot of talk about it, but I'm not aware of pension funds that have just said, right, we're going to invest in green bonds. There are funds who are investing in green bonds, but not as a dedicated investment.** To my knowledge, there probably are some, but none that I've talked to and we talked to quite a few. [Adaptation]is a compelling argument if you know where that's happening and if you've got that transparency I suppose and then where is resilience fitting into that then? So this we've seen a growth and that going beyond the responsible investment to consider with you know a broader strategic approach.. Adaptation is sort of understood as part of disaster risk management. Not so much as a standalone climate issue because cities have to think about climate and non-climate related risks'.(LON10_II)
	Financial incentivisation/ Demand signals	'It is very **difficult to find green bonds that are devoted to adaptation globally**. And one study that has been done, it said it's only 2%. But then I did see a more recent study that said it was about 7%, but it's still very low. And is there any do you hear consideration of other types of bonds like climate bonds, climate resilience bonds, social impact bonds, sustainability, performance bonds, That what's being developed and talked about?' (LON10_II)
	Exchange (resilience market, bilateral exchange)	'So that is something that I'm really pushing this course, you know, thinking about. And I mean, I advise pension funds where it stands, and I made a commitment to always **asking asset managers this question of how you are taking and adaptation resilience** into new investment processes'.(LON10_II)
	Fiduciary	'But we tend, we tend to argue that that is part of **your fiduciary responsibility**''. (LON08_II) 'On the **fiduciary duty**, the recent changes that have come through for pension funds in the UK - that's one you see we have finally ae happy to invest in sustainable responsible investment but our primary fiduciary duty and in exercising our prudential stewardship is being able to pay those pensions. And so that's often one that we come across'. (LON08_II) 'And I think any **pension fund has to start looking at a financial investment thesis of an investment**. Or mandate. So that has to be the primary driver because they have the fiduciary duty to do that. But once they have considered that, , then it's around the diversification benefits, perhaps the income generation opportunity from the investment inflation protection and then the alignment of that investment to their investment beliefs around ESG'. (LON10_II) **'Focusing just on adaptation I would say at the moment, and it is purely about the sort of fiduciary duties of companies**. [.....] being able to demonstrate that you are doing actions that are in the best interest of the company. Said that it links into returns, it links into performance it to shareholders value creation. I think that's the main motivation at the moment, and I think that is what is sort of pushing them to think quite **short term** as well. So, you know, there's **not many companies that I've seen that are really thinking seriously about longer term climate change and actually making decisions.** So, there's a lot of analysis done, but actually, you know, changing their decisions based on that, I've not seen that. That's what I think is today. I think that that's going to change. , quite soon'. (LON_A01) 'We've talked about **potential regulatory changes** to allow investment into the illiquid. There is also the relaxation within that would be the relaxation or of what is what is meant by fiduciary duty or what people understand to be fiduciary duty is to incorporate other what might be seen as non-financial elements, but ultimately they are financial. If you extend the time horizon sufficiently. So, there is that element and project sizes or the likes of an asset owner. , we need scale. And on that side we're talking typically tens of millions of dollars if not hundreds'. (LON09_II) 'It's [**changes to fiduciary duty**] going to depend on who you're talking to. We will be determined on a jurisdictional level basis. I have conversations with some of our asset managers who are more U.S. were us based. It's a much stricter definition and it is still very much financial. , there has you know, there is an **openness within the UK**

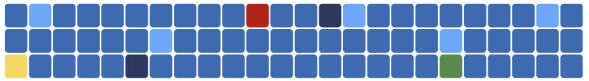
		environment that it is not so narrowly defined, but there has yet to **be case by case law** to help support that'. (LON09_II)
Knowledge	Education	'We have the pension funds, who's leading in that space, and it's about having good investment advice. So, this is where we've really been targeting the investment consultants who guide the pension funds. And they've been a **little bit behind the curve up until last year'**. (LON_IV_23) 'Yes, it's a **problem of knowledge and project profitability** too'. (FR02_B)
	Capacity	**'One strength is undoubtedly the instruments we have developed, and another is the interdisciplinary skills of the team within the company**. The team comprises professionals from various sectors, all linked to the world of infrastructure, services, utilities, and experts in urban regeneration and mobility. Therefore, we can grasp various technical and regulatory aspects of these areas'. (CHAM01_x)
	Innovation	'It's how are you going to get a **cash flow** from an effort, from an adaptation investment? And this is where governments can use investment in a very different way than a financial institution would use investment. […] if it's investing in a company that is providing services to adapt, then we can invest in that company because we can get the financial returns'. (LON09_II)
	Best practice	'**I don't have best practices**. There's not much practice. And so I think probably I, I want people to sort of, you know, the Dutch frameworks and then I'd probably look to the IBRD soon. Is that so focused on it?' (LON04_AM) 'I think **knowledge sharing, building and best practice** is a really important priority. And making that available. that's even, as I said, with our organization, that's one of the key things that has been area of focus and partnering with similar organizations to really make that happen. (LON13_O)
Technology	Technology availability/ implementation	'And because a lot of climate related projects are **newer technology**, they're more innovative, they don't have a long track record'. (LON06_O) 'So that's, that's the other thing, like maybe a **technology would be very effective**, but the institutional investor does not want to take the risk'. (LON07_II) 'And because **a lot of climate related projects are newer technology, they're more innovative, they don't have a long track record**, . technology risk is definitely one of the [barriers].. But I think the like the overarching one is **there's a mismatch and a lack of capacity on the project developer side to speak the language of that investors are**. And then there are very few investors that are willing to try to figure out the language of the cities are speaking and like where the cities are able to get to. I think the point I the lack of knowledge, technical advice on green infrastructure investment.[……..] I work on the **Project Preparation Action Group**, so I'm hearing about those challenges. But really that there's a gap between the, like the technical capacity and the language and the way that cities think about and understand projects and then the way that investors do. Where, a city is going to start looking for outside financing much earlier on in the project cycle. And so it won't be at the stage where you can go to a bank or go to an asset manager and present a compelling investment case. And whether that's because they don't have the internal capacity to put staff time into it to do the pre-feasibility studies they need to for budget reasons, or technical reasons, because their projects are too small and the ticket sizes aren't big enough. But there's, there's definitely this disconnect.. Knowing what they need to present something to an investor that will actually help them to access that financing. I think that's some of that is probably is definitely coming from the perception that returns are low and they require high capital investment.' (LON06_O).

Annex 10. FIE Maturity Assessment Model (MAM) pilot results

Interview data from 17 FIEs operating in the lead territories is plotted below into the MAM. This is a highly subjective and qualitative assessment carried out by 2 researchers and the interviewer based upon a short interview and review of policy documents. It was carried out with the main purpose to test the robustness and usefulness of the model.

Legend: Y- Yes: present in the organisation, N- No: not present, ND- Not deducible from the interview and other materials, NA- Not applicable.

Condition	Intervention category	Features of investment maturity	Maturity assessment results																			
			INS 01	INS 03	INS 04	ROM 01	ROM 02	ROM 03	ROM 04	FR 01	FR 02	Fr 03	FR 05	IT 01	IT 03	IT 04	BElo 1	BEL 02	BEL 03	BEL 04	Cha m 01	TOT
Exposure	Exposure	Climate hazard exposure	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	ND	Y	Y	Y	Y	Y	Y	17
	Stress testing	Climate risk assessment (CR) tools use (TCFD, EU Tax, stress test)	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	ND	Y	Y	Y	Y	Y	15
	Climate screening	CR investment screening	Y	Y	Y	ND	Y	N	Y	Y	N	Y	Y	Y	ND	Y	Y	Y	N	Y	Y	14
Commitment	Industry leadership	Leadership	N	N	Y	N	Y	N	N	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	9
		Adaptation investment interest	Y	N	Y	Y	Y	ND	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	12
	Vision	Commitment/vision/targets	Y	N	ND	N	Y	N	N	N	N	NA	Y	Y	ND	N	N	N	N	N	ND	4
	Collaboration	Networks/partnership	Y	N	Y	N	Y	N	Y	Y	Y	ND	Y	Y	Y	ND	Y	Y	N	Y	Y	11
		Coordination/collaboration	Y	N	Y	Y	Y	N	N	Y	Y	ND	Y	Y	Y	ND	N	N	N	Y	Y	11
	Resources	Human capacity	Y	N	Y	ND	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y	13
		Internal funds/funding	Y	Y	Y	N	Y	N	N	Y	Y	ND	ND	ND	Y	ND	ND	N	N	Y	ND	8
Markets/Finance	Investment readiness	Readiness/motivation /financing activities	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	Y	Y	14
		Concessional capital/securitised vehicles	NA	N	ND	ND	Y	Y	N	NA	ND	N	N	NA	Y	ND	N	N	N	Y	Y	5
		Mechanisms/tools/products	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	ND	ND	Y	N	Y	N	Y	Y	12
		Co-investment/de-risking/transaction bundling	Y	N	N	N	Y	Y	N	Y	Y	Y	ND	N	N	Y	N	N	N	Y	Y	9
	Market failure	Incentivisation/impact monetisation/vesting value	Y	N	Y	N	Y	N	N	NA	N	N	N	N	N	N	N	N	N	ND	Y	4
	Commercials - Flexibility	Risk/return	ND	Y	ND	ND	Y	ND	N	NA	N	N	N	Y	Y	N	N	N	N	ND	Y	5
		Bankability/income stream/transaction size/bundling	Y	N	N	N	Y	NA	N	NA	Y	NA	N	N	N	NA	N	N	N	N	N	3
		Flexible structures	ND	Y	Y	ND	ND	Y	N	NA	N	N	ND	Y	Y	NA	N	N	Y	ND	Y	7
	Scale/Market maturity	Proportion portfolio invested adaptation	Y	Y	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	N	Y	11
		Proportion portfolio invested nature	ND	N	Y	N	ND	N	N	Y	N	N	ND	ND	ND	Y	N	Y	N	N	ND	4
		Green investment at benchmark level Green	ND	Y	Y	Y	Y	Y	Y	NA	N	Y	ND	Y	Y	Y	Y	Y	Y	Y	Y	16
		Risk disclosures - PILLAR 111 SFDR	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	NA	15
		Sus finance disclosures - PRI	Y	Y	Y	Y	Y	Y	N	N	Y	ND	N	Y	NA	Y	Y	Y	Y	Y	Y	14
Policy	Disclosure	CR reporting & disclosure	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	N	ND	ND	N	Y	N	ND	Y	9
	Incumbency	Tackling lock-in/bias	NA	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1
Knowledge	Knowledge/ Awareness	Experiments/innovation	Y	N	Y	N	N	N	N	Y	N	N	Y	Y	N	Y	N	N	N	N	Y	7
		Awareness/knowledge /advice	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	14
		Best practice	Y	N	N	N	Y	N	N	Y	N	Y	N	N	N	N	N	Y	N	N	Y	6
Technology	Tech	Tech availability	Y	N	Y	N	Y	N	N	N	N	N	N	Y	Y	ND	N	N	N	N	N	6
		Tech innovation	N	N	N	N	N	N	ND	Y	N	N	N	Y	ND	ND	N	N	N	N	N	2
TOTAL			21			9	25	9	8	16	12	11	15	20	12	14	8	12	8	16	22	



Annex 11. Flagship projects

Name	Type	Prioritised	Focus	What do they do?	Target Audience	Membership?
Adaptation fund	UN Fund	No	Climate adaptation	Finances projects and programmes from planning to implementation, ensuring monitoring and transparency at every stage	Developing countries	Yes
IIGCC	Platform	Yes	Climate Change	Support investors in understanding risks and opportunities associated with climate change	Institutional Investors	"Yes, +400 members. Annual fee according to the number of employees "
ARSINOE	Project	No	Climate adaptation	Co-creation and design of innovative climate adaptation solutions	Small or medium-sized enterprises, start-ups, spin-offs, universities or research and technology development institutes, multinationals, NGOs and foundations.	No
Climate100+	Platform	Yes	Climate Change	High-level agenda for company engagement to achieve clear commitments to cut emissions, improve governance and strengthen both climate-related financial disclosures and transition plans.	Investors and world's largest corporate GHGs emitters	Yes, +700 investors and +170 companies
Bankers without Borders	Platform	No	Poverty	An operational framework to mobilise, engage and harness the talents and skills of the private sector to support both its own mission and that of other poverty-focused social enterprises.	Social enterprises and non-profits fighting global poverty	Yes. Volunteers.
CDP	Platform	No	Environmental impacts	Environmental disclosure (they started with C, but then added water security), while building outreach to support cities, states and regions.	Investors, companies and subnational governments	Yes
Cities climate finance (CCFLA)	Platform	Yes	Climate Change	Multi-level/stakeholder coalition aiming to close the investment gap for subnational urban climate projects and infrastructure. The platform enables knowledge exchange between all relevant actors involved in urban development, climate action and/or finance.	Sub-national level: public and private financial institutions, international organisations and cities and sub-national networks.	Yes
Column2	Type	Prioritised	Focus	What do they do?	"To who? Target Audience"	Membership?
Adaptation fund	UN Fund	No	Climate adaptation	Finances projects and programmes from planning to implementation, ensuring monitoring and transparency at every stage	Developing countries	Yes

Adaptation fund	UN Fund	No	Climate adaptation	Finances projects and programmes from planning to implementation, ensuring monitoring and transparency at every stage	Developing countries	Yes
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CDP	Platform	No	Environmental impacts	Environmental disclosure (they started with C, but then added water security), while building outreach to support cities, states and regions.	Investors, companies and subnational governments	Yes

Annex 12. FIE engagement strategy

This is a draft version of the FIE engagement strategy (Version June 2024)

1. Introduction

What do we mean by FIEs?

The definition of FIEs has a basis in the CLIMATEFIT Grant Agreement, as follows: "Financing and Investment Entities" who are targeted to discover and access resilient investment opportunities. With reference to an Investment Entity, it can be defined as 'an entity whose business purpose is to make investments for capital appreciation, investment income, or both. An investment entity also evaluates the performance of those investments on a fair value basis' (IFRS, 2012)[49]. An FIE can also be conceptualised as a body that 'obtains funds from one or more investors for the purpose of providing the investor(s) with investment management services; commits to its investor(s) that its business purpose is to invest funds solely for returns from capital appreciation, investment income, or both; and measures and evaluates the performance of substantially all of its investments on a fair value basis' (PwC, 2021)[50]. Compared to Financing Entity, the latter is more involved in funding business activities, making purchases, or investments through banking or other financial activities such as insurance, finance leasing, issuing credit cards, and portfolio management.

Who are FIE Champions?

FIE Champions are, as outlined in the CLIMATEFIT Champion Guidelines, a set of: "identified organisations and stakeholders that provide different types of funding and financing sources for climate resilience. They have excellent knowledge of key innovative Adaptation Funding and Financing Solutions (any funding, financing, guarantee scheme, grants, or a combination thereof necessary to finance the investment concept). They will be consulted during the project to test the aforementioned solutions. 'Champions' will test and help improve various innovative Investment Concepts, Incentive Mechanisms and Adaptation Funding and Financing Solutions targeted and tailored to climate resilience."

According to the Champion Guidelines, criteria for selection include the following:

- Implements a robust framework to support climate adaptation (climate strategy, climate risk assessment, action plan, targets, KPIs, reports) (MANDATORY)
- Adheres to associations/initiatives on climate, sustainable investments, biodiversity protection or other typologies (e.g. being a member of a Sustainable Investment Forum – SIF/Subscribers of PRI)
- Following the recommendation of the Task Force on Climate-related Financial Disclosure (TCFD)/International Sustainability Standards Board (ISSB).
- Implements climate stress test (Banks)
- Invests in activities eligible for Climate Change adaptation according to the EU Taxonomy
- Invests in Nature-Based Solutions (NBS)
- Provides Finance for Biodiversity Pledge Signatory
- Has an Adaptation Plan in place or planned in the next three years (follow an annual plan that integrates criteria focused on climate change adaptation and resilience to address climate-related challenges)
- Actively targets the goal of climate neutrality within investment activities (net-zero objective)
- Invests in SDGs aligned activities (e.g. SDGs 9; 11; 13; 14; 15)
- Signatories of global initiatives on sustainable finance (i.e. Principles for Responsible Investments (PRI)

2. FIE's Engagement Strategy – Main Objectives

The objective of the FIE Engagement Strategy is to attract and retain FIE interest in CLIMATEFIT and ensure FIEs' collaboration and cooperation in reaching CLIMATEFIT's key objectives and progress on its deliverables, including and not limited to:

- the co-development of the investment strategies and of the investment plans;
- the co-design and development of bankable and scalable Climate Adaptation Financing Solutions including sustainable and replicable Incentive Mechanisms;
- co-design of credit/risk models adapted to Climate Adaptation financing and investments;
- acceleration of FIE participation to Climate Adaptation pipeline development.

The ultimate objective is to ensure the participation of certain FIEs in the financing of four pilot projects in CLIMATEFIT's four Lead Territories.

[49] IFRS (2012) Investment Entities. Project Summary and Feedback Statement. Available Online: PDF
[50] PwC (2021) Definition of an investment entity. Available Online: URL

To ensure that FIEs develop and retain interest in CLIMATEFIT, a specific retention strategy will be developed to ensure that participation in the various stages of the project maintains value to FIEs. Initially value could be provided through training or relationship building, which could eventually involve into actively developing/participating to new Adaptation business/investment opportunities.

This proposed strategy calls on one hand for a coordinated and extensive communication and dissemination effort of CLIMATEFIT's activities to FIEs and on the other hand the creation and management of fora where FIEs can discuss and develop adaptation investment and financing opportunities with other Key Stakeholders.

3. FIE's Engagement – Roles and Responsibilities

The engagement of FIEs falls to different partners across the CLIMATEFIT consortium, especially those working with Lead Territories. This section outlines the different roles and responsibilities in the realm of engaging FIEs throughout the CLIMATEFIT project lifetime, in particular the FIE Engagement Lead role (see below).

To start, the diagram below showcases the relationship between the different roles and responsibilities of the actors engaged in the initiation and execution of CLIMATEFIT activities with the Lead territories. Following the outputs from WP1, the Lead territories (Strasbourg, Flanders Region, Alba Iulia, and Brescia) help the Lead facilitators identify the FIEs within their territories. Together with the Lead Facilitators, input to WP1 was collected from the Consortium leads in each territory, PAs, Lead Territory FIEs, and Advisors. The Lead Territory FIEs also provide input to the information collected by the Lead Territories and Facilitators, together with the Advisors who assist in research-based activities and advise on FIEs engagement and financing issues.

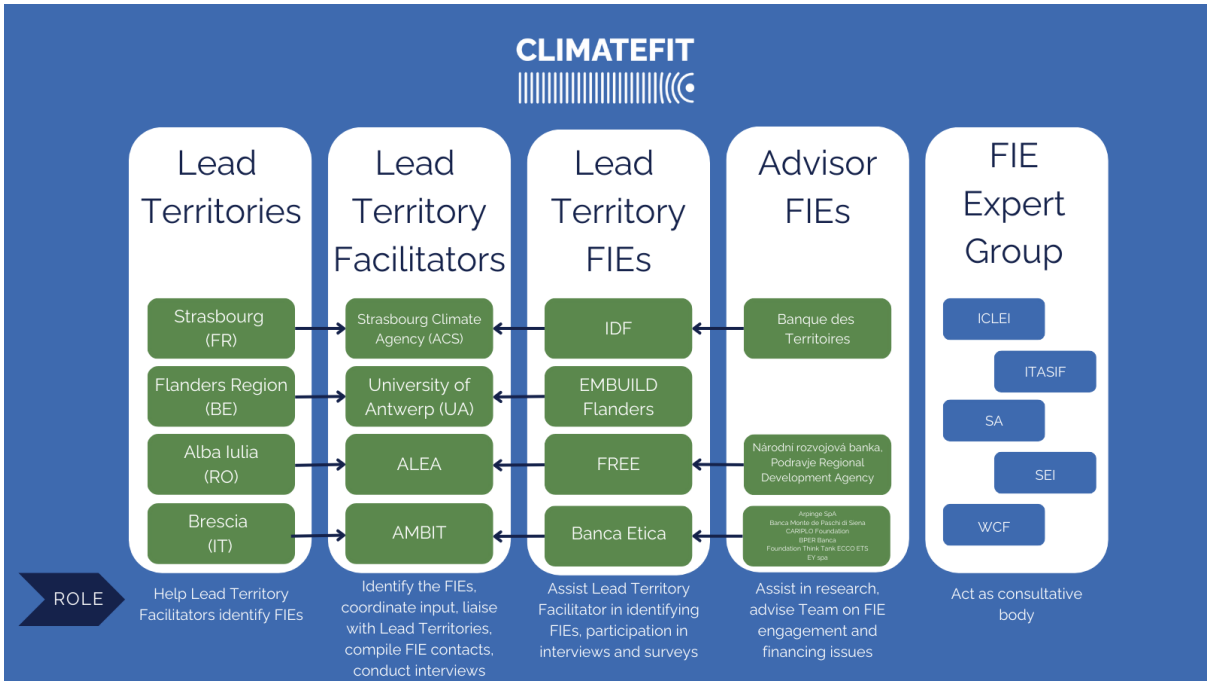

Figure. Role in CLIMATEFIT FIE engagement.

FIE Engagement Lead (FEL)

The execution of the FIE Engagement Strategy falls operationally to the FIE Engagement Lead (FEL) (to be appointed, see below 4.1 Human Resources and Responsible Partners). Each step of the engagement (see Section 2 below) will be led by the FEL in conjunction with WP Leads. Meanwhile, the steering of further versions will be designated to WP leaders. The FIE Engagement Lead will develop and implement training programs and standard communications/engagement procedures and materials to ensure a high level of quality and consistency in CLIMATEFIT's approach to FIEs.

The FIE Engagement Lead (FEL) is a role created specifically to make outreach to FIEs effective within the scope of CLIMATEFIT. As noted in the FIE Engagement Lead Role Note, "An FIE Engagement Lead (FEL) takes the leadership position of engaging FIEs in CLIMATEFIT. That includes designing, overseeing, and managing the engagement of FIE across all work packages. Thus, the FEL assures that engagement activities involving FIEs are done properly, professionally, and efficiently. The FEL is primarily a position of a strategic nature, not operational, in that it is centred on setting a common vision, approach and standards, as well as providing methodologies and tools, which consortium partners can adopt to successfully involve FIEs. Considering that FIEs engaged in the project are in different geographical locations and their account managers vary

(consortium members holding many of these contacts), the FEL seeks to guarantee that interactions with FIEs in the project meet minimum quality standards. Where deemed necessary, the FEL supports CLIMATEFIT account managers with advice and guidance on engagement.

The FEL focuses on agenda setting, guidance, and task management. Specifically, FIE Engagement Lead (FEL) is a strategic role created to ensure effective outreach to FIEs within the scope of CLIMATEFIT. The FEL is responsible for:

- Overseeing the execution of the FIE Engagement Strategy across all work packages.
- Designing and managing the overall engagement approach for FIEs.
- Developing and implementing training programs, standard communications, and engagement procedures.
- Setting common vision, approach, and quality standards for FIE interactions.
- Providing methodologies and tools for consortium partners to engage FIEs successfully.
- Collaborating with Work Package (WP) Leads to steer strategy development and implementation.
- Supporting CLIMATEFIT Account Managers with advice and guidance on engagement when necessary.

The FEL ensures that all FIE engagement activities are conducted professionally, efficiently, and consistently across the project, regardless of geographical location or varying account managers.

FIE Account Managers

FIE Account Managers will maintain the direct level of contacts with FIEs. FIE Account Managers are overseen by FIE Engagement Facilitators to ensure progress in discussions. Different relationship/structures will be explored and implemented flexibly, depending on the territory/Governance structure, however, these will maintain standards across different regions. In comparison to the FEL role, the FIE Account Managers' priorities include: managing portfolios, monitoring progress and set evaluation reports to maintain the FIEs engagement.

Specifically, FIE Account Managers are responsible for maintaining direct contact with assigned FIEs. Their primary duties include:

- Serving as the primary point of contact for specific FIEs.
- Building and maintaining relationships with assigned FIEs.
- Communicating project information and opportunities to FIEs.
- Gathering feedback and insights from FIEs to inform project strategies.
- Implementing engagement strategies developed by the FEL and Facilitators.
- Reporting progress and challenges to FIE Engagement Facilitators.

FIE Account Managers operate flexibly within different territories and governance structures while adhering to project-wide standards.

FIEs Engagement Facilitators

Designated CLIMATEFIT **Facilitators** will manage each FIE engagement process in each country (See Chapter 3, Table 3.1 for an overview of the facilitators). They will ensure account manages are progressing in discussions with the facilitators

Specifically, FIEs Engagement Facilitators manage the FIE engagement process at a country or regional level. Their responsibilities include:

- Overseeing FIE Account Managers within their assigned geographical area.
- Ensuring progress in discussions between Account Managers and FIEs.
- Adapting engagement strategies to local contexts and governance structures.
- Coordinating engagement activities across multiple FIEs within their region.
- Liaising between Account Managers and the FIE Engagement Leader.
- Monitoring and reporting on regional engagement progress and outcomes.

FIE Expert Group

Alongside the appointment of an FEL, an FIE Expert Group (FEG) has also been created. FEG current members are: ICLEI, ITASIF, SA, SEI and WCF. The FEG is a permanent consultative body that will support the FEL with advice/opinions and/or contacts during the different stages of the project. FEG, will meet semi-annually or can be convened by FEL on an ad hoc basis should urgent issues need to be addressed.

4. How to Engage FIEs?

The following section outlines the criteria for engaging with FIEs as part of CLIMATEFIT, as well as the tools that will be employed to best reach and interact with them. It then goes on to outline specific activities in the short and long term that will be undertaken by project partners.

FIE's Engagement Criteria

FIEs Engagement Criteria for which FIEs are selected and prioritised as appropriate for involvement shall focus on diversity of types of FIEs (banks, institutional investors, asset managers, philanthropic organisations, developers, impact investors etc.), FIEs that have curiosity in financing adaptation, with EU territory business activity, and a willingness to be involved in adaptation financing.

Key Criteria:

- Diversity: Emphasize engagement with a diverse set of FIEs in terms of size, sector, and geographical spread, risk appetite, solutions provided, etc. Prioritise larger entities. Facilitate communication and training through joint PA/FIE co-design sessions.
- Commitment to Adaptation Financing: Assess FIEs' curiosity, willingness, and existing involvement in financing adaptation. This can also include identifying mitigation vs adaptation commitments, and how adaptation fits into climate commitments
- Prioritization: Engage Champion FIEs, Leader Territory FIEs, and essential stakeholders in each territory like State Investment Banks, Governments, Financial Regulators, and Enabling Organizations. The process can adapt to and support progress made in FIEs, as climate adaptation strategies and investment plans develop.
- Nice-to-Have Criteria: Recognize involvement in best practices or funding mechanisms related to adaptation as a positive criterion.

Based on the Pathways2Resilience D5.2 Catalogue of Sources, Instruments, and Best Practices Examples, a preliminary list of different FIE types have been evaluated to determine levels of priority, as distinguished in three categories: priority FIEs, secondary FIEs, and FIEs to reserve for future work. The former will comprise the early efforts in FIE engagement as part of CLIMATEFIT.

As of the time of writing, the prioritization of FIE types are as shown in the table below

Table. Types of FIEs by level of prioritization in CLIMATEFIT outreach efforts

Priority FIE types
1. Banks and Financial Institutions • Central Banks • Corporate Banks • Investment Banks • Retail Banks • National Development Banks • Sovereign Wealth Funds • Council of Europe Development Bank • European Bank for Reconstruction and Development • European Investment Bank
2. Government and Public Sector Entities • National Governments • Local Municipalities • Regional agencies • European Commission • Government Agencies • Regulators
3. Charities, Trusts, and Foundations • Charities and Trusts • Foundations • Philanthropies • Banking Foundations
4. Insurance and Reinsurance Companies • Insurers • Reinsurers • Households – Insurance
5. Investment and Development Organizations • Impact Investors • International Climate or Development Funds • EIT Climate KIC (was not sure where to place them) • Community Development Financial Institutions • Community Land Trusts • Project Developers

• Adaptation-focused companies **6. Utilities** • Investor-owned utilities • Publicly-owned utilities **7. Non-Governmental Organizations (NGOs)** • NGOs **8. Households and Individuals** • Households – Insurance
Secondary FIE types
• Asset Managers / Institutional Investors • Businesses • Community Development Companies • Households - Bills / Utilities • Households – Direct • Households - Property Owners • Individuals - Retail Investors • Large enterprises and multinationals • Pension Funds • FIE Ecosystems (e.g. Think Tanks, Universities, Colleges and Schools
FIEs to reserve for future work
• Angel Investors • Business Improvement Districts • Individuals – Direct • Individuals - Savings • Individuals – Visitors (not sure I got what do you mean by this) • Lotteries • Micro Small and Medium-Sized Enterprises (MSMEs) • Own resources • Venture capital investors

FIE Maturity Assessment. Engagement Criteria for FIEs, as described above, as well as engagement activities described below, are also to be informed by an FIE Maturity Assessment. This assessment will be a tool to guide how FIE engagement develops and is tailored to the unique context of each FIE.

Based on interviews with FIEs, financial regulators and supervisors of the financial system, an FIE maturity assessment model is formed under WP1.2, that is aimed to understand FIEs adaptation finance capabilities and appetite, while provide FIEs themselves to identify their strengths and weaknesses, forming and form the basis for tailored investor climate action plans (ICAPs).

The FIE Maturity Assessment is a qualitative assessment approach that aims to be a resource for:

- PAs to use to identify and understand for the FIEs in their territory their adaptation finance capabilities and appetite. This information/intelligence can assist PAs in selecting FIEs for deep engagement in CF and in general in the long term for potential partnering on financing adaptation.
- CF Consortium to better understand the maturity of the FIEs involved in CF, giving the ability to prioritise engagement activities with those with higher maturity ratings. A CF academic paper on growing FIE maturity (participating FIEs will be surveyed at project start, mid-way and close).

Thus, it is important to consider the results from the FIE's Maturity Assessment to help guide the discussion on which entities to engage and how. This can be applied by identifying FIEs' objectives and opening up dialogue to identify FIE's climate and risk management governance body (from survey and interviews – CFO/CEO/Board Committees/other). The definition and invitation of FIE Champions (based on FIE Maturity Assessment results) can also be applied.

Task WP1.2 will be undertaken with the full involvement of CLIMATEFIT's FIEs and additional FIEs active in the territories covered by the project and interested to open their investment portfolios and methodologies for investment assessment to identify opportunities for new investment (for instance through WCF, F4T, ITASIF, SA and our Advisory Board's networks). WCF will assess their main barriers, drivers and current practices of climate resilience funding and financing, drawing upon the amassed knowledge products of these organisations. The assessment will include an exploration of the common ground with the project and financing models in use for adaptation. The assessment will be based on interviews with FIEs, financial regulators and supervisors of the financial system.

FIE Engagement Tools

Internal databases and software

- Client management software (CRM e.g. Salesforce) considering the challenge of participation by different organisations
- Collation of all FIEs joining the network onto Sales Force database by WCF partners

All designated FIE Facilitators will utilize the distributed account management approach assisted by EQY. This ensures efficient tracking and management of engagement activities. The Database to be made available to CLIMATEFIT consortium members to facilitate and enable project development activities.

Capacity Building and Trainings

Induction programs and a series of engagement events are aimed to bring FIEs together, facilitated by WCF, EQY & Ramboll. A timeline for the events will be developed by EQY in WP1.2 including these and other activities that serve to implement an FIE Engagement Strategy. The activities will be commenced by the designated Facilitators in M3 in coordination with WCF as part of WP1.2.

It is important to employ a participatory approach allowing FIEs to co-design the programs and events. This approach ensures that the needs and perspectives of all stakeholders are considered, fostering a sense of ownership and commitment among FIEs. The co-design process could include the following elements: needs assessment, collaborative planning sessions, pilot programmes, and regular engagement and feedback loops, etc.

Interviews and Surveys of initial target FIEs in CLIMATEFIT's Lead Territories (Belgium, France, Italy, and Romania) and identification of Champion FIEs (should be in Tools)

- Development of a series of FIE (and stakeholder) "voice of the investor" survey instruments to capture and measure FIEs' interest/perceived value-add to project participation.
- M4-5: Establishment of contact and sharing of promotional/explanatory materials about CLIMATEFIT
- M4-5: Setup of interviews and gathering of consent forms
- M4-6: Conducting and transcription/translation of interviews
- Timeline TBD: Analyses of interview findings.

Existing Events and Initiatives relevant to FIEs

- Existing spaces and events where FIEs are present
    - e.g. Institutional Investors Group on Climate Change IIGCC, UN Principles of Responsible Investment UNPRI, Covenant of Mayors, etc.
    - Multistakeholder events devoted to sustainable funding, such as strategic development sessions, national workshops, etc.:
    - Sessions typically involve key stakeholders, including institutional investors, government representatives, and industry experts.
    - Discussions on integrating adaptation and mitigation factors factors into investment decisions, identifying sustainable investment opportunities, and developing long-term strategies.
    - Workshops which bring together diverse stakeholders, such as government officials, financial institutions, non-governmental organizations (NGOs), and private sector representatives.
    - Events for which the topics cover national climate policies, green finance mechanisms, and public-private partnerships for sustainable development.

A targeted series of engagement methods for FIE Champions has also been laid out in the CLIMATEFIT Champion Guidelines, including initial email-based outreach materials, and subsequent opportunities like FIE Champions' participation in webinars and trainings as speakers, involvement of FIEs in territorial meetings and Local Resilience Taskforces (LRTs), and features of their stories on CLIMATEFIT communication and dissemination channels.

5. FIE's Engagement Activities

The engagement activities for FIEs are designed to evolve over both short-term and long-term horizons to ensure sustained interest and effective collaboration with FIEs selected for cooperation. The activities are structured to support FIEs in developing and expanding their adaptation finance strategies, as well as to leverage their participation in key project activities within CLIMATEFIT. Below is a detailed expansion of the short-term and long-term engagement activities, along with the methodological approach and reasoning for this division. This section of the FIE Engagement Strategy aims to link closely to the LRT Engagement Plan produced in Work Package 4.

Short Term (2024-2025)

The key tasks for short-term activities in the FIE Engagement Strategy are centred around supporting FIEs to build and expand their adaptation space within their climate risk management strategies. These tasks involve:

- Support FIEs to build/expand adaptation space within climate risk management strategy
- Communicate CLIMATEFIT objectives and ambition: organize and conduct regular informational sessions to clearly communicate the objectives, goals, and ambitions of CLIMATEFIT on adaptation finance. These events are designed to engage FIEs and inform them about the project's aims and benefits. This block of activities will allow to build relations with selected FIEs and ensure the unity of the formed vision. Host regular webinars and workshops to introduce FIEs to CLIMATEFIT's objectives, goals, and the broader vision for climate adaptation finance.
- Align CLIMATEFIT with national adaptation strategies: review the local and EU-level adaptation strategies with following facilitation of the sessions to discuss how CLIMATEFIT's initiatives align with or complement existing national and EU-level adaptation strategies. This activity will help to highlight synergies and potential areas for collaboration in the field of adaptation finance. The review sessions should involve FIEs to include their perspective on climate funding and financing.
- Inform on CLIMATEFIT's opportunity to access pre-selected local and international adaptation investment pipeline
- Communicate CLIMATEFIT's activities in scaling up investment potential
- Promote CLIMATEFIT opportunity to become an 'innovator' within the adaptation financial landscape: within this activities pack, it is planned to organise a promotion campaign on how participation in CLIMATEFIT could be beneficial for FIE`s reputation and market positioning as innovators in the adaptation finance. This will allow for increased interest from FIEs and potentially create a multiplication effect, where the piloting FIEs could serve as role models in the market.

Project activities in which we will engage FIEs are numerous and include:

- Co-design of investment strategies and plans: Involving FIEs in the co-design of investment strategies and investment plans is crucial for ensuring that these strategies are both effective and aligned with CLIMATEFIT's objectives and existing climate strategies on the EU, national and local levels. Participative approach allows to foster a sense of ownership and commitment, which is essential for securing sustained investment and support. This could be achieved through a) collaborative workshops, b) one-on-one consultations with FIEs, and c) feedback loops in the form of followup surveys or meetings.
- Identification of innovative adaptation financing/funding solutions (AFFS): This activity is vital for generating innovative ideas on how to attract new sources of funding for adaptation action and how to diversify the funding portfolio by attracting new types of investors. This could be achieved through a) mapping existing innovative financing mechanisms in each national context, bearing in mind existing regulatory constraints in each country, b) expert group consultations in each national context, c) piloting projects to test the feasibility and scalability of identified AFFS.
- Investment concepts (ICs): Developing new investment concepts is crucial for shifting the dominant paradigm from traditional funding to impact funding that considers not only financial KPIs but also climate-related indicators. By involving FIEs in this process, we can ensure that the concepts are financially viable and have high chances of being adopted by FIEs. Prototyping and validation further ensure practical applicability, while documentation and dissemination of successful concepts help in spreading best practices and encouraging broader adoption.
- Incentive mechanisms (IMs): Implementing effective incentive mechanisms is essential for encouraging investment in climate adaptation projects. These mechanisms can significantly enhance the attractiveness of projects by offering financial benefits or risk mitigations. Integrating these incentives into policy frameworks ensures sustained support and stimulates market activity, driving more capital into climate adaptation projects. This could be achieved through a) engagement of respective stakeholders, namely PAs and regulators, to identify potential policy and fiscal incentives, b) policy advocacy, c) impact assessment and evaluation of the implemented measures.
- Negotiation of investment agreements resulting in investment cases): Expert facilitation and advisory services provide clarity and confidence to FIEs, reducing barriers to investment. Documenting and sharing successful investment cases offer templates and learning tools for future projects. Thus, the activities cover a) success stories documentation and promotion, b) advisory services for investment agreements.

Long Term (2024 – 2026)

In long-term activities, we would like to promote sustainable finance and sustain FIEs' involvement in adaptation projects. By effectively pitching CLIMATEFIT's opportunities, we aim to provide knowledge exchange and foster innovation and resilience in climate change. This includes:

- Gathering and disseminating adaptation knowledge, promoting best practices on sustainable financing solutions, and sharing the financing landscape of adaptation vs mitigation investments.
- Showcasing best practices on sustainable financing solutions and promoting the adaptation champions case studies

- Linking the activities to the EU Taxonomy compliance, contribution to FIEs KRIs/KPIs

6. Impact of FIE Engagement Activities

The work undertaken to engage with FIEs aims not only to benefit FIEs themselves and encourage their further interest and involvement in CLIMATEFIT and adaptation finance largely, but also to create a broader impact of CLIMATEFIT actions. This means that the FIE Engagement Strategy supports Key Performance Indicators (KPIs) and Key Results Areas (KRAs) of CLIMATEFIT that range from the number of FIEs engaged to the amount of money leveraged for climate adaptation.

Benefits to FIEs

From their involvement in these activities, CLIMATEFIT foresees the following benefits to FIEs of participation in CLIMATEFIT:

- **Knowledge sharing and advice**: CLIMATEFIT provides a platform for FIEs to access guidance on adaptation and mitigation finance, knowledge exchange, and networking opportunities. Through workshops, webinars, and expert consultations, FIEs gain in-depth knowledge about sustainable finance practices, climate adaptation strategies, and emerging trends, thus, the project assists FIEs to make informed decisions in meeting sustainable finance commitments.
- **Facilitating connections**: CLIMATEFIT serves as a bridge, connecting FIEs with key stakeholders involved in adaptation investment projects. By leveraging its Advisory Board, Consortium networks and relationships with PAs, Local Resilience Taskforces (LRTs), the Project fosters collaboration between the key actors in the field in the project area. Through these connections, FIEs gain access to a pipeline of investable projects, valuable resources, and technical expertise, enabling them to explore new investment opportunities and contribute to climate resilience efforts effectively.
- **Promoting best practices**: within the CLIMATEFIT community, project encourages the identification of the FIEs' best practices for different national and regional contexts and promotes them as a new standard for the financing field. Through forums, conferences, and knowledge-sharing platforms, FIEs will be able to showcase their best practices, innovative approaches, and lessons learned. This will allow to shift the paradigm towards more sustainable financing with a shared vision between different stakeholders involved and simultaneously embrace the culture of continuous learning and improvement. The best practices model also could be used for multiplying effect by inspiring other FIEs to adopt and adapt the practices developed within CLIMATEFIT.
- **New market development and investment opportunities**: the Project creates an enabling environment for FIEs to explore new market opportunities and shift investment avenues towards climate adaptation. Through focusing on successful case studies of FIEs champions and innovative sustainable financing models, CLIMATEFIT provokes interest and builds trust among FIEs in funding adaptation projects. This paves the way for increased investments in climate-resilient initiatives.

Broader Impact

In line with the other KPIs and KRAs defined for CLIMATEFIT in the Grant Agreement, the impact of FIE Engagement Activities will include the following outcomes:

- Engagement of 42-84 FIEs
- Aggregate €471 M expected outcome, leveraged €2384M

Review and expand FIE's commitment to CLIMATEFIT

- Monitor FIE's engagement process
- Monitor points of interest
- Expand collaboration to CLIMATEFIT project scale up
- Develop Networking Opportunities among FIEs (by type/ strategy/ location/ambition)

Annex 13. Interview script of the international best practices research

Purpose and structure of the interview

An interview is conducted to gather information about an international best practice that could not be obtained through desk research. This means that information is not yet obtained or is incomplete about one or more elements of the analysis framework.

The interview has an introduction and four question parts:

- Opening questions (OQ).
- Questions based on the analysis framework.
- Specific questions about the IBP (IBP).
- Closing question (CQ).

⚠ The term **international best practice (IBP)** is used generally throughout the interview guide. **During the interview, replace it with the case's name**.

PART I

Opening questions (OQ)

- OQ1. Can you **introduce yourself** and describe your involvement in the IBP?
- OQ2. How does the financial model differ from business-as-usual approaches the same climate challenges as in this IBP?

PART II – questions based on the analysis framework

⚠ Not all questions below will be asked during an interview. If the questions have been sufficiently through the desk research, they will be skipped during the interview.

The questions are based on the components of our analysis framework. Reference to the analysis framework is placed behind the question (for researchers only).

Questions highlighted in yellow will be asked during the interview. All other questions are skipped.

Local context (LC)

- LC1. Which **climate challenges** (risks or hazards) are tackled with the IBP? – *Climate challenge (1a)*
- LC2. Can you describe how the political, social, geographical, cultural, and institutional **context** led to the initiation of this IBP? – *Structural conditions (1b)*
- LC3. before the IBP's initiation, what were **barriers** that inhibited the investment in climate resilience projects? – *Barriers (1c)*
    - LC3a. How were those barriers overcome with the IBP?

The IBP as a climate resilience project (CRP)

- CRP1. which **specific measures or strategies** are implemented in this IBP to tackle the climate challenge(s)? – *Climate resilience solution (2a)*
- CRP2. Which were the main steps that were undertaken in during the **process** to initiate and implement the IBP? – *Process (2b), key activities (A2) and key partners (A2)*
    - Which **official decisions** had to be made and by whom?
    - Which **legal instruments or procedures** were required to implement the IBP? – *Legal conditions (C2)*
    - Which **partners** were (are) involved during the process, and how were they involved?
    - What is the role of the different partners in the implementation of the IBP?

Business model (BM)

- BM1. Which **environmental, social, and economic values** does the IBP offer? – *Value proposition (A1)*
- BM2. Which resources were needed to implement the IBP (for example, staff, time, budget, expertise, technical knowledge…)? – *Key resources (A2) and resources and transaction costs (C1)*
- BM3. Who are the key beneficiaries of the proposed values? – *Key beneficiaries (A2)*
- BM4. What is the governance structure of the IBP? – *Governance (A2)*
    - ↪ How is the IBP managed and organized on a daily basis?
- BM5. What are the costs of delivering and maintaining the IBP? – *Value capture (A3)*
- BM6. How are costs reduced with the IBP compared to business-as-usual? – *Value capture (A3)*

- BM7. How are the values of the IBP captured through monetary values or public goods? – *Value capture (A3)*

Financial model (FM)

- FM1. How are financing and funding secured for the IBP? – *Financing and funding structure (B1)*
- FM2. From which sources do financing and funding come, and how much? – *Sources (B2)*
- FM3. Which instruments or financial mechanisms are used to secure financing and funding? – *Instruments (B3)*
- FM4. How are financial risks for the partners involved mitigated, shared, or managed through the IBP's financial model? – *Financial risks and de-risking (C3)*

Outcomes (O)

- O1. Does the actual **implementation timing and cost** match the initial estimates or expectations? – *Efficiency (3a)*
- O2. Has the climate resilience solution (so far) been **effective to address the climate challenge(s)**? – *effectiveness (3b)*
- O3. Are there any broader economic, societal, cultural, or environmental **impacts from the IBP**? – *Impact (3c)*
    - How are the costs and benefits distributed among society?

Lessons learned (LR)

- LR1. What are the main successes of the IBP, and specifically the financial and business model used in this IBP? – *Successes and limitations (4a)*
- LR2. What are limitations of the IBP, and specifically the financial and business model used in this IBP? – *Successes and limitations (4b)*
- LR3. What are conditions to transfer of the IBP's business and financial model to other contexts? – *(potential and conditions for transferability (4b)*

PART III

specific questions about the IBP

To be prepared by the interviewer based on the desk research

PART IV

Closing questions

- CQ1. What advice would you give to other municipalities or regions that would like to implement the business and financial model used in the IBP?
- CQ2. Is there anything you want to add about the IBP that was not addressed during the interview?

Annex 14. 20 international best practices: information cards (T1.3)

Greater Cape Town Water Fund (Cape Town, South Africa)

Location	The City of Cape Town, Western Cape province, South Africa
Population size	The City of Cape Town[51]: 4,977,833 (2024) Western Cape province: 7,433,020 (2022)
Project area size	55.000 hectares or 555 km² (the total expected area for clearing and controlling invasive land species
Area type	Downstream: Urban area (The City of Cape Town) Upstream: mountain areas and Cape Floristic Region
Climate challenge	Droughts due to increased temperature and decreased rainfall
Key Community System(s)	Water management; ecosystems and nature-based solutions
Objectives	Increase water supply and prevent water shortages
Climate challenge solution	Clearing and controlling invasive plant species that use significantly more water than indigenous species in the sub catchments that supply the rivers and dams of the Western Cape Water Supply System (WCWSS)
Key benefits	Increased water supply and security, green jobs, ecosystem restoration and biodiversity enhancement, resilience to climate shocks, reduced severity of wildfires.
Implementation status & timeframe	2017-2049. Implementation of the program is ongoing since 2019.
Investment volume (€)	$54.29 million (2024 US Dollar)
Key financing barriers addressed	Overreliance on inconsistent and insufficient government and private funding; lack of a long-term strategic plan.
Financial model	A Water Fund is a collective action funding and governance mechanism that enables downstream public and private water users to provide financial and technical support in catchment restoration alongside upstream communities.
Financial sources	Public: Local (metropolitan) municipality Private: Large enterprise and multinationals (water-dependent industries) Third sector: Foundations and trusts, philanthropies, charities
Financial instruments	Blended finance: water fund Taxation (public budget from general taxes) Grants: donations, private corporate investments Intergovernmental transfers Results-based financing: payment for ecosystem services

[51] The City of Cape Town is not the same as Cape Town. The City of Cape Town is a metropolitan municipality that forms the local government of Cape Town and surrounding areas. The City of Cape Town contains multiple cities and municipalities, Cape Town being one of those.

Clean Water Partnership (Prince George's County, Maryland, USA)

Location	Prince George's County, Maryland, USA
Population size	957,767 (2021)
Project area size	4,000 acres – 16.19 km² spread across the county (retrofit impervious surfaces targeted)
Area type	Much of the county are urban and suburban communities with impervious areas (buildings, roads, pavements…)
Climate challenge	Water pollution of the Chesapeake Bay due to increased stormwater runoff of polluted and untreated stormwater from surrounding states and counties, including Prince George's County. Local flooding due to increased stormwater runoff
Key Community System(s)	Water management, health and human well-being, local economic systems
Objectives	Reduce stormwater runoff and decrease water pollution in the county's three main rivers, while promoting social and economic development within the County's community
Climate challenge solution	Retrofitting 4,000 acres (total county target is 15,000) of untreated impervious areas with green infrastructure[52].
Key benefits	Improve water quality by removing pollutants. An accelerated implementation of green infrastructure stormwater improvement projects at reduced cost. Creation of green jobs by subcontracting county-based firms, with a focus on local, small, and minority businesses.
Implementation status & timeframe	Since 2014 (implementation ongoing since 2015).
Investment volume (€)	$272.7 million (last update: January 2024)
Key financing barriers addressed	Lack of public funds because of the investment size and short timeframe to meet mandatory targets, despite the county having a steady source of funding through its Clean Water Act fee.
Financial model	CWP is a design-build-operate-maintain community-based public-private partnership (CBP3) with environmental, social, and economic impact performance metrics, a community driven procurement process, and a pay for performance element with the possibility to extend the private party's contract if initial targets are met. Funding for the CWP comes from government agencies grant proceeds, bonds, and a Clean Water Act Fee.
Financial sources	Public: government agencies Private: asset owners/institutional investors, property owners (households)
Financial instruments	Blended finance: Community-based public-private partnership (CB3) Debt: general obligation bond Fee/user charges: property-related fee (Clean Water Act Fee)

[52] Green infrastructure best management practices include bioretention gardens, bioswales, outfall protection, permeable pavement, pocket sand filters, pond retrofits, regenerative step pool storm conveyance, stream Restoration, submerged gravel wetlands, tree box filters tree planting, wet swales

Cloudburst Management. Plan (Copenhagen, Denmark)

Location	Copenhagen, Denmark
Population size	653,664 (2023)
Project area size	179,8 km² (plan for the entire city)
Area type	Urban, flat and coastal terrain.
Climate challenge	Flooding from increased precipitation due to temperature rise.
Key Community System(s)	Water management, Critical infrastructure, nature-based solutions
Objectives	Make the City of Copenhagen resilient against 100-year storms, protect against flooding.
Climate challenge solution	The Cloudburst Management Plan's core principle of the CPM is to channel water above-ground to areas where it causes no damage to reduce pressure on the underground sewage system. The plan includes more than 300 projects based on five solution types: Cloudburst boulevards, underground pipes, retention boulevards, central delays, and green roads.
Key benefits	Flood protection and reduced damage from floods, climate adaptation co-benefits (biodiversity, recreational value, improved microclimate), increase in property values and tax, job creation
Implementation status & timeframe	Since 2011 (Climate Adaptation Plan) and 2012 (Cloudburst Management Pan). Implementation started in 2015 and is ongoing.
Investment volume (€)	€1.9 billion (2024 Euro, 2023 estimate)
Key financing barriers addressed	Lack of public budget within the municipality. Legal framework did not allow utility companies to fund multifunctional surface projects (nature-based solutions)
Financial model	Co-financing with public budgets from taxation, water tariffs from the utility company, and private financing from landowners
Financial sources	Public: local municipalities, publicly owned utilities Private: property owners
Financial instruments	Fees/user charges: stormwater fees (Water tariffs) Public budget from general taxation Direct private investment from property owners Debt: concessional finance (loans with below market rate interests)

Ecomarkets (Victoria, Australia)

Location	Victoria, Australia
Population size	6.681 million (2021)
Project area size	227,444 km2
Area type	Mountains, coastal, rural
Climate challenge	Biodiversity quality loss resulting from wildfires, which is also exacerbated by climate change as shifting temperatures and extreme weather events disrupt ecosystems, leading to habitat destruction and species extinction.
Key Community System(s)	Ecosystems and Nature-based solutions, land use and food systems, water management
Objectives	To incentivize private land owners in Victoria to improve land management for biodiversity protection and native revegetation
Climate challenge solution	The Ecomarkets program emerged as a solution to address the challenge of limited public funding for biodiversity protection. It is a market-based financial mechanism to incentivize private investment in environmental improvements. Landowners who implement practices that enhance biodiversity, such as revegetation projects or improved water management, can earn income by participating in the program. DEECA, which is the environmental agency of Victoria, Australia verifies the environmental benefits achieved by these practices and issues tradable credits reflecting the ecological value generated. Developers whose projects have a negative impact on the environment (e.g., habitat loss) can then purchase these credits through a designated trading platform. This allows developers to fulfil their offsetting obligations mandated by regulations and proceed with their projects. While Ecomarkets programs primarily focus on biodiversity conservation, they can also indirectly contribute to climate change mitigation. Certain land management practices that enhance biodiversity, like planting trees, can also act as carbon sinks, potentially contributing to national climate goals and reducing wildfire risk.
Key benefits	Private funds for biodiversity protection, low involvement of public authorities, self-sustaining system
Implementation status & timeframe	Ongoing, 2006-present
Investment volume (€)	NA
Key financing barriers addressed	Limited public budget, fluctuating credit prices, upfront costs from landowners
Financial model	Landowners who implement approved projects receive credits based on the verified environmental improvements achieved (e.g., increased biodiversity, improved water quality). These credits represent tradable commodities. In a market-based program, landowners can sell their credits to developers or other entities requiring environmental offsets. Developers can purchase credits from landowners through trading platform to fulfill their offsetting obligations. Each credit represents a specific amount of environmental benefit.
Financial sources	Private: Project Developers, landowners
Financial instruments	Results based financing: Payment for ecosystem services Fees/user charges: offsetting

NICE GREEN Nagoya greenification certificate system (Nagoya, Japan)

Location	Nagoya, Japan
Population size	2,331,078 (2021)
Project area size	A program that applies to the entire city: 326.45 km²
Area type	Urban
Climate challenge	Urban heat island because of global warming
Key Community System(s)	Human health and wellbeing, critical infrastructure.
Objectives	Reduce urban heat island effect, conserve and enhance biodiversity
Climate challenge solution	Increasing green areas in new urban developments with a regulatory System of Greening Area mechanism and a voluntary Greenification Certificate System mechanism. These mechanisms impose and encourage property owners to increase green areas in new developments through cover and maintenance of trees, the greening of roofs and walls in addition to the commitment of the owner to maintain the green space in the interests of biodiversity
Key benefits	Reduced heat island effect, enhanced biodiversity.
Implementation status & timeframe	Since 2008
Investment volume (€)	NA
Key financing barriers addressed	NA
Financial model	Greenification Certificate system is a voluntary mechanism that allows developers or landowners to receive preferential interest rates on their loan if they achieve a certain score and star rating.
Financial sources	Private: corporate/retail banks, developers/landowners
Financial instruments	Debt: concessional loan Non-financial instruments: Incentives (preferential interest rates

Groenfonds Midden-Delfland, The Netherlands)

Location	Midden-Delfland, Delft, and Schipluiden (The Netherlands)
Population size	NA
Project area size[53]	76 km² (the entire Midden-Delfland green area, including agricultural land, nature areas, recreational zones, and water).
Area type	Agricultural land, peat meadows, polder
Climate challenge	Quality loss of valuable agricultural cultural landscapes due to lack of maintenance of landscape and ecological elements
Key Community System(s)	Land use and food systems
Objectives	Maintaining the agricultural cultural landscape, including valuable landscape and ecological elements, and strengthening the relationship between city and countryside trough recreation and education
Climate challenge solution	Paying dairy farmers to perform green services. Green services include meadow bird management, maintaining historic grasslands, maintaining landscape elements (fruit trees, pollard trees, small canals), and maintaining cultural historical buildings, among others. To reinforce the city-countryside relationship, green services also include opening up farms/companies for educative and recreational purposes.
Key benefits	
Implementation status & timeframe	Groenfonds was officially created in 2005 and is under operation since 2006
Investment volume (€)	€250,000-€500,000 annually for green services
Key financing barriers addressed	Lack of structural and long-term public funding for green area management and maintenance. Green area maintenance is not a priority of dairy farmers, they lack resources for voluntary maintenance.
Financial model	Groenfonds collects financing from real estate (residential and industry) developments through developer obligations under the banner of nature compensations. Those developer obligations are defensively invested, and the return on capital from those investments are used to pay dairy farmers for delivering green services.
Financial sources	Public: local municipalities Private investors: project developers
Financial instruments	Land value capture: developer contributions General public budget Results-based financing: payment for ecosystem services (PES) Asset management (return on capital from defensive investments)

[53] We did not find an exact project area size in any documents or on web pages. We calculated the project area size by drawing a polygon on Google Maps that as best as possible copies the shape of the area as seen in Figure 1.

Washington Stormwater Retention Credits Program (Washington DC, USA)

Location	Washington D.C., USA
Population size	678,972 (2023)
Project area size	177 km²
Area type	Urban
Climate challenge	Climate change causes increased rainfall, which increases stormwater runoff and untreated discharges into water bodies because of Washington's high share of impervious surfaces and the limited capacity of the sewer system. More untreated discharges into water bodies increases water pollution and therefore negative environmental impacts in the Chesapeake Bay.
Key Community System(s)	Water management, health and human well-being
Objectives	Reduce stormwater runoff and sewer overflows to increase water quality of waterbodies
Climate challenge solution	Stormwater regulations and a stormwater retention credit trading program to incentivise the construction of green infrastructure, including green roofs covered with vegetation, rain gardens, wetlands, cisterns, bioretention installations, permeable paving material, or landscaped bioswales.
Key benefits	Reduced stormwater runoff and increased water quality, more green spaces for local communities with social and health benefits, creation of jobs and added value to the economy.
Implementation status & timeframe	The stormwater retention credit system was implemented in 2013 and is still operational.
Investment volume ($)	No data about investment costs. 8396 green infrastructure projects have been developed between 2015 and 2020.
Key financing barriers addressed	Lack of public financial means (annual budget of the DOEE)
Financial model	Stormwater regulations with a Stormwater Retention Credit (SRC) trading program, a market in which private actors can trade stormwater retention credits to meet retention requirements.
Financial sources	Private investors: project developers, NGOs Households: property owners Public: regional agencies
Financial instruments	Incentives: stormwater credits Fees/user charges: stormwater/wastewater fees ('stormwater impervious surface fee') Risk mitigation: guarantees (SRC Price Lock Program) Non-financial instruments: regulations and mainstreaming (stormwater regulations), subsidies (subsidy program)

Hampton Environmental Impact Bond (Hampton, Virginia, USA)

Location	Hampton, Virginia, United States
Population size	138.037 (2022)
Project area size	Big Bethel Blueway: 3.38 hectare water storage capacity, 1.8 km publicly accessible walking and biking path North Armistead Avenue Road Raising and Lake Hampton: no data
Area type	Watershed in an urban area (residential and commercial)
Climate challenge	Climate changes lead to increased precipitation, leading to more stormwater runoff and consequently increased flooding and water pollution
Key Community System(s)	Water management, critical infrastructure
Objectives	Resilient Hampton: improve residents' quality of life in the face of water-related challenges by increasing the City's ability to withstand and recover from them
Climate challenge solution	Three green infrastructure pilot projects to increase stormwater volume storage capacity.
Key benefits	A reduction of polluted water runoff and flooding. City-wide co-benefits of green infrastructure: improved air quality, neighbourhood green spaces, reduced urban heat island effect.
Implementation status & timeframe	Since 2015 (construction of two projects ongoing, one expected to start construction late 2024).
Investment volume (€)	$34 million (2020 US Dollar value), of which $12 million is financed from an environmental impact bond.
Key financing barriers addressed	Insufficient public budget to meet demanding federal and state water quality requirements
Financial model	An Environmental Impact Bond is a designation given to a "green" municipal bond that not only funds environmentally or socially beneficial projects but also commits to a quantitative prediction, post-implementation evaluation, and disclosure to both bond investors and the community, of actual project outcomes.
Financial sources	Private: asset owners/institutional investors (impact investors, insurers, pension funds, investment banks). Public: national- and state-level government agencies.
Financial instruments	Debt and results-based financing: environmental impact bond (similar like sustainability-linked bonds). Grants: implementation grants.

Paris Climate Bond (Paris, France)

Location	Paris, France
Population size	2.1 million (City of Paris)
Project area size	105 km2 (City of Paris)
Area type	Urban area
Climate challenge	Heatwaves (main climate risk). Paris is facing an increase in average daily temperatures as well as in the number of hot, very hot and extremely hot days and heatwaves.
Key Community System(s)	Critical (urban) infrastructure
Objectives	Objectives of the Adaptation Strategy, part of the Climate and Energy Action Plan: Protecting Parisians against extreme climate events; ensuring water, food, and energy supply; living with climate change: more sustainable city planning; fostering new lifestyles and boosting solidarity.
Climate challenge solution	Two adaptation projects part of the Climate and Energy Action Plan Building 30 hectares of green spaces and the planting 20,000 trees by 2020.
Key benefits	Key benefit: reducing urban heat island effect and cooler temperatures. Co-benefits: increase biodiversity, water absorption, slowing of floods and the trapping of dust, beautifying the city and creating spaces for relaxation and even food production.
Implementation status & timeframe	2014-2020 (two adaptation projects)
Investment volume (€)	€85 million for the two adaptation projects. The climate and sustainability bonds issued since 2015 are expected to have raised a total of €2.3 billion when the 2024 sustainability bond will be issued.
Key financing barriers addressed	Lack of public resources to achieve all the targets of the Climate and Energy Action Plan.
Financial model	The use of climate bonds and sustainability bonds to raise private capital for financing projects of the Climate and Energy Action Plan.
Financial sources	Private: Asset owners/institutional investors (pension funds, asset managers). Public: local municipality.
Financial instruments	Debt: climate bond, sustainability bond Taxation: general public budget from local taxes

Flood Buyouts (USA)

Location	United States of America
Population size	335 million
Project area size	NA
Area type	Mixed
Climate challenge	Urban flooding, often intensified by the increased frequency and severity of climate change-driven disasters, causes significant harm to both life and property.
Key Community System(s)	Water management, critical infrastructure
Objectives	Flood buyouts is an active climate mitigation strategy used in the US. It aims to reduce flood risk and removes people and homes away from active flooding zones. Removing development from floodplains can make the surrounding areas less susceptible to flooding through increased green and undeveloped areas.
Climate challenge solution	After a disaster strikes, local governments approach identified properties and negotiate with homeowners to buy the properties. After the land has been acquired, the homes and any built infrastructure is demolished. The area is left to be a green space. Flood buyouts rely on a mix of funding sources. Federal grants, typically from FEMA and HUD are the most common. Local governments might contribute additional funds or run their own programs with separate budgets. Homeowners receive a buyout price for their property, but it's voluntary ie. they can choose to participate or not.
Key benefits	Communities see reduced flood risks and more green space. Homeowners get a financial escape route from flood zones and the stress of repeated damage. The program pays fair market value, and some areas even offer extra incentives to make relocation easier.
Implementation status & timeframe	1970s-present
Investment volume (€)	NA
Key financing barriers addressed	Limited local government budget for cost matching and cost sharing
Financial model	Flood buyout programs use federal grants and local funds to acquire flood-prone properties at fair market value, offering voluntary relocation for homeowners.
Financial sources	Public: National level government entities, government agencies, local municipalities Private: households (direct), investors
Financial instruments	Grants (public and private) Debt based instruments: green bonds Fee/User charges: stormwater fees Taxations: local options sales tax

Sheffield Lower Don Valley flood defence project (Sheffield, UK)

Location	Sheffield, South Yorkshire, England
Population size	556,500 (2021)
Project area size	Flood defences along 8km of the Lower Don Valley (LDV)
Area type	Urban area around a major river (Don) in a low-lying valley. The LDV has a high concentration of businesses.
Climate challenge	The LDV is very vulnerable to flooding, and this risk of extreme weather events will increase due to climate change.
Key Community System(s)	Water management, Local economic systems.
Objectives	The overall aim of the LDV flood defence project is to lower the annual risk of flooding from 1:25 in places to a minimum of 1:100, which allows businesses to obtain insurance more easily.
Climate challenge solution	New flood defences at fifty work locations and regular and ongoing channel maintenance on the left and right bank of an eight kilometre stretch of the river Don.
Key benefits	Reduced risk of flooding businesses; job protection and economic regeneration; insurance premiums for businesses at acceptable rates.
Implementation status & timeframe	2007-2013: feasibility, design, and planning application of the LDV project 2014-2019: duration of the business improvement district
Investment volume (£)[54]	LDV flood defence project: £21.4 million
Key financing barriers addressed	Lack of local public funding; national funding can only be obtained if a small part of the investment is covered by alternative (private) sources.
Financial model	A business improvement district (BID) to leverage national grant funding. In a BID, businesses agree through a ballot to fund specific activities chosen to strengthen the success and sustainability of those operating in a defined area.
Financial sources	Private: businesses (large enterprises and MSMEs) Public: national-level government agencies
Financial instruments	Grant: implementation grant Fees/user charges: business improvement district

[54] It was difficult convert the currencies found in the original sources to 2024 values because of lack of data about the timing of calculations. We therefore keep the original values found in sources dating from 2013-2018.

Dorset Heathlands

Location	Dorset (county), England
Population size	379,600 in Dorset county (2021)
Project area size	8500 hectares (heathlands)
Area type	Heath (heathland), a shrubland habitat found mainly on free-draining infertile, acidic soils and characterised by open, low-growing woody vegetation.
Climate challenge	Increased risk of heathland fires as a consequence of warmer and drier summers, and urban development in the vicinity of the heathlands.
Key Community System(s)	Land use and food systems
Objectives	The avoidance and mitigation of impacts of new residential development upon the Dorset Heathlands
Climate challenge solution	Development restrictions within 400 metres of heathlands, and mitigation measures for developments between 400 metres and 5 kilometres from heathlands. Mitigation measures include Strategic Access, Management and Monitoring; and heathland infrastructure projects
Key benefits	Protection and preservation of biodiversity; available green spaces for the public; increased knowledge and awareness about the heathlands; reduction of fires in the heathlands.
Implementation status & timeframe	Since 2000 (start of the partnership); use of developer obligations to pay for mitigation measures since 2007.
Investment volume (€)	3.5€ million for mitigation activities in the heathlands between 2020 and 2025. This does not include heathland infrastructure projects.
Key financing barriers addressed	No public funding for mitigation activities.
Financial model	The use of developer obligations collected based on local policy plans to pay for Dorset Heathlands mitigation measures.
Financial sources	Private investors: project developers.
Financial instruments	Land value capture: property and land tax (one time developer obligation at time of development).

Project Finance for Permanence (multiple countries)

Location	PFP has been applied in Brazil, Peru, Columbia, Costa Rica, Canada, and Bhutan.
Population size	NA.
Project area size	Different for each PFP. The smallest under implementation protects 1 million hectares of conservation areas (Bhutan), the largest 60 million hectares (Brazil).
Area type	Terrestrial (often forests) or marine conservation areas (e.g., Amazon forests in Brazil, Peru, and Columbia).
Climate challenge	Conservation areas are under increasing pressure from climate change, human activities, biodiversity loss, and the increasing risk of zoonotic spillovers linked to degraded ecosystems.
Key Community System(s)	Ecosystems and nature-based solutions.
Objectives	PFP is an initiative that secures important policy changes, and all funding necessary to meet specific conservation goals of a program over a defined long-term timeframe, with the ultimate aim of achieving the ecological, social, political, organizational, and financial sustainability of that program.
Climate challenge solution	Protection of conservation areas through numerous measures: ecological monitoring, social monitoring of communities living in and around conservation areas, habitat restoration, tourism related activities, sustainable use of natural resources by the local community, nature-based sustainable enterprises.
Key benefits	Numerous ecosystem services, carbon sequestration (reduced deforestation), social and economic benefits for local communities,
Implementation status & timeframe	Different for each PFP. Currently, six PFPs are under operation (implementation)
Investment volume (€)	Different for each PFP. The smallest is $77 million (Forever Costa Rica), the largest is $642 million (Brazil).
Key financing barriers addressed	Consistent lack of funding from (public) authorities causes a global gap to finance for the protection of conservation areas.
Financial model	The ultimate financial objective of any PFP is to ensure long-term financial sustainability of a country/region's conservation priorities through: (a) initially covering the estimated financial gap during the agreed implementation period; and (b) ensuring sufficient recurrent in-country funding to cover needs beyond that period.
Financial sources	Public: national and/or regional-level public entities. Private: NGOs, philanthropies, international cooperations. Other sources could be involved depending on which sustainable finance mechanisms are used.
Financial instruments	Blended finance through a combination of multiple sustainable finance mechanisms. Examples include taxation, results-based financing (debt for nature swaps, payment for ecosystem services), fees/user charges (carbon pricing, user charges, entrance fee), grants, donations.

Reserva Particular do Patrimonio Natural Municipal (Curitiba, Brazil)

Location	Curitiba, Brazil
Population size	3,852,459 (2024)
Project area size	432 km2
Area type	Urban
Climate challenge	Biodiversity quality loss which is exacerbated by climate change as shifting temperatures and extreme weather events disrupt ecosystems, leading to habitat destruction and species extinction.
Key Community System(s)	Ecosystem and nature-based solutions, land use. Water management, health and human wellbeing
Objectives	Protecting urban forests and to prevent unchecked urban sprawl
Climate challenge solution	Curitiba's RPPNM program tackles urban sprawl by incentivizing landowners to conserve natural areas on their property. Landowners who convert their land into RPPNMs receive tax breaks and can earn income by selling tradable development rights (TDRs). These TDRs represent the unused development potential of the land and can be purchased by developers who need to meet green space quotas in their projects. This win-win program fosters conservation allows for flexible development, and benefits the city with a healthier environment and reduced costs. This program offers various climate resilience benefits through the preservation of natural areas, enhanced biodiversity and improved air and water quality.
Key benefits	Clean air, income for plot owners, reduced costs for municipality of Curitiba
Implementation status & timeframe	2006, implementation ongoing
Investment volume (€)	1.5 million USD in 2006
Key financing barriers addressed	Limited public budget for expropriation and maintenance
Financial model	The Municipality of Curitiba, Brazil gives incentives to landowners to protect the urban forests on their land through tax deduction or transferrable development rights to build elsewhere in the city.
Financial sources	Public: Government Agencies Private: Households: property owners Private: Private investors (project developers)
Financial instruments	Transferrable Development Rights Non-financial instruments: Incentives (tax breaks)

Seychelles Debt for Nature Swap (Seychelles)

Location	The Seychelles
Population size	99,258 (2021)
Project area size	455 km2
Area type	Archipelago
Climate challenge	Sea level rise which is driven by climate change, inundates coastal habitats and displaces human and wildlife populations, exacerbating ecological and socioeconomic challenges.
Key Community System(s)	Ecosystem and nature-based solutions, health and human wellbeing
Objectives	To reduce national debt and boost environmental protection through the creation of Marine Protected Areas preserving both the fishing industry and the tourism industry that the Seychelles economy relies on
Climate challenge solution	The Seychelles implemented the Debt for nature swap to tackle its dual challenge of environmental protection and high external debt. They established an independent trust called the SeyCCAT and used loans and grants to buyback a portion of their external debt from creditors at a discount. This debt forgiveness reduced their overall debt. The purchased debt was then restructured with lower interest rates and longer repayment periods, further lowering their debt servicing costs. The saved money from the reduced debt payments was redirected towards climate adaptation projects.
Key benefits	Debt relief for Seychelles, creation of marine protected areas
Implementation status & timeframe	*NA*
Investment volume (€)	21.2 million USD (2012)
Key financing barriers addressed	NA
Financial model	The Seychelles implemented the Debt for nature swap to tackle its dual challenge of environmental protection and high external debt. They established an independent trust called the SeyCCAT and used loans and grants to buyback a portion of their external debt from creditors at a discount. This debt forgiveness reduced their overall debt. The purchased debt was then restructured with lower interest rates and longer repayment periods, further lowering their debt servicing costs. The saved money from the reduced debt payments was redirected towards climate adaptation projects.
Financial sources	Third sources (NGOs and Philanthropic organisations) National Level Government Entities
Financial instruments	Results-based financing (Debt for nature Swaps)

Viveracqua Hydrobond (Veneto region, Italy)

Location	Veneto, Italy
Population size	4.9 million (2019)
Project area size	18,345 km2
Area type	Mountains, coastal
Climate challenge	NA
Key Community System(s)	Water management
Objectives	Long term financing of water infrastructure in Italy
Climate challenge solution	The Viveracqua Hydrobond project in Italy provided a solution for financing water infrastructure upgrades. Eight water utilities formed a consortium and issued minibonds totalling €300 million to fund these projects. These minibonds were then bundled into an Asset-Backed Security (ABS) to attract broader investment. This structure aimed to achieve two key goals: securing long-term financing with a maturity matching the infrastructure lifespan, and reducing administrative burdens for participating municipalities.
Key benefits	The Hydrobond secured long-term financing with a 20-year maturity, aligning with the lifespan of the upgraded infrastructure. This eliminated the immediate need for water tariff increases, promoting financial stability for both water utilities and consumers. Secondly, by spreading out the repayment over a longer period, the Hydrobond potentially helped keep water bills stable for consumers.
Implementation status & timeframe	Ongoing since 2014
Investment volume (€)	30 million EUR
Key financing barriers addressed	NA
Financial model	This case is an example of pooling multiple mini bonds. The Viveracqua consortium comprised of eight water utilities and the Hydrobond collectively issued minibonds totaling €300 million. These bonds were then aggregated and securitized into an Asset-Backed Security (ABS) to enhance investment attractiveness and diversify funding sources. This strategic financial arrangement was designed to reduce administrative costs and complexity, offering a sustainable financing mechanism while promoting stable water pricing for consumers.
Financial sources	Public: European Investment Bank, Financial arm of Veneto region Private: MSMEs, households (property owners)
Financial instruments	Debt based instruments: Minibonds Fees/user charges: water bills

Wetland mitigation banking (USA)

Location	United States of America
Population size	335 million
Project area size	9147420 Km²
Area type	Rural, wetland
Climate challenge	Wetland loss is accelerated by climate change and leads to significant biodiversity loss as these critical ecosystems are degraded or submerged. This destruction disrupts habitats for numerous species, undermining ecological balance and resilience.
Key Community System(s)	Ecosystem and nature-based solutions, land use and food systems, water management
Objectives	The Wetland Mitigation Banking program aims to achieve the no net loss of wetlands due to agricultural practices. Farmers have to destroy wetlands in their fields because it can cause hindrance to their activities. This program helps farmers comply with wetland conservation regulations and ensures that overall wetland health is maintained.
Climate challenge solution	The WBMP program enables the farmers who are looking to offset their negative impact to purchase credits from established mitigation banks. These credits represent ecologically restored wetlands elsewhere and compensate for the lost wetland.
Key benefits	The WBMP program benefits both farmers and the environment. Farmers can comply with wetland conservation regulations by purchasing credits from mitigation banks, avoiding costly on-site mitigation projects. This program also helps maintain overall wetland health by creating new wetlands to compensate for those lost to agriculture.
Implementation status & timeframe	*2014 to present*
Investment volume (€)	Initial funding- 10 million USD, current funding- 5 million USD per year
Key financing barriers addressed	NA
Financial model	The Wetland Mitigation Banking Program (WBMP) aims to achieve no net loss of wetlands due to agricultural activities. It does this by enabling farmers to mitigate wetland impacts on their land. Farmers achieve mitigation by purchasing credits from established mitigation banks. These credits represent ecologically restored wetlands elsewhere, compensating for the lost wetland functions on the farmer's property.
Financial sources	Public: National government (Grants) Private: Households (property owners)
Financial instruments	Results based financing: Payment of Ecosystem Services Fees/user charges: offsetting.

Gothenburg green bonds (Gothenburg, Sweden)

Location	Gothenburg, Sweden
Population size	596,841 (2022)
Project area size	447.8 km² (city size)
Area type	Urban area
Climate challenge	Main climate risk in the Nordics: Flooding due to increase sea level rise and heavy rainfall is one of the biggest climate change risks in the Nordic countries and Gothenburg. Stricter climate policies that require reducing greenhouse gas emissions and upgrading the energy efficiency of buildings.
Key Community System(s)	Health and Human Wellbeing, critical infrastructure, water management.
Objectives	Transition Gothenburg to an environmentally sustainable city by 2030, with specific goals for nature, climate, and people, as described in the City's Environment and Climate Programme.
Climate challenge solution	There are eight green project categories: include renewable energy; green buildings; energy efficiency; clean transport; waste management; water and wastewater management; sustainable land use and environmental management; and climate adaptation
Key benefits	Improved sustainability and resilience on a city-wide level
Implementation status & timeframe	2013 (first green bond issuance, annual issuance since 2013)
Investment volume (€)	€2.15 billion total volume of outstanding green bonds as of 31 Dec 2023.
Key financing barriers addressed	*None reported*
Financial model	In 2013, Gothenburg issued the first municipal green bond in the world to attract investments aimed to reduce the effects of climate change. The green bond has been issued annually since 2013.
Financial sources	Private institutional investors (banks, pension funds…)
Financial instruments	Debt: municipal green bond

Bilbao Flood Proof district (Bilbao, Spain)

Location	Bilbao, Spain
Population size	345,821 (2018)
Project area size	41.6 km²
Area type	Urban
Climate challenge	Urban flooding, often intensified by the increased frequency and severity of climate change-driven disasters, causes significant harm to both life and property.
Key Community System(s)	Water management, critical infrastructure
Objectives	The objective of the redevelopment project is to turn Zorrotzaurre from an industrial site to a residential area. This requires adequate protection from flooding. Objectives with regards to flooding have been defined as: existing houses in Zorrotzaurre should be well protected for T=100 rainfall events: new buildings/housing should withstand T=500 events
Climate challenge solution	The Master plan for Zorrotzaurre involves the following 5 steps: • Opening the Duesto Canal to turn the peninsula into an island • Elevation of the ground level • Construction of flood protection wall • Provision of storm water tanks • Green and open space
Key benefits	The Bilbao City Council gains reduced flood risk and potentially higher tax revenue from a revitalized district. Landowners benefit from increased property values and development opportunities. Bilbao residents enjoy improved flood protection and new public spaces. The coordinating body (Junta de Concertación) sets a positive example for future PPPs. A public land management agency like Surbisa could see efficient land use and economic gains from the project.
Implementation status & timeframe	*2012 to present*
Investment volume (€)	30 million EUR in 2012 for the entire project (investement volume into the PPP is unknown)
Key financing barriers addressed	NA
Financial model	The Zorrotzaurre PPP is a flood protection project in Bilbao, Spain which involves public and private entities to finance and build flood walls, raise land levels and manage storm water systems.
Financial sources	Public: Regional and subnational government entities (Local Municipalities) Private: Project developers
Financial instruments	Blended finance: Public Private Partnership

Edwards Aquifer Protection Program

Location	San Antonio, Texas, USA
Population size	1.473 million (2022)
Project area size	1307 km²
Area type	Urban
Climate challenge	Droughts are increasingly linked to climate change as rising temperatures intensify evaporation rates, reducing rainfall. This disruption prevents underground water resources from replenishing adequately, exacerbating water scarcity in affected regions.
Key Community System(s)	Ecosystem and nature-based solutions, water management, health and human wellbeing
Objectives	The Edwards Aquifer Protection Program seeks to protect the underground aquifer that provides the water for San Antonio. The EAPP maintains the aquifer by protecting areas where the aquifer is replenished. The EAPP uses land easements to buy development rights for land owners to conserve open space and offers various environmental benefits.
Climate challenge solution	The Edwards Aquifer Protection Program combats water reuse by acquiring properties along with land easements on private land. This restricts development and protects the recharge and contributing zones, ensuring the Edwards Aquifer has a sustained water supply.
Key benefits	The program safeguards the Edwards Aquifer, a crucial source of clean water for the San Antonio region. This protects groundwater quality and potentially reduces future water treatment needs. Land acquisition efforts help conserve open space within the aquifer's basin, while also providing habitat for endangered species and other wildlife as a secondary benefit. By protecting the aquifer, the program contributes to public health by ensuring a reliable source of clean drinking water. The EAPP promotes water sustainability by preventing over-exploitation of the aquifer. This reduces the risk of depletion and ensures a long-term water supply for the region.
Implementation status & timeframe	*Since 2000*
Investment volume (€)	335 million (2000-2024)
Key financing barriers addressed	Limited public budget for buying private land
Financial model	the EAPP secures conservation easements to protect the aquifer, vital for the region's water supply. This strategic financial initiative was strongly supported by voters, reflecting its wide acceptance and the community's commitment to sustainable water management. It has leveraged local sales tax increases and green bonds to fund ecosystem services.
Financial sources	Public: Local municipalities (Local options sales tax) Private: Property Owners Sources for Green Bond funding are not known
Financial instruments	Results based financing: Payment of Ecosystem Services Debt based instruments: green bonds Taxation

The CLIMATEFIT project aims to support EU territories in their just and transformational journey toward climate resilience by bridging the finance gap, providing critical insight and building the capacities of (i) Public Authorities (PAs) to identify, orchestrate and attract various public and private financing sources and (ii) Financing & Investment Entities (FIEs) to identify and access resilient investment opportunities. CLIMATFIT opens a significant opportunity to foster innovative resilience investments in vulnerable EU territories and to boost competitiveness and EU leadership in a growing market. The project will build on a deep understanding of existing initiatives to sustain systemic and catalytic resilience investments by engaging its Technical Partners, PAs and FIEs in the co-creation of 20 innovative investment strategies, ten concrete and scalable investment plans and four bankable transformational investment cases, increasing the bankability of resilient project pipelines across a diversity of scales, financing gaps, contexts, barriers to financing, climate risks and vulnerabilities, biogeographical regions, adaptive capacities and maturity regarding climate change represented from its 20 case studies grouped in three clusters: Northwestern, Eastern and Southern.

CLIMATEFIT