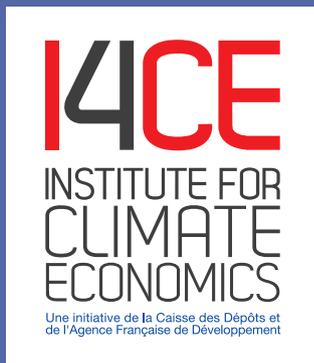


January 2026

Adaptation



Adapting France to +4°C: current resources, additional needs, and funding options

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The Institute for Climate Economics (**I4CE**) is a non-profit research organization that provides independent policy analysis on climate change mitigation and adaptation.



We promote climate policies that are effective, efficient and socially fair. Our 40 experts engage with national and local governments, the European Union, international financial institutions, civil society organizations and the media. Our work covers three key transitions – energy, agriculture, forests – and addresses six economic challenges: investment, public financing, development finance, financial regulation, carbon pricing and carbon certification.

I4CE is a registered non-profit organization, founded by the French National Bank (Caisse des Dépôts) and the French Development Agency (Agence française de développement, AFD).

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CONTEXT

This study builds on I4CE's work carried out over several years on the qualification and quantification of adaptation needs and resources in France.

This report, originally published in French in September 2025, is first a contribution to the public debate on adaptation in France. The methodologies applied, the data collection process, as well as the analytical framework proposed, may inform broader discussions in Europe, as the preparations for an EU integrated framework for European climate resilience and risk management are well underway.

The study was conducted alongside the development and publication of the third National Adaptation Plan (3rd NAP) in France. The process for this NAP saw strong momentum, both through the involvement of a wide range of stakeholders (ministries, public administrations, public service operators, and private actors) and through strong political backing at the highest level.

This 3rd NAP is structured around a “reference warming trajectory for adaptation to climate change”, which invites all stakeholders to consider warming levels of +2°C in 2030, +2.7°C in 2050, and +4°C in 2100 for their adaptation plans and strategies. These warming levels apply to metropolitan France (*i.e.* French Warming Level, FWL)¹. This scenario corresponds to the warming levels implied by countries' existing emission reduction commitments under the framework of the Conferences of the Parties (COP) as of 2024. Unless otherwise specified, all warming levels referred to in this report are expressed in FWL.

This study provides an overall picture of current resources, additional needs and funding options for adaptation, based on the monitoring and analysis of around fifteen areas of national public action affected by climate change. It consists of two main documents:

► **A report presenting:**

1. All the resources currently committed to adaptation. It places them in the context of recent developments and analyses what they reveal about how adaptation has been implemented to date.
2. An overview of assessed adaptation needs, highlighting what we consider to be unavoidable needs and those that will require further choices to be made.
3. An overview of ongoing discussions and lines of reflection regarding the distribution of the adaptation effort and the financing options currently under consideration.

► **A technical appendix** providing a more comprehensive panoramic view of all the elements monitored, based on our ongoing analytical and consolidation work across the fifteen national public policy domains.

¹ It corresponds to a global warming level (GWL) of 1.5°C in 2030, 2°C in 2050 and 3°C in 2100. More information about the TRACC and correspondence tables between French Warming Levels (FWL) and Global Warming Levels (GWL) are available here: https://www.ecologie.gouv.fr/sites/default/files/documents/27012026_DP_TRACC.pdf

SUMMARY

Adaptation momentum has grown significantly in recent years, but has been weakened in 2025

Since 2020, resources devoted to adaptation have increased across all areas of public policy affected by climate change. The period 2020-2024, in particular, has been a genuine turning point, both in understanding the issues at stake and in scaling up national resources. At this stage, there are no longer any significant blind spots, though funding levels and coverage are still limited in some areas.

As a result of this momentum, **€1.7 billion** has been explicitly dedicated to adaptation in 2025, through national budget allocations and resources mobilized by public operators, financial institutions and public service companies. These funds are mainly created or expanded to implement adaptation measures via the Water Agencies and various mechanisms such as the Green Fund, the Barnier Fund and the France 2030 calls for projects. They also include resources allocated to research and innovation, as well as to adaptation initiatives supported through technical and coordination capabilities.

More broadly, all relevant public policies and investment programmes are increasingly integrating climate change considerations. This suggests that **tens of billions of euros** of expenditure, while not explicitly dedicated to adaptation, contribute significantly to it. These include, in particular:

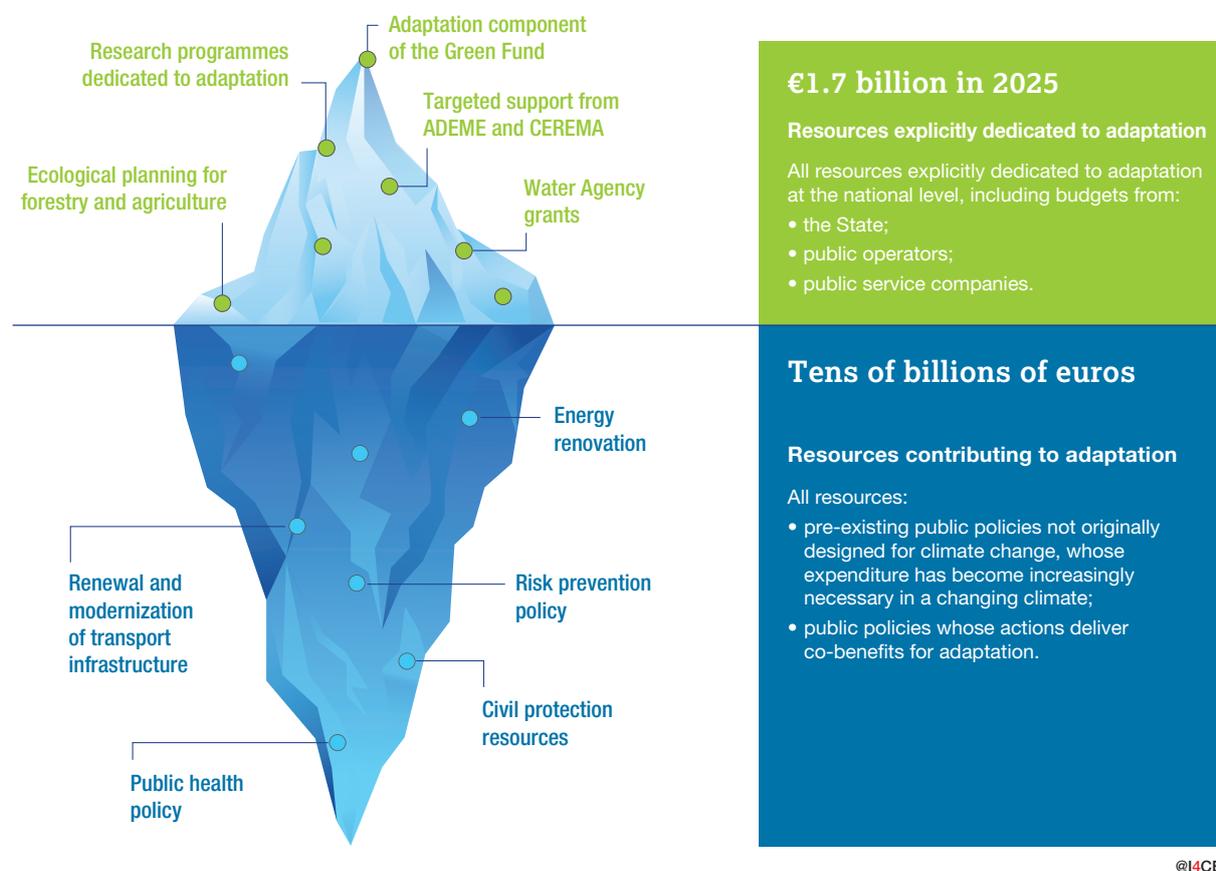
- **investments in the transition with proven co-benefits for adaptation**, such as infrastructure modernization, building energy renovation and forest renewal;
- **policy measures that, by their very nature, help manage climate risks**, such as flood prevention, civil protection and environmental health policies.

Although these co-benefits are increasingly sought, overheating during heatwaves in public buildings such as schools and transport hubs, as well as in homes – despite recent renovations – shows that adaptation is still not adequately integrated and vulnerabilities remain.

► During budget debates, it is particularly important to monitor the tens of billions of euros in resources that contribute to adaptation (not only the billions explicitly dedicated to adaptation), since changes to these resources, generally decided on the basis of considerations other than adaptation itself, have a direct impact on the country's capacity to adapt.

PUBLIC FINANCE FOR ADAPTATION: WHAT AND HOW MUCH?

Resource examples:



The situation is more mixed when it comes to the human resources of public operators contributing to adaptation. To date, several key operators have been identified – including ADEME, CEREMA, *Météo-France* and the National Forestry Office (*Office national des forêts*, ONF) – that are responsible for coordinating, supporting, providing technical expertise, and implementing adaptation measures. Monitoring their staffing levels provides an indication of their capacity to maintain and develop the new skills and functions required in the context of climate change. However, despite a slight increase in 2024, the long-term trend shows a significant decline since 2015, particularly for ONF (a reduction of 1,218 FTEs), *Météo-France* (584 FTEs), the Water Agencies and the National Institute of Geographic and Forest Information (*Institut national de l'information géographique et forestière*, IGN) (198 FTEs each).

While the period from 2020 to 2024 has seen genuine progress on this issue, more recent developments have cast significant doubt on the continuation of this momentum. Whether in budgets specifically dedicated to adaptation – such as the Green Fund and certain France 2030 measures – or more broadly in resources contributing to adaptation, 2025 marks the end of the upward trend observed in recent years. Some budgets are already facing sharp cuts, particularly in the forestry and agriculture sectors.

Until now, resources have mainly been used to catch up, with efforts largely focused on maintaining existing models

Analysis of the resources currently allocated to adaptation shows that few have been deployed proactively. In most cases, a climate event acts as the trigger for budgetary decisions: heatwaves prompt a reassessment of resources for public health or energy production policies; fires do the same for civil protection. Funding is then released, initially with the aim of catching up with climate changes that have already occurred. However, this reactive spending is often accompanied by

forward-looking work which, for now, has little influence on action plans and dedicated budgets.

Current adaptation efforts still focus largely on preserving existing agricultural, economic and tourism models. This is understandable – adaptation often aims to protect existing systems – yet it exposes a clear gap between rhetoric calling for transformation and the reality of adaptation policies.

A foundation of essential requirements, regardless of the adaptation pathway chosen

In addition to the resources already mobilized, we have identified a set of further requirements corresponding to measures that must be taken whatever adaptation vision is ultimately pursued. These include:

1. Strengthen resources for support and technical expertise. Effective preparation depends on access to the right expertise – vulnerability assessments, technical data – to inform decisions and to provide robust support, particularly for local actors and communities. Public expertise already exists within organizations such as Météo-France, CEREMA, ADEME and ONF, built up over years of investment in research and experimentation. The challenge now is to go further and to make this expertise available to those who need it most:

- Complete all studies identified in the PNACC-3 (the French 3rd national adaptation plan).
- Consolidate the steering and coordination of adaptation policy at the national level – **€6.4 million/year**.
- Strengthen public technical expertise – *Mission adaptation* – **€4 million/year**.

2. Make adaptation a systematic consideration in investment flows. This means both stopping investment in infrastructure, buildings or facilities that are unsuitable for a changing climate, and leveraging planned investments to enhance the overall level of adaptation of the French economy, while reducing costs.

3. Improve crisis response. Faced with climate impacts that can no longer be avoided, and given the low level of anticipation observed to date, it is essential to increase the resources dedicated to preventing and managing climate-related crises. Whatever choices future governments and local authorities make, France will have to cope with climate events that are longer, more intense and occur earlier in the season. For the safety of the population and the resilience of the economy, **investment is urgently needed in response capacities, in line with emerging risks** (such as a sufficient fleet of operational water-bombing aircraft, pumping capacity, emergency stockpiles, etc.), **in warning systems and crisis preparedness** (monitoring mechanisms, crisis planning, exercises), **and in the robustness of damage-response systems**. Failure to act now would mean condemning ourselves to endure repeated crises and to make impossible choices over which relief operations to launch and which communities to support.

Choices to be made, policy programmes for adaptation to be developed

Beyond these essential requirements, which can bring together a range of political perspectives, adapting to climate change requires structural choices that define both our adaptation objectives and the pathways to achieve them. Deciding what we want to preserve (an economic activity, an industry, a set of buildings, a service level) and what we are prepared to change is, above all, a political decision.

Choosing to maintain existing economic models, consistent with current trends, may in some cases be a defensible option and constitute an adaptation objective in itself. But this must be done explicitly, taking into account the limits and conditions of viability of current models, for example, irrigated agriculture, winter tourism, or service levels for energy or transport infrastructure. The necessary resources must also be secured: maintaining the public insurance model requires significant investment in prevention; maintaining access to water calls for investment to improve efficiency and reduce consumption; maintaining transport service levels demands major investment in renewal and modernization.

Conversely, preserving the status quo at all costs will not always be possible or even desirable. In such cases, measures to reconfigure spaces, reinvent sectors and transform territories can be envisaged and tested. These alternative political visions may be motivated by their intrinsic benefits (an agroecological, less productive agricultural model, for example, may bring greater benefits for biodiversity and the climate) but also by economic considerations and the efficient use of public funds (for example, when increased expenditure on sand replenishment or dyke reinforcement in response to coastal erosion eventually places a lasting burden on local finances).

These options reflect political visions of adaptation that must be debated as such. To date, they remain open in most of the areas studied. Different approaches to climate change lead to very different actions and requirements. To inform and structure this debate, our work provides cost components to enrich the discussion with quantified data.

Providing the means to preserve what already exists

Types of actions: strengthening risk-prevention measures, optimizing water use, improving infrastructure resilience, and providing targeted support for affected economic sectors.

Reinvent, restructure, renew

Types of actions: major projects to redevelop urban areas, reshape rural landscapes, relocate activities, restore coastal natural areas, and promote economic diversification.

► In the run-up to national and local elections, it will be essential for stakeholders to assess their adaptation options objectively, and to develop coherent strategies that reflect their vision of the challenges ahead. The cost components presented in this study provide a useful foundation for this purpose.

The emerging but already crucial question: who will pay?

In recent years, discussions on how to allocate responsibility and share the costs of adaptation have intensified. They are taking place against a backdrop in which well-established mechanisms – such as those financing risk prevention, civil protection and water management – are already showing their limitations as needs increase. Yet few structural decisions have been made so far on how adaptation will be financed.

For now, discussions remain fragmented, with each stakeholder advancing its own proposals and funding ideas within its area of competence. Taken together, however, these exchanges reveal some common ground:

A recurring theme is the direct contribution of users to cover the adaptation needs of services affected by climate change, for example through water, electricity or transport tariffs. While this user-financing model has the merit of transparency, questions remain about its social acceptability and the ability of private actors to absorb still poorly quantified cost increases.

Solidarity is also central to the debate on adaptation financing. Equalization mechanisms are being discussed between regions so that less exposed or more fiscally robust areas can support those already affected or less well-off, for instance, in relation to flood risk, forest fires or declining snowfall.

In particular, given that adaptation serves the public interest, the use of national solidarity is increasingly being discussed. It extends the long-standing principle that all citizens share the costs of climate-related losses, exemplified by the natural disaster compensation scheme. Increasingly, this collective financing approach is being called upon to fund vulnerability reduction measures in a growing number of territories, each perceiving itself as particularly at risk and therefore entitled to benefit from coastal and mountain areas to the Mediterranean region. However, this raises difficult questions about fairness and long-term sustainability.

► To date, there is no comprehensive national framework for financing adaptation. Developing such an approach is now essential to:

- gain a clearer understanding of the available options, their advantages and limitations;
- bring greater coherence to sectoral discussions that sometimes target the same financing mechanisms without prior coordination or consultation;
- define and prioritize the principles of national burden-sharing for adaptation.

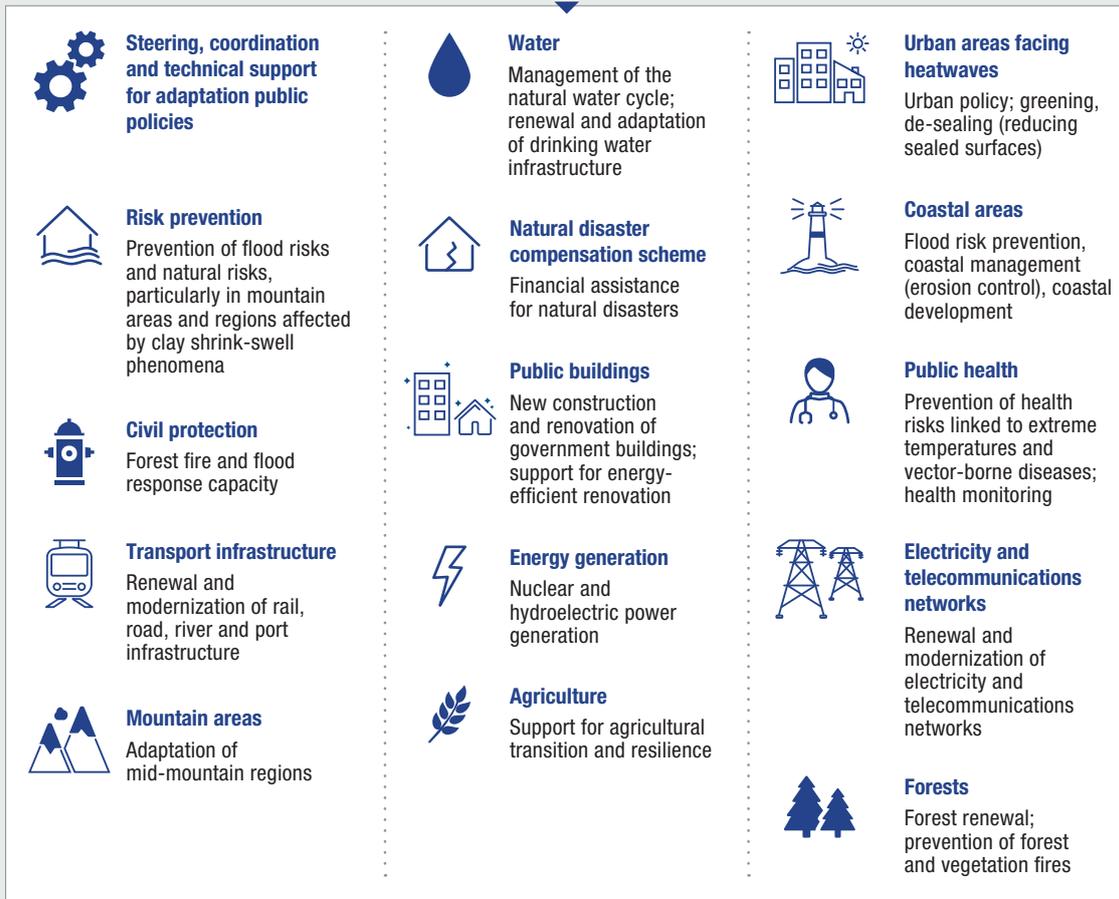
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SCOPE

15 major areas of national public action on adaptation

This study provides an overview of the resources allocated and the needs identified for adaptation across 15 key areas of national public policy affected by climate change. The State has a role to play in each of these areas, either because they fall directly within its remit or because it supports, guides, regulates or finances action in these domains.



A wide range of adaptation and resilience actions

This study adopts a broad definition of adaptation, encompassing the full continuum of actions, ranging from reducing vulnerabilities upstream, through crisis preparedness and response, to post-event damage management mechanisms.



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Current overview

The study reviews the resources planned for adaptation in 2025, presenting a snapshot of those explicitly dedicated to adaptation at the national level and setting them in the context of broader public resources that also contribute to adaptation, even when this is not their primary objective.

RESOURCES DEDICATED TO ADAPTATION

Overall resources:

► Planned for 2025 to reduce vulnerabilities upstream and to prepare for and manage climate-related crises.



The State



Public operators



Public financial institutions



Public service companies

► Prévus en 2025 pour réduire les vulnérabilités à l'amont, se préparer et gérer les crises liées au changement climatique.

CONTRIBUTING RESOURCES

Overall resources:

I. Public policies whose actions deliver co-benefits for adaptation

Examples: water policies, energy renovation, infrastructure modernization.

II. Policies that, by their very nature, help manage climate risks and whose expenditure has become increasingly necessary

Examples: risk prevention, civil protection, public health.

Outside the scope: actions supported by European funds; actions undertaken by local authorities; and actions carried out by private actors, unless coordinated or financed at the national level.

Outlook

Drawing on the available literature, the study assesses documented needs (both financial and human) for scaling up adaptation efforts. It also reviews ongoing discussions on how to finance these needs and outlines possible avenues for addressing them.

IDENTIFIED NEEDS

FINANCING

Public and private actors – all stakeholders combined – as expressed by stakeholders in each field



Essential requirements



Cost components to be integrated into forthcoming strategies

Issues linked to existing funding mechanisms

New funding avenues

Methods for distributing the financial effort

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INTRODUCTION

Climate change is already disrupting our regions, infrastructure and economies. While adaptation to these changes takes place locally and depends on specific contexts, national public action nevertheless plays a decisive role in making it possible – through the exercise of sovereign powers, the provision of financial support, the coordination of sectoral policies, and the definition of regulatory and strategic frameworks.

From a national perspective, this publication examines the scale of the economic and financial efforts currently being made to adapt to climate change. It provides a consolidated picture of the resources mobilized, and places them in the context of recent trends and developments. It also highlights what these efforts reveal – or conceal – about how France is adapting, at a time when implementation of the third French National Climate Change Adaptation Plan (PNACC-3) is taking place under severe budgetary constraints. This context calls for close attention both to how public spending evolves and to how it is allocated.

Beyond this assessment, the study identifies the needs expressed by stakeholders and institutions to clarify the gaps between ambitions, resources and implementation capacities – gaps that depend on adaptation choices which, in many cases, have yet to be made. Finally, it provides a basis for reflection on how the adaptation effort should be shared, between different stakeholders, sectors and territories, thereby raising the question of solidarity in response to inequalities created or exacerbated by climate change.

This study is intended for all those who wish to follow, contribute to and enrich the debate on climate adaptation. It provides analytical insights and quantitative benchmarks to inform these discussions (particularly budget debates), and calls for the consolidation of political visions of adaptation through quantified evidence and financing strategies.

For a more detailed analysis, additional information can be found in the appendix (available in French)

This publication summarizes figures and supporting information in deliberately concise tables, which form the basis of the analysis presented here. A more detailed set of

data compiled through our monitoring and consolidation work is provided for each area in the form of tables detailed in the appendix (numbered “A#”).

We refer the reader to the appendix for detailed justifications. These tables present:

- **A1. Resources specifically dedicated to adaptation** at the national level, planned for 2025;
- **A2. Resources that contribute more broadly to adaptation**, with an assessment of their current level of contribution;
- **A3.** The current status of **additional adaptation needs**;
- **A4.** A specific focus on the issues of coordination, technical expertise and governance capacities;
- **A5.** The main current financing mechanisms, with an assessment of their ability to meet additional needs and, where relevant, additional funding options under discussion.

To facilitate cross-referencing between the study and the appendix and vice versa, the main figures used in the study and detailed in the appendix are highlighted as shown above.

[LINK TO THE APPENDIX](#)

1. ADAPTATION FINANCING: CURRENT STATUS AND TRENDS

1.1. Resources for adaptation in 2025

The most visible adaptation resources are often those specifically and explicitly dedicated to this objective. When all new measures and increased budget lines introduced in response to climate change are consolidated, they amount to more than **€1.7 billion for 2025**. However, this figure represents only part of the overall resources mobilized for adaptation and must be viewed in the context of the much larger sums – not always new or primarily dedicated to this goal – that nonetheless contribute directly to adaptation efforts.

€1.7 billion explicitly dedicated to adaptation in 2025

Beyond the well-known funding streams – such as the Green Fund, the Water Agencies and the increased Barnier Fund (Lahais and Sas 2025) – our consolidation work identifies a total of **€1.7 billion** that is expected to be spent on adaptation in 2025. The full list of these resources is provided in **Appendix A1**.

€1.7 billion for adaptation in 2025: what is it about ?

This amount corresponds to the total planned resources for 2025, comprising:

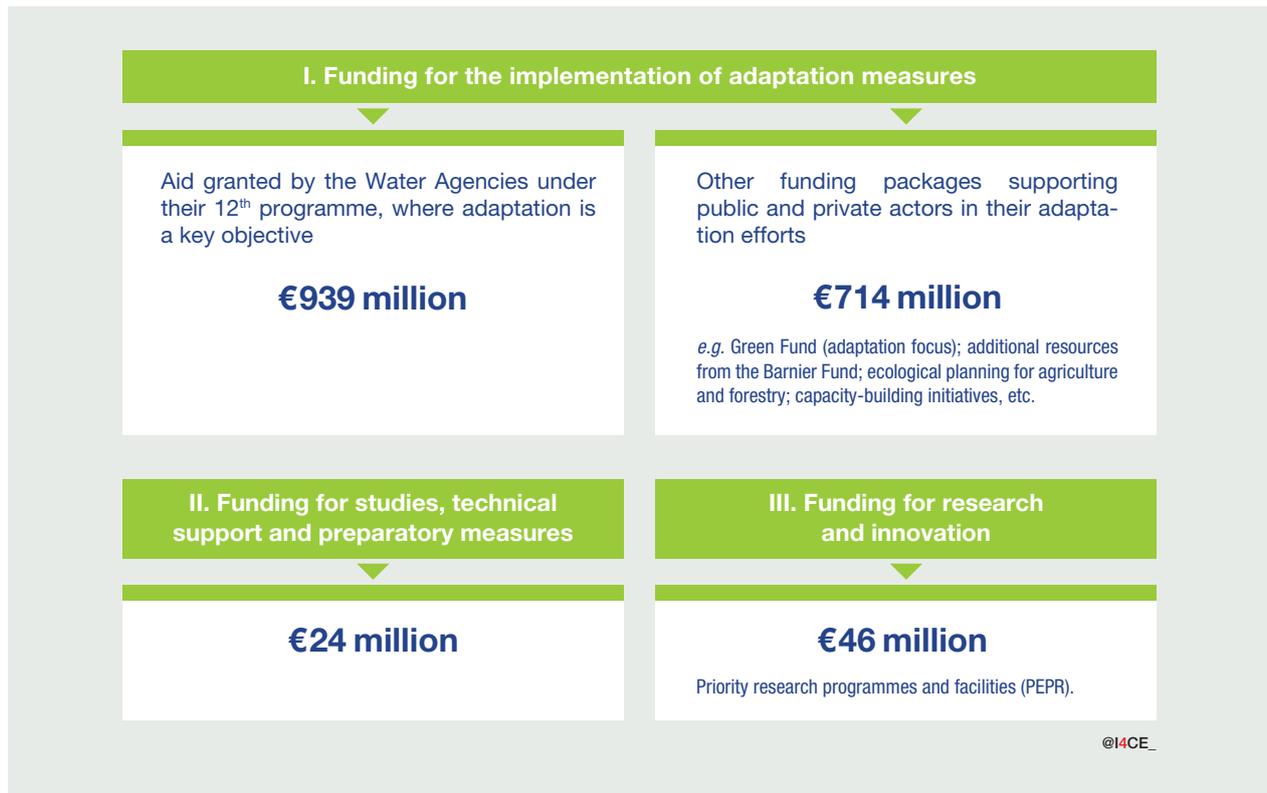
- **Funding allocated through the national budget, including:**
 - funding for governance, coordination and research capacity;
 - adaptation of State assets and policies within its remit;
 - support for the adaptation efforts of other public and private actors.
- **Resources mobilized by national public operators, public financial institutions and public service companies** to implement policies or objectives that are formalized or coordinated at the national level.

This assessment aims to quantify the national-level effort made by public actors to reduce vulnerabilities and to prepare for and manage crises linked to climate change. Other measures monitored in this study are mentioned in this section but are not included in the total, such as:

- damage compensation mechanisms, including insurance schemes;
- financing instruments, such as loan facilities.

This exercise differs from the green budget, which measures the environmental impact of the State budget (see dedicated box).

FIGURE 1. ALLOCATION OF €1.7 BILLION EXPLICITLY DEDICATED TO ADAPTATION IN 2025



Funding for the implementation of adaptation measures

Aid granted by the Water Agencies accounts for more than half of the total

The largest share, **€939 million per year**, corresponds to the adaptation spending under the Water Agencies' 12th intervention programme. "Adapting to climate change and promoting water savings" is now one of the programme's key priorities (French Government, 2024). It includes "linking with climate change adaptation plans (PACC) and water abstraction reduction pathways" and "enhancing resources, managing crises and preventing the impacts of droughts, while strengthening the responsibility of water users and stakeholders".

To achieve these aims, the Water Agencies plan to devote 40% of their financial support to actions promoting adaptation to climate change.² This marks a real shift: adaptation is no longer considered merely a secondary co-benefit, but has become a central and explicit objective. The Water Agencies' intervention programme is the first major public policy to have explicitly channelled a significant share of its resources into implementing climate adaptation projects.

The remaining half is divided among several areas coordinated at the national level

Beyond water policy, resources are now being committed to actions dedicated to adaptation or to supporting public and private actors in their adaptation efforts. Together, these amount to **€714 million** in 2025. They include:

- **Increased funding for existing programmes in response to climate change.** Several public policies were already focused on managing climate risks (e.g. natural risk prevention) or on crisis response (e.g. civil protection). As climate pressures on these activities intensify, their budgets have been increased in recent years, and these additional funds can now be regarded as resources explicitly dedicated to adaptation;
- **New, purpose-built funding instruments created in response to climate change.** In other areas, climate change represents not only additional pressure but an entirely new challenge requiring targeted and innovative responses. These have led to the creation of ad hoc mechanisms specifically designed for adaptation.

² <https://www.lesagencesdeleau.fr/les-agences-de-leau/priorites-et-missions> - accessed on 19/06/2025. It should be noted that this share was estimated at 55% for the 11th programme (French Government 2024).

TABLE 1. RESOURCES ALLOCATED IN 2025 TO NEW OR EXPANDED BUDGETS SPECIFICALLY LINKED TO RISING CLIMATE-RELATED NEEDS

(In € million)

	National resources deployed through LIFE projects dedicated to adaptation	1.4
	Overseas Adaptation Initiative (IAOM)	0.5
	Action by the French Development Agency (AFD) to promote adaptation in overseas territories	1.7
	France 2030 – Call for projects “Innov’Eau”	33
	Green Fund – “Mayotte Water Plan” component	5.8
	“Quartiers Résilients (Resilient Neighbourhoods)” initiative led by ANRU	14
	Green Fund – “renaturation” component	62
	Additional post-PNACC-3 resources from the Barnier Fund	+75
	Green Fund – “Flooding” component	9.5
	Green Fund – “Adaptation to mountain risks” component	4.9
	New measures to prevent the risks of clay shrink-swell	30
	France 2030 – Call for projects “Prevention and remediation of building damage caused by the clay shrink-swell phenomenon (RGA)”	2.6
	Green Fund – “Coastal” component	2.8
	Capacity-building initiatives for forest fires	48.6
	Specific expenditure on building adaptation	0.9
	Investments in nuclear power plant adaptation	38
	Increased efforts under DFCI (Forest Fire Defence)	+25.2
	Ecological planning – Forestry sector (upstream): Renewal, “Seeds and Seedlings” and “Efficient and Resilient Management and Silviculture” calls for projects; ONF Adaptation MIG (Public Service Mandate)	174
	Ecological planning – Forestry sector (downstream): “Efficient Industrialization of Wood Products” call for projects	47.1
	National Agricultural and Rural Development Programme	3
	Mediterranean Climate Agriculture Plan	25
	Actions supported under France 2030	106

Further details (amounts and explanations) for each line item are available in [Appendix A1](#).

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Available loan schemes to support adaptation

Resources dedicated to adaptation are not limited to funds directly allocated in response to climate change. Other financial instruments, particularly loans, are also integral to the toolkit that can be mobilized. These tools strengthen the capacity for action and enable local authorities and economic actors to launch or expand adaptation projects. Current mechanisms include loans offered by public financial institutions:

- *Aquaprêt* from the *Banque des Territoires* – **€4 billion** over four years, created to address the growing challenge of water stress;
- Adaptation loans from the *Banque des Territoires* – **€1 billion** over five years to support regional adaptation efforts tailored to local contexts (coastal areas, overseas territories, urban areas, mountain regions, etc.);
- Structural loans, guaranteed by *Bpifrance* and introduced in 2025, designed “to support farmers facing difficulties linked to climate hazards”;
- Loans from the French Development Agency (AFD) to support adaptation in overseas territories – **€153 million** in 2024 (2025 figure not yet available).

Funding for studies, technical expertise and preparatory measures

Initiating and implementing adaptation processes requires, above all, human resources, time and expertise at multiple levels (I4CE 2024d; IGEDD 2025). This need is increasingly recognized, even if it remains difficult to identify the share of human resources dedicated specifically to adaptation across the various administrations and organizations. Nonetheless, several targeted measures can be identified.

At the national level, these include management and coordination resources through the technical and planning services of State operators and public financial institutions. Examples include resources dedicated to broad adaptation initiatives, such as CEREMA’s “*Territoires adaptés au climat de demain (Territories Adapted to Tomorrow’s Climate)*” programme and ADEME’s TACCT support programme, as well as initiatives targeting specific territories or themes (e.g. coastal adaptation technical expertise from the *Banque des Territoires*).³ Together, these resources amount to around €24 million in 2025.

TABLE 2. RESOURCES ALLOCATED IN 2025 TO ADAPTATION TECHNICAL EXPERTISE, COORDINATION AND GOVERNANCE CAPACITIES (IN € MILLION)

Governance and coordination of adaptation policies at the national level	3.3 M€
General public technical expertise schemes (ADEME, CEREMA, Green Fund, Bpi France)	7.5 M€
Thematic public technical expertise schemes (Regional Development Banks, cities, mountain areas, coastlines)	13 M€

Further details (amounts and explanations) for each line item are available in **Appendix A4**.

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It also includes study budgets. The PNACC-3 lists numerous studies. Some are already underway, such as the study on water conservation in the tourism sector conducted by the Directorate-General for Enterprise at the Ministry of the Economy, and studies on the vulnerability of transport networks led by the Directorate-General for Infrastructure, Transport and Mobility at the Ministry for the Ecological Transition, or by infrastructure operators themselves.

Others are scheduled to begin in the short term, for example on the effectiveness of various prevention and remediation measures for risks linked to clay shrink-swell; on incentive schemes to promote cooling

distribution; and on the impacts of climate change on the health system.

These studies often represent modest amounts (less than €1 million per study) and are highly dispersed, making them difficult to consolidate. Nevertheless, they remain essential to improving preparedness.

Research and innovation resources

There is still no consolidated overview of all research projects currently underway in France that address adaptation. However, the Priority Research Programmes and Equipment (PEPR) established under France 2030 and implemented by the French National Research Agency

3 The “Mission Adaptation” serves as a single entry point for local authorities accessing these schemes, but does not itself mobilize additional resources. <https://mission-adaptation.fr/>

(ANR) clearly reflect the national effort in this area.⁴ These programmes bring together France's main public research bodies (e.g. CNRS, Météo-France, INRAE and BRGM) to coordinate their efforts around priority issues. Eight PEPRs (TRACCS, SOLU-BIOD, OneWater, Ville Durable, IRiMa, FORESTT, SVA, AgroEcoNum) explicitly include adaptation among their objectives, representing a total of **€282 million** over seven to ten years. On an annualized basis, this corresponds to approximately **€45.5 million** in 2025.

Research on adaptation is not new. Beyond current programmes, France's adaptation policy builds on a substantial body of knowledge generated through earlier initiatives (e.g. the GICC programmes, the development of the Drias portal, TRACC datasets and the Explore2 project) which, since the 2000s, have created significant intellectual capital, providing a strong foundation for evidence-based decision-making.

Additional resources to cover damage

While the measures above mainly aim to prevent or reduce the impacts of climate change, recent years have also seen an increase in the resources – particularly public ones – mobilized to cover losses already incurred:

- Following the work of the Varenne Committee on Water and Climate Change (2022), crop insurance reform was introduced with the goal of reaching **€560 million** by doubling the contribution paid by farmers (**€60 million**) and allocating **€255 million in 2023**, **€275 million in 2024** and **€295 million in 2025** in budget allocations.
- To help restore property deemed uninsurable in metropolitan areas affected by severe climatic or geological events, since 2008 the State has provided an exceptional solidarity grant (DSEC), amounting to **€30 million in 2025**.
- Since 2022, a support scheme for municipalities managing forests severely affected by the bark beetle crisis has been in place, with a 2025 budget of **€1 million**.
- To ensure the long-term sustainability of the natural disaster (CatNat) scheme in the context of climate change, the “natural disaster surcharge” was increased in 2025. CatNat should therefore have additional coverage capacity of **€1.5 billion** per year.

Although these budgets cannot directly reduce vulnerabilities,⁵ they are nevertheless a vital part of the overall resources needed for adaptation. Covering unavoidable losses strengthens the resilience of the economy and society.

Tens of billions of euros planned for 2025 contribute to adaptation, but in some cases could do so more effectively

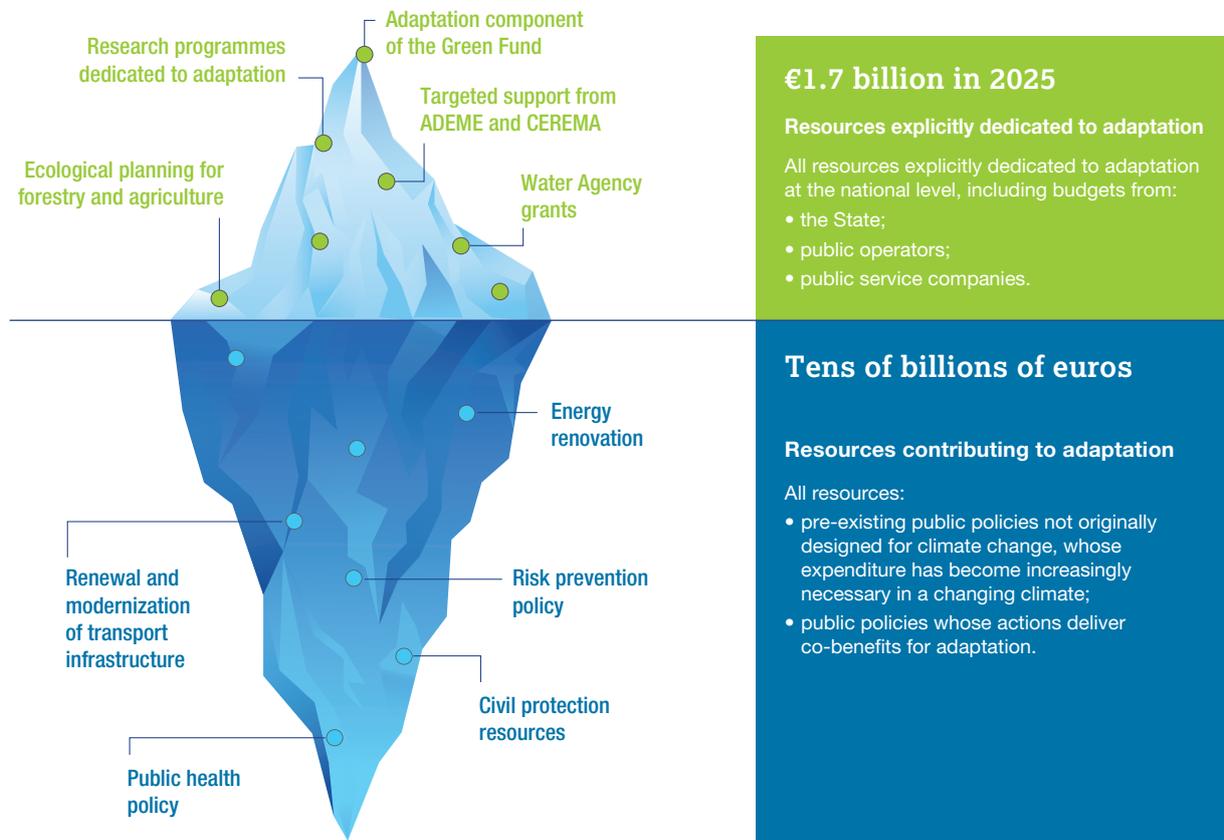
Many other resources contribute to adaptation without explicitly identifying it as such. The total specifically allocated to adaptation therefore offers only a partial picture of the financial effort to prepare for the impacts of climate change. Much of this funding predates the explicit integration of climate change into public policy, yet it still supports adaptation, either by financing actions that inherently deliver co-benefits (for example, flood risk prevention) or by incorporating adaptation objectives into existing programmes, thereby generating additional benefits without necessarily requiring new resources (as in the case of energy renovation initiatives).

4 PEPRs are not the only research effort in the field of adaptation. Other, more diffuse programmes and projects also contribute, but they are not monitored in a consolidated manner that would allow their inclusion in this analysis.

5 They are therefore not directly included in the total amount of resources explicitly dedicated to adaptation.

FIGURE 2. PUBLIC RESOURCES FOR ADAPTATION: SCOPE AND SCALE

Resource examples:



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Together, these measures represent tens of billions of euros in expenditure in 2025. The variation in the amounts involved reflects the economic structure of each sector more than the scale of the adaptation challenges themselves: for instance, infrastructure renewal accounts for billions of euros, while mountain development represents tens of millions, as the two areas have very different capital needs.

Careful monitoring of these measures is crucial, since decisions often made for reasons other than adaptation can still have direct implications for overall adaptation outcomes.

Policies that inherently contribute to managing climate risks

Public policies that were already designed to manage climate risks are becoming increasingly essential as the climate changes. It is therefore not only the recent increases in the Barnier Fund or civil protection budgets that contribute to adaptation. It is equally important to track all resources allocated to these policies, since any reduction would mean losing critical capacity for anticipation and response in a world of growing risks.

TABLE 3. POLICIES THAT INHERENTLY SUPPORT THE MANAGEMENT OF CLIMATE RISKS (suite)

	<p>Flood risk prevention policy</p> <p>Between 2011 and 2022, 122 Flood Prevention Action Programmes (PAPI) were approved by the State and local authorities, representing a total investment of €3.3 billion, or an average of €300 million per year (Rapin and Roux 2024).</p>
	<p>Civil protection policy</p> <p>Civil protection policy is mainly funded from local budgets. The consolidated budget for departmental fire and rescue services (SDIS) stood at €5.9 billion in 2024 (Ministry of the Interior 2024), with departments and municipalities being the main contributors (Dumont 2024).</p> <p>The national share of this policy, primarily covered under budget programme 161, amounts to €860 million in 2025 (a decrease of approximately 4.5% compared with 2024). It includes, in particular, the implementation of capacity-building initiatives and the renewal and strengthening of the national air fleet. However, the implementation of the trajectory set out in the Ministry of the Interior's Orientation and Programming Law (State 2023) faces a number of challenges, notably the availability of industrial sectors capable of meeting the identified needs (Vogel and Husson 2024; Dumont 2024) and recent budgetary adjustments (Maudet and Pantel 2025).</p>
	<p>Public health and environmental policy</p> <p>In terms of public health action planning, the PNACC-3 identifies the National Health and Environment Plan 4 (PNSE4), with an estimated budget of €177 million over five years for its <i>One Health</i> approach. However, <i>France Stratégie</i> notes that this plan does not include any measures specifically dedicated to climate adaptation, and the potential for co-benefits in terms of adaptation therefore appears limited (France Stratégie 2023b).</p> <p>For budget allocations, programme 204 “<i>Prevention, health safety and healthcare provision</i>” allocates funds that deliver co-benefits for adaptation:</p> <ul style="list-style-type: none"> • Action 15 (€28 million in 2025) brings together funds to prevent human exposure to risks related to the environment and nutrition (French Government 2025b). • Action 16 (€19 million in 2025) covers monitoring and warning systems in exceptional health crises, such as heatwaves (French Government 2025b).

Further details (amounts and explanations) for each line item are available in [Appendix A2](#).

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The fundamentals of adaptation

The links between adaptation and policies for disaster relief, risk prevention or natural disaster insurance are fairly clear. However, there is another, less visible but equally important dimension: the maintenance (or even expansion) of certain physical and social infrastructure that underpin the robustness and resilience of an economy. This has been clearly demonstrated in developing countries (Hallegatte *et al.* 2017): the most vulnerable are those that lack solid infrastructure networks (electricity, transport, telecommunications, health systems, etc.) and social safety nets (health coverage, emergency services, unemployment insurance, etc.). The first step in adapting to climate change is access to basic services, which is essential in normal circumstances but vital when a climate shock occurs. For example, reliable transport infrastructure supports economic development in ordinary times but becomes critical during and after crises, enabling the delivery of relief, the evacuation of populations, and the rapid resumption of activity. A substantial body of research highlights the links between unequal access to services and vulnerability (IPCC 2022; Benitez and Reghezza 2018; Reghezza-Zitt *et al.* 2012). The logic underlying these findings also applies to France and the European Union. As climate risks intensify, our physical and social infrastructure remains fundamental to adaptation. The primary challenge, therefore, is to preserve and strengthen these systems, ensuring effective access for those who need them most, while adapting them to a changing climate.

Policies with adaptation co-benefits that could be optimized

Many other policies generate adaptation co-benefits by helping to reduce the exposure or sensitivity of buildings, infrastructure and economic activities to climate risks. This is particularly true of energy transition investment programmes which, by supporting

the renewal of assets, the renovation of buildings and the transformation of industries, also enhance their robustness and resilience. Indeed, renewed infrastructure, renovated buildings and urban spaces designed to modern standards are generally better suited to climate impacts than those affected by maintenance delays, poor insulation or outdated planning.

TABLEAU 4. POLICIES WITH CO-BENEFITS FOR ADAPTATION

	<p>Urban policy</p> <ul style="list-style-type: none"> The stated objective of the “Resilient Neighbourhoods” initiative is to ensure that the €14 billion (2014-2030) allocated to the New National Urban Renewal Programme (NPNRU) effectively strengthens the resilience – particularly climate resilience – of the priority urban neighbourhoods (QPV). <p>Urban greening policy</p> <ul style="list-style-type: none"> Local authority expenditure on adapting urban areas to high temperatures is not subject to contractual targets or national monitoring. However, projects supported by the Green Fund’s “renaturation” measure should be noted, with total funding of €1.43 billion in 2024 (MTE 2025).
	<p>Policies supporting building energy renovation</p> <p>The government provides various financial instruments to co-finance energy renovation projects:</p> <ul style="list-style-type: none"> Public buildings owned by local authorities, with €707 million from the Green Fund allocated in 2024 for a total investment of €3 billion (MTE 2025). Housing, mainly via the <i>MaPrimeRénov’</i> scheme, €2.3 billion in 2022, contributing to total investment of €16.4 billion in the energy renovation of private housing in 2022 (I4CE 2023). <p>Policy on the renovation of public buildings owned by the State</p> <ul style="list-style-type: none"> The government is dedicating significant resources to the renovation and maintenance of its housing stock. By 2025, these investments are expected to total €2.8 billion for all structural work and major maintenance (French Government 2025a).
	<p>Transport infrastructure regeneration and modernization policies</p> <ul style="list-style-type: none"> Rail network: €3.1 billion invested in regenerating and modernizing the national rail network (Ambition France Transports 2025). Non-concession national road network: €700 million invested in regenerating and modernizing the national road network (Ambition France Transports 2025). It should be noted that no consolidated data exist for departmental and municipal road networks. River network: €200 million invested in regenerating and modernizing the river network (Ambition France Transports 2025). Rail freight and combined transport: €200 million invested in regenerating and modernizing rail freight and combined transport (Ambition France Transports 2025). Bridges: National Bridges Programme (2023-2026): €40 million for assessments (survey, reconnaissance and analysis) and €55 million to support local authorities in repairing municipal structures (Longeot and Belin 2022). Concession road network: €829 million invested in 2023 by motorway concession companies in renewing the concession network (ART 2024).
	<p>Electricity network modernization policy</p> <p>RTE invested €0.9 billion (out of a total €2.3 billion) in 2024 in renewing and adapting the electricity transmission network to climate change (RTE 2025).</p> <p>In 2023, ENEDIS allocated €1.2 billion (out of €4.9 billion) to strengthen the resilience and modernize the electricity distribution network (ENEDIS 2023b).</p>

TABLEAU 4. POLICIES WITH CO-BENEFITS FOR ADAPTATION (suite)

	<p>Agricultural transition support policy</p> <p>Between €3.2 and €5 billion (out of €53.6 billion) of public funding for the French food system planned for 2024 was deemed conducive to ecological transition (I4CE 2024c). This mainly covers public expenditure supporting sectors that reduce greenhouse gas emissions and the use of plant protection products, and that promote renewable energy production and agroecological practices.</p>
	<p>Policy to support the forestry and timber industry</p> <p>A Senate report estimates that total annual public expenditure for the forestry and timber sector will reach €1.45 billion in 2024, including €816 million in national budget allocations (Klinger and Lurel 2024). However, as presented in PNACC-3 measure 38, all reference documents framing forestry policy take adaptation issues into account. Some expenditure, such as the ONF's public interest missions financed by the State, the Strategic Forest and Wood Fund, and investments in the downstream forestry sector, do contribute, particularly in this area. However, the level of contribution is disputed: although the issue of adaptation to climate change is clearly identified, the way it is addressed – particularly through investment support – remains a matter of debate.</p>

Further details (amounts and explanations) for each line item are available in [Appendix A2](#).

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1.2. Real progress between 2020 and 2024, but momentum weakened by budget constraints

Momentum gained, and almost no blind spots remaining

The tables above provide an overview of France's adaptation measures in 2025. This snapshot should be read in the context of the broader trends shaping these developments. Five years ago, it would have been extremely difficult, if not impossible, to produce a consolidated picture of the resources devoted to adaptation, as very few mechanisms explicitly identified this objective (aside from a handful of budgets such as those of the Water Agencies or the Barnier Fund). Today,

this is finally possible because, since the early 2020s, adaptation has been an explicit and traceable marker across almost all relevant policy areas. For example, decisions on forest fire policy are now framed explicitly within the context of “risk transformation”.⁶

This shows that adaptation momentum is now well established across all areas of public policy affected by climate change. There are no longer any major blind spots, even if the funding levels or coverage remain limited in some sectors – such as health – at this stage.

The State's Green Budget exercise

Each year, during the budget debate, the government presents an environmental assessment of the national budget, designed to “measure the environmental impact of the State budget by identifying budgetary and fiscal expenditure that is favourable or unfavourable to the environment” (French Government 2025c). This “Green Budget” identifies €25 billion in State expenditure that, in 2025, will contribute to making the economy and regions more resilient to climate change. This includes resources managed by agencies involved in adaptation (e.g. Water Agencies, Météo-France, VNF, ADEME) and funding for programmes that contribute to adaptation (e.g. the Barnier Fund, the Green Fund, and support for energy renovation and the management of the timber industry).

However, there is a tendency to assign a favourable “adaptation” rating whenever the “mitigation” rating is favourable. In practice, this link is not automatic: it is essential to verify, programme by programme and credit by credit, that adaptation has actually been taken into account (I4CE 2025; 2020). Similarly, part of the €440 billion considered environmentally neutral could, in fact, be directly affected by climate change. This applies, for instance, to budget programmes that support the development and renewal of networks, telecommunications and transport infrastructure. These expenditures are far from neutral. They could enhance adaptation if climate risks are properly integrated, or, conversely, increase vulnerability if they are not.

A majority of dedicated resources allocated between 2020 and 2024

In terms of public financial efforts, it is clear that adaptation – like environmental planning more broadly – has benefited from post-Covid recovery policies, with 2020–2024 marking a genuine surge in activity. A significant share of the dedicated resources identified in this study were allocated and implemented during this period. These include the creation of the Green Fund (2022); additional resources for the Water Agencies to implement the Water Plan (2023); the increase in the Barnier Fund (2025); funding for ecological planning in the forestry and agriculture sectors (from 2020); the civil protection capacity-building initiatives (2023); and all public loan and technical assistance schemes (from 2020).

Public policies and investment programmes are increasingly integrating climate change

The situation has also improved markedly across all investment programmes affected by climate change. Where once it was impossible to tell whether these programmes accounted for climate risks, evidence now clearly highlights adaptation co-benefits and identifies key actors who demonstrate a genuine understanding of the issue. In several programmes, dedicated initiatives have been launched in recent years to integrate adaptation, signalling the first real steps towards alignment. For example, the National Agency for Urban Regeneration (*Agence Nationale de la rénovation urbaine*, ANRU) now explicitly recognizes adaptation as an objective of its programmes; summer comfort is gradually being factored into energy renovation grants and State property operations; and vulnerability studies and early strategic frameworks are being developed for transport networks and energy infrastructure.

⁶ “We must adapt to this transformation of risk. Because this exceptional year may not be so exceptional after all, and we will have to respond to this in the decades to come.” <https://www.vie-publique.fr/discours/286992-emmanuel-macron-28102022-lutte-contre-les-feux-de-forets> - 28 October 2022.

These developments highlight the growing contribution of such investments to adaptation, rather than the risks of maladaptation. Nevertheless, while these co-benefits are increasingly sought, adaptation opportunities are still being missed, and in some cases, vulnerabilities are even being reinforced. More broadly, there remains significant scope to strengthen the integration of adaptation into these investments (I4CE 2025).

A detailed analysis of the contribution of these policies to adaptation is provided in **Appendix A2**.

A more uneven picture for the human resources of adaptation operators

Beyond explicitly dedicated measures, much of the day-to-day work of public operators involved in adaptation contributes directly to this objective. Routine forest maintenance, support for carbon-neutrality initiatives, water resource management, and weather monitoring and surveillance systems all play a tangible role in strengthening France's ability to cope with the effects of climate change.

We have identified eleven key public operators whose operational capacity merits close monitoring: ADEME, CEREMA, IGN, the Water Agencies, OFB, CELRL, the National Parks, ONF, CNPF, ANCT and BRGM. Tracking the number of full-time equivalents (FTEs) employed by these bodies is a useful indicator in this regard. While budgets are generally organized around specific intervention programmes (such as ADEME's Heat Fund), human resources indicate each organization's ability to coordinate, support and even implement adaptation measures, areas for which State operators play a pivotal role (I4CE 2024d). In the absence of precise data on the number of FTEs dedicated specifically to adaptation,⁷ we treat overall staffing levels and their changes over time as an indicator of the flexibility available to these operators.

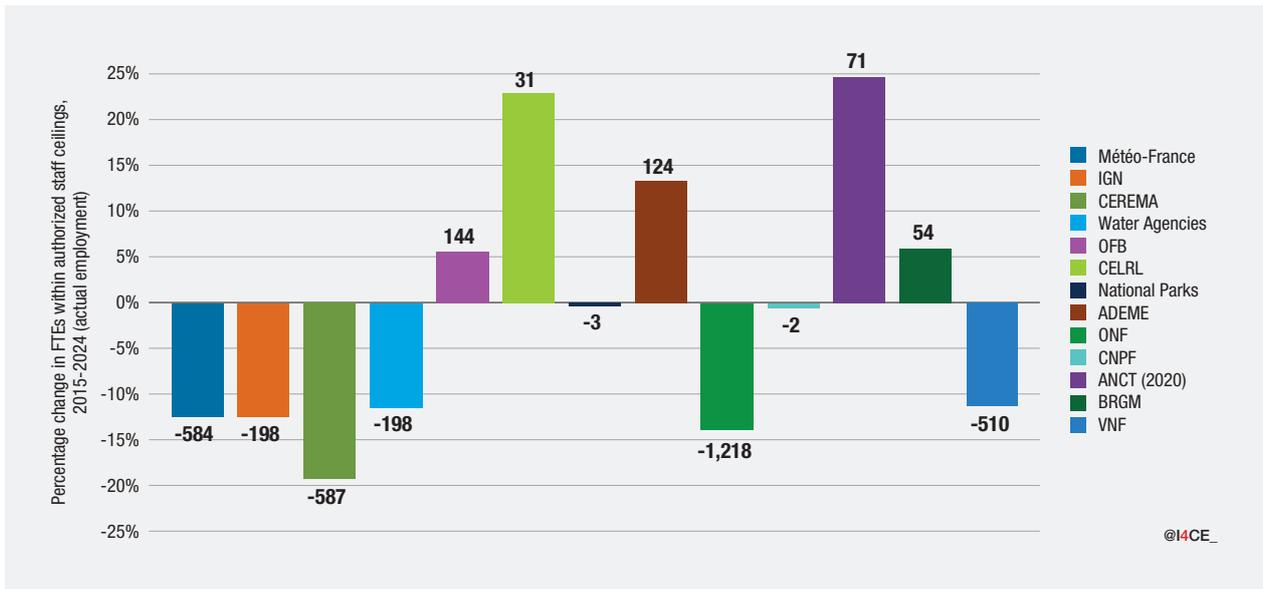
The positive momentum observed in investment between 2020 and 2024 is also reflected, to some extent, in the staffing levels of operators involved in adaptation. In particular, 2024 saw increases in staff numbers at nearly all of the monitored operators, with IGN the only exception.

However, this short-term improvement takes place against a long-standing backdrop of declining staffing levels, a trend that has been well documented and widely criticized for some time (Cour des comptes 2024c; Capo-Canellas 2021; CGEDD 2021). These repeated warnings prompted us to extend our analysis over a longer period. Over the past decade, this brief period of stabilization and, in some cases, growth, has not offset the overall downward trend observed among many key operators. Between 2015 and 2024, for instance, ONF lost 1,218 FTEs, Météo-France 584, and both the Water Agencies and IGN 198 each.

These reductions have forced operators to prioritize their activities, leaving limited flexibility to develop or retain the specialized expertise required for adaptation – expertise that often takes time to build and is difficult to replace once lost. The effect of these cuts is already visible: in 2022, for example, the reduction in staff at Météo-France was cited as one of the factors that hindered its ability to accurately forecast the exceptionally intense storm that struck Corsica. This loss of capacity is all the more concerning given growing demands placed on the organization for forecasting and warning (Capo-Canellas 2021; National Assembly 2023).

⁷ Some details were nevertheless provided in the context of the recent parliamentary fact-finding mission on resources devoted to adaptation. CEREMA estimates that around 380 FTEs were working directly on adaptation in 2024 (equivalent to 50,000 person-days), while ADEME estimates 14 FTEs (Lahais and Sas 2025).

FIGURE 3. CUMULATIVE CHANGE IN TOTAL WORKFORCE (2015–2024) OF THE MAIN NATIONAL PUBLIC OPERATORS CONTRIBUTING TO ADAPTATION



Will there be a slowdown from 2025 onwards?

While the period from 2020 to 2024 saw real progress on adaptation, the more recent period – marked by budgetary constraints – has cast significant doubt on whether this momentum can be sustained. Some gains now appear well established, while others may be reconsidered.

The reduction in the Green Fund appears difficult to reconcile with the needs identified in the PNACC-3. In 2025, the total Green Fund budget was cut by €850 million to **€1.15 billion**, although the government has expressed a clear intention to preserve the adaptation component, first during the presentation of the PNACC-3 and again in official guidance sent to implementing departments to improve the Fund’s performance by focusing spending on the most efficient measures.

As the total budget is fungible, the overall reduction nevertheless raises concerns about competition between measures. The final amount committed to adaptation could still end up being lower than announced, depending on the projects submitted by stakeholders. Even if allocations for adaptation are maintained, funding for other measures will automatically decrease. Yet many of these – such as energy renovation and biodiversity initiatives – also generate co-benefits for adaptation.

This reduction, only partially offset by the **€75 million** increase in the Barnier Fund, runs counter to the needs identified in the PNACC-3. Around twenty actions are expected to rely on the Green Fund and the Barnier Fund for implementation in 2025. In its 2025 annual report, the High Council for Climate (2025) notes that the funding currently identified for the PNACC-3 remains well below estimated needs.

More broadly, the amounts allocated to State budget programmes related to adaptation mark the end of the growth phase seen in recent years. This reflects, in part, the expiry of a cycle of investment support policies, with no replacement measures introduced (e.g. the end of the *Plan Avenir Montagnes*, the completion of France 2030 commitments).⁸ This is also due to a net reduction in the funds initially allocated. Following the cancellations, the amounts planned for 2025 for ecological planning measures in forestry and agriculture are significantly lower than those initially announced (a 50% reduction in commitment authorizations and payment allocations for ecological planning between the initial 2024 and 2025 finance laws). Budget allocations for the implementation of the *Water Plan* in 2025 have been postponed; while the low level of State funding for urban renewal in 2025 threatens the completion of certain projects.

Initial discussions on preparing the 2026 budget offer little sign of short-term improvement. Several signals raise questions about the current momentum: these include co-benefit schemes such as *MaPrimeRénov’*, which was frozen for the first time this summer and whose future is now uncertain, as well as discussions on the downward revision of funding trajectories agreed with certain operators, such as VNF, and even possible mergers or reorganizations of operators whose human and technical resources remain essential.

⁸ “In a letter sent on 5 May 2025 to all ministers, Budget Director Mélanie Joder was already preparing the ground for the withdrawal of funds for ecology and competitiveness measures under the recovery plan launched in 2020.” https://www.lemonde.fr/politique/article/2025/05/25/budget-nouveau-type-de-loi-gel-des-credits-de-nouvelles-pistes-pour-redresser-les-comptes-publics_6608340_823448.html – accessed on 01/07/2025.

1.3. What these measures reveal about adaptation to date

The allocation of financial resources is an indicator of collective choices, even when they are implicit. Beyond rhetoric, budgets reveal priorities by showing where the time and resources of organizations are actually focused. Analysing the resources committed, and placing sectoral trends in context, therefore provides insight into how France has adapted to the impacts of climate change so far.

Adaptation efforts largely aimed at catching up

Additional resources for adaptation are often activated in response to a climate event that serves as a trigger. In the aftermath of storms Lothar and Martin in 1999, for example, electricity system operators began developing

advanced climate trend analysis capabilities and incorporating vulnerability reduction into their investment programmes.⁹ More recently, the bark beetle infestation prompted collective action on the need to adapt forest management (French Government 2022a; Cattelot 2020; Ministry of Agriculture and Food 2020). The summer of 2022, marked by particularly severe forest fires, triggered a real awareness of the need to adapt France's civil protection system (see **box**). Similarly, the Water Plan, announced in 2023, was primarily designed as a response to the consequences of the 2022 drought (French Government 2023). It was also following the heatwaves regarded as exceptional in previous summers that the government, at the very beginning of summer 2022, announced the creation of a €500 million fund for the "renaturation" of cities, which was later integrated into the Green Fund.¹⁰

Focus: Civil protection reforms after the 2022 fire season

The summer of 2022 was marked by particularly severe forest fires, with major blazes affecting several departments, including Gironde, Pyrénées-Atlantiques, Var, Finistère and Morbihan.

Those involved in responding to the fires noted that the French civil protection system had been pushed to its limits. They indicated that it would have been very difficult to cope with either a greater number of incidents or a longer fire season (Belluco and Lemaire 2024).

This assessment was heard at the highest level of government and publicly acknowledged by the President in his October 2022 speech thanking civil protection personnel. For the first time, the Head of State recognized the need to develop new systems and to scale up resources to respond to the evolving risks brought about by climate change.

This moment therefore marks the starting point for initial adaptation efforts, subsequently reflected in budgetary decisions and in the Ministry of the Interior's Programming Law (*Loi d'orientation et de programmation du ministère de l'Intérieur*, LOPMI).

⁹ <https://www.rte-france.com/l-heritage-de-la-tempete/> et <https://www.enedis.fr/nos-missions/vous-depanner> – accessed on 07/08/2025.

¹⁰ <https://www.info.gouv.fr/actualite/500-millions-deuros-pour-remettre-de-la-nature-dans-les-villes> – accessed on 07/08/2025.

TABLE 5. RESPONSES OBSERVED FOLLOWING EXCEPTIONAL CLIMATIC EVENTS

Climate phenomenon	Subsequent response in terms of budget and public policy	
1999 Storms Lothar and Martin		RTE – Starting point for the policy of mechanically securing the lines of the electricity transmission network.
		ENEDIS – Creation of the Rapid Electricity Intervention Force (FIRE) and launch of the underground cabling policy.
2003 Heatwave		EDF – Creation of a framework for exemptions in exceptional weather conditions, raising temperature limits and heating differentials, and launching the “extreme heat” plan.
		Public Health – Creation of a heatwave alert system and registers of vulnerable or isolated individuals.
2019 Drought		Forestry – Creation of a roadmap for adapting French forests and introduction of subsidies for forest renewal.
2022 Fires		Civil protection – Strengthening State support for civil protection actors (capacity building initiatives); launch of the <i>Beauvau</i> civil protection initiative.
Geotechnical drought		Compensation scheme – Order of 22 December 2023 increasing the CatNat surcharge rate.
Heatwave		Renaturation – Announcement of an urban greening fund (now part of the Green Fund).
		Creation of a national heatwave management plan.
Drought		Agriculture – Release of emergency funds and announcement of the Water Plan.

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In some sectors, it is not a single event but a gradual accumulation of problems that ultimately prompts awareness and action. For example, it was not a single isolated incident but a series of disruptions, together with rising repair and maintenance costs, that led transport infrastructure managers to take action (SNCF. Réseau 2024; Cour des comptes 2022).¹¹ Similarly, the growing deficits of municipalities operating winter sport resorts, following several low-snowfall winters, have begun to raise concerns among public auditors (Cour des comptes 2024b). These trends, observed across many sectors, are described in detail in the Cour des comptes’ 2024 Annual Public Report (2024d).

Some of the resources – particularly public funds – released in response to such warnings initially take the form of crisis management or mitigation measures. One example is emergency aid for farmers affected by

“exceptional” weather events, which reached a record €500 million in 2021 and another €430 million in 2022 (I4CE 2024b).

In most cases, however, the response does not stop at managing the immediate crisis but leads to a more lasting reassessment of existing measures. Beyond the 2022 drought, for example, the Water Plan aims to secure water resources in the context of climate change (French Government 2023). Similarly, while the initial national response to the bark beetle crisis in forests took the form of emergency aid to remove damaged wood, a broader and longer term initiative was subsequently launched, extending reforestation support beyond the stands directly affected. The Objectif Forêt report by the Higher Council for Forestry and Wood notes that “climate scenarios highlight situations of short-term vulnerability” and concludes that there is a “need to adapt the stands

¹¹ “Climate instability is already having an impact. It affects the quality of service provided to customers, damages certain assets and affects employees’ working conditions. It also puts upward pressure on maintenance costs by requiring increased network monitoring, more intensive vegetation management, and both preventive and corrective maintenance.” Introduction to SNCF. Réseau’s “Strategic note on adaptation” (2024).

concerned without delay” (CSFB 2023). This analysis helped determine the scale of the aid measures now in place.

Adaptation measures often emerge from lessons learned through such events. A key step in this process is the reassessment of needs – placing the triggering episode within a scientifically documented climate trend – which reveals the limits of previous responses and points to underlying structural weaknesses.¹²

Initially, this reassessment often takes the form of a “catch-up” effort, channelling financial resources

into upgrading infrastructure in response to climatic changes already observed. Yet this process is increasingly accompanied by more forward-looking work to build the capacity to anticipate future developments.

This approach is strongly supported by the PNACC-3, which provides for numerous forward-looking studies in this area and offers methodological tools and benchmarks to ensure that this work remains consistent with the assumptions of the reference warming trajectory (TRACC).

TABLE 6. EXAMPLES OF CORRECTIVE MEASURES AND FORWARD-LOOKING INITIATIVES

	Examples of corrective measures	Forward-looking initiatives
 <p>Increase in compensation covered by the CatNat scheme</p>	<p>Reducing the compensation scheme’s deficit by raising the CatNat surcharge from 1 January 2025.</p> <p>A €75 million per year increase in 2025 in the resources of the Barnier Fund, helping to reduce the prevention deficit that has grown in recent years.</p>	<p>A project conducted by three experts examined ways to adapt the French insurance system to changing risks (Langreney <i>et al.</i> 2024).</p> <p>A working group with insurers was set up under PNACC-3 / Roquelaure initiative on the insurability of territories for local authorities.</p> <p>→ Status: Inconclusive at this stage. The increase in the surcharge is only one of the measures recommended in the Langreney report. Other proposals to ensure the scheme’s long-term sustainability under climate change have not yet been implemented.</p>
 <p>Forest dieback</p>	<p>Aid for reforestation primarily targeted at damaged stands (57% for France Relance and 63% for France 2030) (Ministry of Agriculture and Food, 2025).</p>	<p>Since 2020, three successive plans have aimed to develop a renewal policy that covers not only damaged but also vulnerable stands. Due to the addition of criteria in successive specifications, planting operations now aim to promote tree species and silvicultural methods that foster the creation of more resilient forests, drawing on forward-looking initiatives (CSFB 2023; Cattelot <i>et al.</i> 2022; Ministry of Agriculture and Food 2020; Loisier and Mérillou 2025).</p> <p>→ <i>Aid specifications now increasingly incorporate adaptation criteria (though this remains debated). PNACC-3 also provides for a further update of these specifications and (under measure 38) calls for the establishment of a “national climate change adaptation strategy, supported by the State, including forest renewal and extended to include the levers of improvement, resilience and biodiversity to be established and integrated into the new national forest and wood programme” planned for 2027.</i></p>
 <p>Increasing discomfort in buildings during summer</p>	<p>Since 1 January 2022, summer comfort criteria have been introduced in RE2020, but they are based on the 2003 heatwave scenario as the reference event and do not take climate projections into account.</p>	<p>Provision of climate data aligned with TRACC in 2025.</p> <p>PNACC-3 plans to study and review the integration of summer comfort in RE2020.</p> <p>→ Status: No regulatory changes planned at this stage (PNACC-3 plans to examine the issue once the study has been completed).</p>
 <p>Degradation of critical transport infrastructure</p>	<p>Investments initially focused on clearing maintenance backlogs.</p>	<p>Land transport infrastructure managers are conducting vulnerability assessments of their assets and preparing adaptation strategies. In 2025, the French Council for Infrastructure Orientation was tasked with defining investment needs for climate-resilient infrastructure.</p> <p>→ Status: Strategies and investment plans not yet finalized.</p>

¹² See the numerous reviews conducted by general inspectorates and parliamentary bodies following various events influenced by climate change (IGEDD, IGA, and CGAAER 2023; Départements de France 2022; Bacci *et al.* 2022; CGEDD 2019; IGEDD, IGA, and CGAAER 2023; Ledoux 2023; Cattelot 2020; CCR 2023a).

TABLE 6. EXAMPLES OF CORRECTIVE MEASURES AND FORWARD-LOOKING INITIATIVES

	Examples of corrective measures	Forward-looking initiatives
 Pressure on water resources	The Water Plan (2023) was designed mainly in response to the 2022 drought and aims to adapt existing uses and address identified vulnerabilities (French Government 2023).	At the basin level, several water agencies have launched studies to integrate adaptation into future planning (e.g. HMUC-type studies, Loire-Bretagne Water Agency et al., 2022). <i>At the national level, numerous studies and consultations are underway, including the Assises de l'eau, the Varenne de l'eau et du changement climatique (2022), as well as forward-looking initiatives by the High Commission for Strategy (2025). Economic actors have also contributed, notably through the Panorama of global financing of water policy in metropolitan France published by the Cercle Français de l'Eau (Salveti and Cercle Français de l'Eau, 2024; MTE 2019; French Government 2022b; High Commission for Strategy and Planning 2025a; France Stratégie 2025).</i> → Status: Gradual incorporation into planning.
 Coastal erosion	Securing assets (e.g. buildings, infrastructure, campsites) already under threat.	National study on coastline projections and analysis of challenges at multiple timescales (5 years, 2050 and 2100). Work by the general inspectorates and the National Coastal Line Committee (CNTC) to propose a financing solution; → Status: Inconclusive – proposals not adopted due to lack of consensus.
 Decrease in snow cover in the mountains	Local authorities cover ski area operating deficits through their budgets.	Rapid, large-scale deployment of vulnerability diagnostics for ski resorts. → Status: Few genuinely transformative strategies developed following these vulnerability studies.

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Some of this work has already produced clear estimates of the additional resources that will need to be devoted to adaptation in the coming years, while other analyses are still ongoing (see Appendix A3).

However, the strength of these dynamics varies across sectors. It remains very uncommon for prospective exercises to have resulted in the decisions needed to allocate sufficient resources for adaptation on a scale matching future climatic changes. Ultimately, in quantitative terms, few real choices are made in advance.

Most measures currently dedicated to adaptation are designed to respond to challenges that are already tangible and immediate, and would be beneficial even in the absence of further climate change. **Funding for more proactive adaptation remains modest and is concentrated mainly on early-stage initiatives, studies and experiments. Many of the measures in the PNACC-3, for example, involve launching or developing vulnerability studies and trials.** In some cases, this simply reflects the state of knowledge and the technical maturity of the issues concerned. In others, it reflects political maturity, with choices that have not yet been made, or for which there is not yet consensus.

Current adaptation efforts largely aim to preserve existing models

These efforts generally take the form of adjustments, efficiency improvements or minor non-fundamental changes, rarely involving any redesign of systems (High Council for Climate 2021; 2024b). The 2023 Water Plan, for example, focuses on improving water-use efficiency without challenging existing patterns of use. Similarly, adaptation policies in agriculture mainly promote the optimization of existing practices rather than structural shifts in crops or production models (High Council for Climate 2024a; Solagro 2025). On the coast, beyond studies and scenario exercises, adaptation actions by local stakeholders still mainly involve targeted protection or relocation works (e.g. road relocations) with almost no examples of genuine relocation projects involving significant population or economic activity displacement and broader territorial restructuring.¹³ In mountain regions, the prevailing logic has long been confined to “tourism diversification”, without fundamentally challenging the winter sports resort model or translating broader economic diversification into practice (Cour des comptes 2024b).

This situation echoes findings in the scientific literature on the predominance of incremental adaptation

¹³ One exception worth noting is the village of Miquelon <https://www.adaptation-changement-climatique.gouv.fr/actualites/veille/deplacement-miquelon-laboratoire-adaptation-au-changement-climatique>

policies over more transformational ones (IPCC 2022), and on the tendency of complex systems to seek self-preservation (Erard 2024).

Nonetheless, in several areas there remains a clear gap between rhetoric that stresses the need for change and the reality of the adaptation measures implemented.

This gap is particularly visible in mountainous and coastal regions, where forward-looking visions of economic or spatial reorientation are emerging but have yet to be translated into practical action plans.¹⁴ The same applies to agriculture: while the transition to an agroecological model is widely supported in discourse, most funding continues to support conventional agricultural models that pay little regard to adaptation (European Court of Auditors 2024; 2021).

The question “What do we want to preserve?” is rarely asked explicitly. The choices historically made regarding target service levels or acceptable risk are still often treated as unquestionable. As a result, the dynamics of adapting transport systems have not yet prompted debate on the level of effort we are collectively prepared to make (*i.e.* should we accept the prospect of a new investment wall to maintain traffic reliability under worsening climatic conditions, or instead prioritize certain routes over others, if not all works can be undertaken?). **Such an approach is questionable when the limits and conditions for the viability of current systems are not clearly defined.** It amounts to endorsing choices without any guarantee of their technical or economic feasibility, and risks locking sectors or regions into dead ends once the limits of adaptation are reached.¹⁵

For example, the National Low Carbon Strategy – a central element in debates on the future of French agriculture – is based on the assumption of “moderate yield growth by 2050 for all production methods” (INRAE 2023).¹⁶ This assumption reflects a continuation of recent trends (Schauburger *et al.* 2018) and implicitly depends on technical, genetic and practical advances that could offset the expected impacts of climate change on yields, though these are not detailed anywhere. The economic viability of these maintenance assumptions has not yet been explicitly discussed.

Other examples include the large-scale investment projects in mountain areas (snow cannons, ski lifts) that are being undertaken despite major uncertainties regarding their long-term viability under projected snow conditions, both in terms of return on investment and broader socio-economic impact. Such projects can give the illusion of immediate adaptation. In reality, they do little to prepare for the eventual economic transition of these areas – a process that will take years to plan and implement, by which time winter sports are unlikely to remain viable in these areas (Cour des comptes 2024b).

It should be noted that the adaptation financing mechanisms already in place do not systematically exclude more transformative options, but they are rarely prioritized by project promoters. For example, the Water Agency programmes can fund large-scale river renaturation projects or support changes in agricultural or industrial models, yet these types of initiatives often receive only a small share of available funding (French Government 2024). Similarly, reforestation schemes increasingly allow, as specifications are updated, for support to renewal methods other than full replanting, such as stand enrichment or natural regeneration. However, these alternatives still account for only a very small proportion (no more than 5%) of allocated aid (Ministry of Agriculture and Food, 2025).¹⁷

Beyond the preferences of individual stakeholders or the availability of funds, other key factors explain the bias towards incremental rather than transformational adaptation. The latter typically requires the achievement of threshold effects or critical mass, and can only be envisaged at the scale of larger systems, particularly sectors. Work by the interministerial delegate under the *Varenne de l’Agriculture* on crop diversification and conversion strategies shows, for example, how difficult it is for a single farmer, or even a group of farmers, to switch crops without coordinated organization across the entire upstream and downstream supply chain (access to equipment, inputs, transport and storage, processing industries and distribution channels) to ensure market outlets for their produce (DIVAE 2023). Similarly, entire sectors – from seedling production to sawmilling capacity and market organization, including forestry operations – must evolve to support diversification in tree species and silvicultural practices. This transformation involves not only material investments (*e.g.* sawmills able to process a wider variety of wood, including hardwoods) but also workforce training and shifts in economic models currently optimized for a single type of forestry. In mountain regions, strategies for ski resort development are often defined at the level of the organizing municipalities. However, the scale of the changes required calls for broader vision and coordination (at the level of basins or mountain ranges) to ensure the relevance of choices made and to enable genuinely transformational options, such as strengthening the local industrial base or developing joint projects between high-altitude areas and valleys.

14 The few examples of more transformative adaptation identified to date have either involved the abandonment of a project before implementation (*e.g.* the cancellation of the Caen–Presqu’île project in Caen la Mer), or in a forced reorientation once the situation became untenable (*e.g.* the torrential flooding of La Béarde, the closure of the Céuze resort), leading to significant socio-economic impacts in the territories concerned.

15 The IPCC defines adaptation limits as “The point at which an actor’s objectives (or system needs) cannot be secured from intolerable risks through adaptive actions.” These may be hard limits, where no adaptive actions are possible to avoid intolerable risks, or soft limits, where options are currently not available, but could emerge in future. (IPCC 2021).

16 The scenario incorporates the effects of a 30% shift in farms from conventional to organic production between 2020 and 2050.

17 As Frédéric Jobert has noted, there are few alternatives to open-area planting for stands that have been burned (50% of the France 2030 programme) or severely damaged, for instance as a result of bark beetle infestations (30% of the France Relance programme). “Other solutions, however, exist for less damaged stands” (Jobert and Terra Nova 2025).

2. THE COST OF TOMORROW'S ADAPTATION: ASSESSING CURRENT NEEDS

No comprehensive assessment of adaptation needs has yet been carried out in France (Cour des comptes 2024d; I4CE 2024a; Timbeau 2023). As detailed in our 2024 publication, this is largely because, outside a few sectors, adaptation strategies are not yet sufficiently mature to support comprehensive investment scenarios (I4CE 2024a). Nevertheless, the available information makes it possible to assess the requirements across the main areas concerned. Appendix A3 summarizes

all the public and private needs identified, across all stakeholders, without assigning responsibility for their implementation.

Some of these needs refer to actions that are unavoidable, whatever strategies are chosen, given the climate change already underway. Others are harder to quantify as they depend on strategic decisions yet to be made between different options for reducing vulnerabilities upstream.

2.1. Unavoidable adaptation requirements

Strengthening support and technical expertise

The first essential area of expenditure relates to the resources required for support and technical expertise. Whether a highly proactive or a more reactive approach is taken to adaptation, whether the aim is to maintain existing activities for as long as possible or to anticipate deeper transformations, effective preparation requires both time and expertise. Every adaptation process begins with an assessment of vulnerabilities, based on contextualized fieldwork and the acquisition and application of scientific knowledge on climate impacts (IPCC 2022). For most organizations, this means mobilizing new skills and adjusting internal processes. Beyond technical expertise, additional resources are needed for facilitation, project management and support for organizational change (see Table 7, I4CE 2024d).

Embedding the adaptation reflex in investment flows

The second essential area of expenditure concerns the practical application of the “adaptation reflex” in long-term investments that are already planned – sometimes referred to as “adaptation by design”. This means both halting investment in infrastructure, buildings or facilities that will not be fit to cope with the effects of climate change, and making the most of planned investments to strengthen the French economy’s capacity to adapt at lower cost (I4CE 2025).

At the start of the year, we identified five opportunities to be seized from 2025 onwards, together with ways of putting this approach into practice (see Table 8).

More broadly, all annual investment flows affected by climate change must now take this issue fully into account. Monitoring must be dynamic: first by examining how climate change is currently addressed in existing programmes; and second, by ensuring that each new investment programme or budget line systematically incorporates future climate considerations. Our previous publication identified several general methods for doing this, depending on the sector and type of investment (I4CE 2025).

Focus: modernizing electricity networks: an example of investment programmes that effectively integrate climate change

Electricity network operators are among the most advanced stakeholders in the field of adaptation. The issue has been clearly recognized since the 1999 storms and the 2003 heatwave, and is now central to the development plans of RTE (2025) and ENEDIS (2023a), which each include dedicated chapters on adaptation. Both operators have developed adaptation strategies and integrated these into their investment programmes for infrastructure renewal and modernization:

- RTE estimates investment needs for network renewal and climate adaptation over the next 15 years at around **€20 billion**, roughly three times current annual investment levels;
- ENEDIS estimates investment needs for network modernization and resilience at **€24 billion** between 2022 and 2040.

STRENGTHENING SUPPORT AND TECHNICAL EXPERTISE

TABLE 7. ENHANCING MANAGEMENT, COORDINATION AND TECHNICAL EXPERTISE TO DEVELOP THE KNOWLEDGE AND SKILLS REQUIRED FOR ADAPTATION

Identified needs	Budget
<p>Conduct all studies identified in the PNACC-3</p> <p>For the remaining studies to be launched in PNACC-3, it is important to accurately forecast the amounts – often modest – required to ensure their completion.</p> <p>An overall assessment of these resource needs is not currently available.</p>	<p><i>Not precisely quantified (of the order of several million euros)</i></p>
<p>Consolidate the management and coordination of adaptation policies at the national level</p> <p>Measure 25 of the PNACC-3 provides for the appointment of an adaptation representative in each departmental prefecture, who will devote the necessary time to this role.</p> <p>At the same time, the growing importance of adaptation for decentralized administrations means that additional staff time will be needed to assess, monitor and improve the quality of adaptation projects, beyond what is currently planned.</p>	<p>€6.4 million per year</p>
<p>Strengthening the provision of public technical expertise</p> <p>Among the main support needs for adaptation efforts at the national level, expanding the Adaptation Mission beyond its initial remit and taking on new tasks that may be assigned to it, such as supporting businesses, will require additional resources across the organizations involved.</p>	<p>€4 million per year</p>

Further details (amounts and explanations) for each line item are available in [Appendix A4](#).

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Focus: forestry policy requirements

Two organizations are responsible for implementing forestry policy: the ONF for public forests and the CNPF for private forests. Both receive public funding, but are seeing their responsibilities expand (biodiversity, fire risk, regeneration, timber industry), even as the resources available to them fall increasingly short of requirements (Baumel and Mette 2025).

In its 2024 report, the Cour des Comptes warned that the ONF's financial trajectory was unsustainable. Public funding needs are projected to reach **€350.1 million** in 2027 (compared with **€285.4 million** in 2023). The report therefore calls for a clear prioritization of tasks or a substantial increase in resources (Cour des Comptes 2024c).

The CNPF has also experienced a 12% reduction in staff over the past 12 years. In the South, for example, 22 staff members are responsible for monitoring 840,000 hectares and 350,000 landowners. The weakness of its structural resources has been identified as a major obstacle for the adaptation of private forests.

EMBEDDING ADAPTATION IN INVESTMENT FLOWS

TABLE 8. OPPORTUNITIES TO IMPLEMENT ADAPTATION ACROSS FIVE INVESTMENT FLOWS FROM 2025

Identified lever	Where are we now?	Cost benchmarks	In what context?									
 <p>Fully integrate summer comfort into the MaPrimeRénov' eligibility criteria</p>	<p>First reference to summer comfort introduced in <i>MaPrimeRénov'</i> on 1 January 2024 – but the issue remains poorly defined and is not yet systematic.</p>	<p>Between €4 and €5 billion per year, in addition to the overall renovation policy still being rolled out for all buildings (I4CE 2024a).</p>	<p>Eligibility criteria and level of public support for energy renovation.</p>									
 <p>Make summer comfort a core element of the Green Fund's "Energy renovation of local public buildings" measure</p>	<p>Mandatory consideration from 2025 onwards, but the criteria remain fairly non-restrictive.</p>			 <p>Make adaptation to climate change a central objective of the State property policy</p>	<p>An inter-ministerial working group dedicated to adapting State-owned buildings was launched in 2024 – an initiative that is not yet systematic (planned in PNACC-3).</p>	<p>Given current project progress, the issue mainly concerns the design of the future plan and does not necessarily imply identifiable additional costs.</p>	<p>Performance criterion for the programme that groups allocations for the energy renovation of public buildings (P348).</p>	 <p>Make adaptation to climate change a central objective of the future plan for urban renewal</p>	<p>Since 2023, the Resilient Neighbourhoods initiative, funded with €150 million, has been in place, but the approach is not yet systematic.</p>	<p>Ongoing discussions on the desirability and terms of the future plan for urban renewal.</p>	 <p>Include adaptation in the performance agreements of transport network operators</p>	<p>The issue has been identified but is not systematically included in performance agreements – some operators (e.g. VNF) are more advanced than others.</p>
 <p>Make adaptation to climate change a central objective of the State property policy</p>	<p>An inter-ministerial working group dedicated to adapting State-owned buildings was launched in 2024 – an initiative that is not yet systematic (planned in PNACC-3).</p>	<p>Given current project progress, the issue mainly concerns the design of the future plan and does not necessarily imply identifiable additional costs.</p>	<p>Performance criterion for the programme that groups allocations for the energy renovation of public buildings (P348).</p>									
 <p>Make adaptation to climate change a central objective of the future plan for urban renewal</p>	<p>Since 2023, the Resilient Neighbourhoods initiative, funded with €150 million, has been in place, but the approach is not yet systematic.</p>		<p>Ongoing discussions on the desirability and terms of the future plan for urban renewal.</p>									
 <p>Include adaptation in the performance agreements of transport network operators</p>	<p>The issue has been identified but is not systematically included in performance agreements – some operators (e.g. VNF) are more advanced than others.</p>	<p>The main need identified concerns additional investment in infrastructure performance and resilience of around €3 billion per year (<i>Ambition France Transports 2025</i>). However, the potential extra cost of ensuring that these investments are climate-proofed has not yet been assessed. Based on the work carried out by operators, the COI was tasked in 2025 with defining these needs.</p>	<p>Discussions on contractual objectives and funding trajectories for transport infrastructure.</p>									

Based on (I4CE 2025).

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■ Preparing to respond better

Faced with the effects of climate change that cannot be prevented, and given the limited degree of anticipation so far, more resources will inevitably be needed, gradually, to prevent and manage climate-related crises. Preparing to respond more effectively forms part of the adaptation strategies sometimes referred to as resilience strategies (Fait and Barusseau 2025).¹⁸

The level of expenditure required in this area will depend largely on the choices – still very open at this stage – made to reduce vulnerability upstream: less prevention inevitably leads to greater crisis and post-crisis management needs, and therefore higher corresponding costs.

Preparing to respond better means anticipating crises rather than merely enduring them. This approach is characterized by alertness, vigilance, training and learning, with the capacity to respond to developments as they occur and to adjust proactively wherever possible. Under certain conditions, particularly where uncertainties raise concerns about excessive investment at the expense of other priorities, or about “maladaptation” (*i.e.* adaptation

measures that prove counterproductive and ultimately reinforce vulnerabilities), such an approach can be compatible with the adaptive management methods recommended for adaptation (ADEME 2019; IPCC 2022).¹⁹

In some cases, however, an excessive focus on resilience strategies at the expense of reducing vulnerability can worsen the distributional impacts of climate change. Economic and social inequalities are already being exacerbated by climate impacts, and the effects of crises vary greatly between populations and regions (Reghezza-Zitt *et al.* 2012; Wisner 2016; Revet 2011; Klinenberg 2022). For example, analyses conducted after major heatwaves reveal strong correlations between health impacts and pre-existing social and economic inequalities, such as age, social isolation, income, and reduced mobility (Santé Publique France 2025). Additional factors heighten the vulnerability of disadvantaged populations, including overcrowded or poorly insulated housing and limited access to green spaces. Without a proactive policy to reduce these vulnerabilities, and even with better systems for crisis response, these inequalities are likely to grow further (IPCC 2022).

What if we fail to equip ourselves to be better prepared? The costs of inaction

By integrating preparedness efforts into adaptation planning, we move from a purely reactive approach to one that is better planned and coordinated. Failing to prepare more effectively would mean resigning ourselves to relying on overstretched and poorly calibrated alert, relief and reconstruction systems. It would also expose us to the risk of genuine capacity breakdowns, with potentially catastrophic economic, political and social consequences, and possible chain or compounding effects. For example, two major climate events occurring simultaneously, such as a wildfire and a flood, could exhaust national response resources entirely.

The costs of such a purely reactive stance correspond to what is commonly referred to as the “costs of inaction” (France Stratégie 2023b; Timbeau 2023; Direction générale du Trésor 2025). These costs are typically high, poorly controlled, and particularly burdensome for public finances (I4CE 2024a).

¹⁸ “Adaptation must also be distinguished from resilience, which refers to a system’s capacity to cope with crises and their consequences, and to recover from them. Adaptation encompasses many resilience actions but is broader in scope, as it entails a longer-term rethinking of how human and natural activities operate in the face of a new normal” (Fait and Barusseau 2025).

¹⁹ The IPCC defines adaptive management as a “process of iteratively planning, implementing and modifying strategies [...]. Adaptive management involves adjusting approaches in response to observations of their effect and changes in the system brought on by resulting feedback effects and other variables.”

PREPARING TO RESPOND BETTER

TABLE 9. EXAMPLES OF ACTIONS AND INDICATIVE EXPENDITURE LEVELS THAT MAY REQUIRE HIGHER FUNDING TO STRENGTHEN PREPAREDNESS AND RESPONSE

Examples of actions	Cost benchmarks
Tracking, monitoring, surveillance and alerts	
Early warning systems	<p>The public service subsidy to Météo-France (for meteorological and climate forecasting and research activities) amounts to €210 million in 2025 – PLF, P159 (French Government 2025b).</p> <p><i>E.g.</i> Subscription services for local authorities make it possible, for a few thousand euros per year, to have a real-time weather alert system and access to assistance when the municipal safeguard plan is activated.</p>
Strengthening health monitoring networks	<p>The management of monitoring systems and alerts during exceptional health crises (such as heatwaves) amounts to €19 million in 2025 – PLF, P204 Action 16 (French Government 2025b).</p>
Strengthening forest health monitoring networks	<p>The “Forest Health Monitoring” initiative represents approximately €1.25 million in 2025 – PLF, P206 (French Government 2025b).</p>
Development of predictive infrastructure maintenance capabilities	<p><i>E.g.</i> SNCF. Réseau has already begun developing decision-support tools that will make it possible not only to manage network usage more effectively but also to carry out predictive maintenance operations.</p> <p><i>E.g.</i> €32 million allocated for real-time weather alert systems (SNCF. Réseau 2024).</p>
Planning, training and simulation	
Strengthening municipal and inter-municipal safeguard plans (PCS) and business continuity plans (PCA): planning and training	<p>Most of the cost depends on the time spent by internal staff, with local authorities directly responsible for preparing action plans. To support these efforts, various tools and training programmes – such as those offered by the Institut des Risques Majeurs (Major Risks Institute) – are available. Costing a few hundred to a few thousand euros, these tools help local authorities strengthen their risk management capacity, from planning to crisis management.</p>
Establishment of a team dedicated to crisis preparation and management	<p><i>E.g.</i> The Nice metropolitan area has created a Health, Environmental and Risk Management Agency composed of a team of eight full-time equivalent staff dedicated to forecasting, preparedness and crisis management. Working directly with government departments, the agency relies on the redeployment of staff when required (<i>e.g.</i> 1,600 FTEs during the Covid-19 crisis) and on pre-positioned emergency stocks at certain sites.</p>
Long-term coordination of networks of actors who will need to cooperate in the event of crises (information exchange, simulations...)	<p><i>E.g.</i> The French Association for the Prevention of Natural and Technological Disasters (AFPCNT) promotes knowledge-sharing and coordination between stakeholders involved in risk prevention. It has 14 FTEs and an annual budget of €2 million (2022).</p> <p><i>E.g.</i> In 2023, a major flood crisis exercise was co-organized by the Argen joint association and the Maralpi Joint Association for Floods, Development and Water Management. The exercise involved nine municipalities and four partners (SDIS, gendarmerie, traffic management centre and civil protection service) in coordination with the sub-prefecture. Preparation took six months and required around six staff-months of work, supported by an external provider. On the day of the exercise, 30 coordinators and 100 individuals were mobilized.</p>

TABLE 9. EXAMPLES OF ACTIONS AND INDICATIVE EXPENDITURE LEVELS THAT MAY REQUIRE HIGHER FUNDING TO STRENGTHEN PREPAREDNESS AND RESPONSE

Examples of actions	Cost benchmarks
Emergency response resources	
Strengthening emergency stocks and operational reserves	<i>E.g.</i> The ENEDIS Rapid Electricity Intervention Force (FIRE) is a mechanism that allows significant resources to be deployed within a few hours to repair networks affected by a climate event. ENEDIS does not specify a consolidated budget but reports that the force includes 3,500 technicians trained in crisis situations, 10 logistics platforms, and 3,500 generators, suggesting annual costs of several million euros , rising to several tens of millions in years with multiple activations.
Development and coordination of voluntary intervention networks	<i>E.g.</i> The Indian Ocean Regional Intervention Platform (PIROI) (€20.5 million budget for 2021-2025) is a regional intervention tool attached to the French Red Cross International Operations Department, which has been running a vast disaster risk management (DRM) programme in the Indian Ocean since 2000. This regional response force is based on a dense network and territorial coverage: more than 800 local committees and 35,000 active volunteers. Based in Réunion, PIROI operates throughout the south-western Indian Ocean alongside the national societies that are members of the programme.
Strengthening of fire and rescue service equipment (e.g., pumping capacity)	Capacity-building initiatives for flooding on the same scale as those for forest fires would represent an additional annual cost of around €30 million . For example, a high-powered motor pump costs approximately €500,000 (Rapin and Roux 2024).
Strengthening civil security air resources: purchase (and maintenance) or hire of aircraft	The cost of acquiring a Canadair aircraft is currently estimated at €60 to €64 million . The French fleet comprises 12 aircraft, expected to rise to 16 (Vogel 2023). The retrofitting of existing aircraft (€15 million per aircraft) is also under consideration, with replacement planned only from 2033 onwards. The DGSCGC also considers it necessary to purchase two Dash-type aircraft (Maudet and Pantel 2025). The civil protection budget for 2024 (P161) allocated €30 million for hiring backup aircraft and helicopters.
Recruitment of professional firefighters and/or policies to promote volunteering	Up to an additional €1.1 billion per year would be required in a scenario relying exclusively on professional firefighters, corresponding to the recruitment of 22,000 firefighters (IGA 2022).
Post-crisis, including insurance	
Developing mechanisms to promote “building back better” after disasters	The “Build back better after flooding” (MIRAPI) pilot scheme, launched in 2021 (running until 2026) has an annual budget of €200,000 . It provides enhanced financial support to homeowners to reduce the vulnerability of their properties following climate-related damage.
Maintaining resources to manage damaged timber and to support post-disaster reforestation	According to the Objectif forêt report, 1,225,000 hectares of stands damaged by fire or disease will require intervention over the next ten years. Depending on the level of intervention, between 477,000 hectares (least interventionist scenario) and 585,000 hectares (most interventionist scenario) are likely to require reforestation during that period. Even considering only these stands (without considering potentially more proactive interventions on “vulnerable” stands), the total investment effort by all stakeholders is estimated at €3.4–€4.2 billion over ten years (CSFB 2023).
Developing schemes for the repurchase and demolition of damaged property	<i>E.g.</i> following storm Xynthia (2010), the French government launched an emergency scheme to buy back properties deemed unfit for reoccupation due to excessive exposure to risk. A total of 167 houses in Vendée and 88 in Charente-Maritime were acquired by the State at a total cost of €83 million (IGEDD 2020).
Developing the compensation system to ensure that it covers a growing share of insured losses	Without additional prevention measures, the cost of insured losses could reach €3.8 billion in 2050 (RCP8.5 scenario) compared with €2.1 billion today (CCR 2023b), which would require increased funding to cover these costs.
Developing agricultural insurance	Budget allocations for crop insurance in 2025 amount to €295 million , reflecting an increase since the system’s reform.

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2.2. Choices to be made: what do we want to keep, and what are we prepared to change?

Determining the needs for reducing vulnerability involves making choices, *i.e.* defining adaptation objectives and the pathways to achieve them. Deciding what we wish to preserve (*e.g.* a particular crop, activity, landscape or aspect of food sovereignty) or to transform is primarily a political question, and the answers will have very different implications in terms of needs. To date, these choices remain open in most of the areas examined. This section therefore presents the economic implications – expressed as cost elements – of the various options available, grouped into two broad categories: those aimed at preserving the status quo, and those that accept the need to reinvent, reorganize or transform models, territories or sectors.

Providing the means to preserve what already exists

Seeking to maintain the status quo – without fundamentally restructuring systems – may be a legitimate adaptation objective in some cases. The difficulty arises when this approach is pursued implicitly, without recognizing its limits or fully accepting its consequences. Aiming to maintain an economic activity, an industry, a set of buildings or a level of service in a given location for as long as possible requires assessing the conditions under which this remains feasible, as well as clarifying the financial effort it entails and the wider economic effects that follow.

Sustaining water-intensive industrial, tourist or agricultural activities in water-stressed areas requires, first, optimizing the use of available resources (*e.g.* efficiency gains) and, where necessary, investing in solutions to secure supply. Maintaining mobility or energy services at current levels calls for investment to strengthen the resilience of critical infrastructure. Similarly, “ensuring the sustainability of the mutualized natural disaster compensation scheme”²⁰ has implications for prevention efforts and requires halting the creation of new assets exposed to risks (CCR 2023b; France Assureurs 2021).

It is nevertheless vital to recognize the limits of such choices and to anticipate possible tipping points. If certain climate change thresholds are reached, maintaining some activities could – gradually or abruptly – become technically or economically impossible. Examples from abroad, such as in Spain and Morocco, show that attempting to sustain irrigated agricultural production without considering the long-term costs of water availability can lead to dependence on large infrastructure projects (water transfers, desalination, etc.) that remain viable only through substantial public subsidies (IDDRI 2023; Haut Conseil pour le Climat 2024a; Cour des comptes 2023). In mid-mountain regions, for instance, it has become common practice to cover the annual operating deficits of ski resorts with public subsidies. However, this practice is not legally permitted²¹ and diverts investment away from other essential public services (transport networks, school renovation, etc.).

Without forward planning, it will be difficult to transition towards alternative models, leaving authorities faced with the need to consider managed withdrawal. In such cases, the existence of cushioning mechanisms (*e.g.* social safety nets) would play a crucial role in mitigating the economic, social and political consequences.

²⁰ Wording taken from the mission statement of the report on the insurability of climate risks (Langreney *et al.* 2024).

²¹ Ski areas are public industrial and commercial services (SPICs), managed by local authorities. They must therefore cover their expenditure from their own revenue. Using a local authority's general budget to finance recurring operating deficits is illegal and has been repeatedly criticized (Cour des comptes 2024b).

SUSTAINING EXISTING SYSTEMS

TABLE 10. EXAMPLES OF ACTIONS AND INDICATIVE EXPENDITURE LEVELS REQUIRED TO MAINTAIN EXISTING SYSTEMS

Type of action	Examples and cost benchmarks
Strengthening risk prevention measures	
Risk prevention measures (maintenance and reinforcement of flood defence systems; development of flood expansion areas; maintenance of forest tracks and firebreaks; capacity to monitor compliance with legal obligations on brush clearance...)	<p>Insurance experts recommend increasing the Barnier Fund to €450 million in 2025 and €520 million in 2026, compared to the €300 million approved for 2025 (CCR 2025; France Assureurs 2025).</p> <p><i>E.g.</i> the “Room for the River” programme in the Netherlands, whose main objective was to improve water level management in four rivers by providing additional floodplain space in designated secure areas, had a total budget of around €2.3 billion over 10 years.²²</p>
Preventive measures for clay shrink-swell	No overall assessment currently exists for needs related to clay shrink-swell risk prevention. The CCR recently proposed consolidating the budget line introduced in the 2025 finance bill and increasing it to €50 million in 2026, up from the current €30 million (Lahais and Sas 2025).
Active coastal defence measures (e.g. sea walls, sand replenishment)	<p>The costs of coastal defence measures vary widely depending on the methods used. Indicative unit costs based on completed projects (CEREMA 2018) include:</p> <ul style="list-style-type: none"> • between €2,000 and €3,000 per linear metre for rock embankments; • between €500 and €2,500 per linear metre for sand-filled geocomposite breakwaters; • between €300 and €700 per linear metre for beach nourishment; • €220 per linear metre for dune cordon creation. <p>These costs exclude the additional costs of maintaining and reinforcing protective structures. For reference, the French mainland coastline is 5,500 km, of which 2,840 km has been developed and landscaped.</p>
Optimizing water usage	
Accelerating the renovation of drinking water networks (e.g. covering the remaining costs for small municipalities)	The investment deficit in water infrastructure (particularly networks) is estimated at €1-€3 billion per year (UIE 2022). The High Commission for Strategy and Planning is targeting a 5% reduction in leakage rates by 2050 (to achieve an average network efficiency of 15%).
Supporting and implementing measures to promote water conservation on farms (e.g. support for water-efficient farming practices, modernization of irrigation systems (drip irrigation, cleaning of reservoirs, maintenance of canals, etc.))	Of the 48 projects selected in the first call for proposals from the Agricultural Hydraulics Investment Fund (launched in 2024 with €20 million in funding), 11 concern the renovation or optimization of hydraulic infrastructure. ²³ The Water Resilience Plan for the Pyrénées-Orientales also includes several such projects (e.g. renovation and modernization of irrigation channels).
Supporting and implementing measures for water conservation at industrial sites	The industrial component of the Water Plan 2023 identified 55 sites for which water saving plans have been developed (enabling a 12.6% reduction in water abstraction). Implementing these plans will involve around 160 projects and up to €327 million in investment by 2030. ²⁴ Under its “public policy” scenario, the High Commission for Strategy and Planning anticipates a 30% reduction in water abstraction by the agri-food sector and a 10% reduction by the chemical and metallurgical industries (France Stratégie 2025; CGAAER 2024).

22 <https://www.interregeurope.eu/good-practices/room-for-river> - accessed on 07/08/2025.

23 <https://agriculture.gouv.fr/annie-genevard-annonce-les-laureats-du-fonds-hydraulique> - accessed on 07/08/2025.

24 <https://www.economie.gouv.fr/actualites/plan-eau-presentation-50-sites> - accessed on 07/08/2025.

TABLE 10. EXAMPLES OF ACTIONS AND INDICATIVE EXPENDITURE LEVELS REQUIRED TO MAINTAIN EXISTING SYSTEMS

Type of action	Examples and cost benchmarks
Securing water resources	
Preservation and restoration of aquatic environments	<i>E.g.</i> The ecological restoration work on the Rhône undertaken by the CNR, with support from the Water Agency south of Lyon, represents €8.2 million for five kilometres of side channels (<i>lônes</i>) and secondary channels. The project also plans to create six islands and reconnect nearly eight hectares of ponds and wetlands to the Rhône and its alluvial aquifer ²⁵
Infrastructure for storage, transfer, reuse and even desalination (CGAAER 2024; Académie des technologies 2023)	<i>E.g.</i> The Pyrénées-Orientales Resilience Plan, which includes seven structural projects (such as ReUt and irrigation security projects), received €25 million in 2024 from the State, local authorities and the Water Agencies (Ministry of Ecological Transition and Territorial Cohesion 2024). In its “public policy” scenario, maintaining current agricultural policy objectives within a decarbonization framework (SNBC), the High Commission for Strategy and Planning estimates that nearly 210 million m ³ of additional storage capacity will be required by 2050 (15.6 million m ³ in 2020 and 222 million m ³ in 2050; France Stratégie 2025). ²⁶ Using a simplified unit-cost assumption of €6 per m ³ (CGAAER 2022), this implies an investment requirement of around €1.2 billion over the next 25 years. Under the same scenario, irrigation equipment use would rise by 50% over the period.
Strengthening infrastructure resilience	
Investment plans for critical infrastructure resilience	For transport infrastructure , no adaptation scenario has yet been modelled or costed by transport managers, the COI or other stakeholders. Work is underway with network managers, which should lead to specific assessments of adaptation needs. <i>E.g.</i> Road drainage works: projects ranging from €2 million (for simple culverts) to €40 million for complex structures. For electricity generation , EDF plans to invest €612 million between 2022 and 2038 to secure production, particularly during periods of high temperature and water stress, excluding changes to reactor cooling systems. To limit withdrawals, the “public policy” scenario of the High Commission for Strategy and Planning proposes converting the four open-circuit reactors expected to remain in operation in 2050 to closed-circuit systems. This would require one cooling tower per site, each estimated to cost around €500 million (Cour des comptes 2024d; France Stratégie 2025). For electricity networks , beyond the investment plans, RTE has conducted an alternative study to make its network “100% climate-proof” by 2040. This scenario, which would significantly enhance system resilience, would require €9 billion in additional investment over 15 years. However, RTE notes risks to industrial feasibility (RTE 2025). For the fibre network , InfraNum and Banque des Territoires (2023) estimate total investment needs (considered ambitious by some stakeholders) at between €7 billion and €17 billion (according to three scenarios). The highest cost scenario assumes widespread underground cabling, in addition to other security measures.
Targeted support for affected economic sectors	
Support plan for plant production sectors	To maintain yields under changing climatic conditions, various adaptation measures can be deployed (irrigation, windbreaks, shading, greenhouses). Implementing a balanced combination of these solutions across farms throughout France is estimated to cost around €1.5 billion per year over the next decade and would generate net production gains (I4CE 2024a). As only part of these investments would be directly profitable at the farm level, a dedicated public support plan may be required.
Support plan for mountain resorts	In 2024, 180 French ski resorts generating less than €15 million in revenue were subsidized by local authorities to the tune of €124 million , mainly to sustain loss-making operations. A national support scheme could be envisaged to cover these deficits, which are expected to increase as global warming progresses, thereby maintaining tourism activity in these regions (Cour des comptes 2024b).

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25 <https://www.cnr.tm.fr/actualites/lancement-des-travaux-de-restauration-ecologique-du-rhone-au-sud-de-lyon/> - accessed on 07/08/2025.

26 It should be noted that this hypothesis, which is intended to maximize storage capacity, would still meet less than 5% of the estimated needs under a scenario of severe climate change (High Commission for Strategy and Planning 2025a).

■ Reinvent, restructure, renew

Some stakeholders – including within the scientific community – argue that maintaining the status quo at all costs will not always be possible, or even desirable (High Commission for Strategy and Planning 2025a; High Council for Climate 2024b). Beyond the long-term costs of sustaining systems no longer suited to new climatic conditions, the fairness and effectiveness of such efforts are increasingly being questioned (*L'affaire du Siècle* 2025; Oxfam 2024).

In these situations, it may become necessary to reorganize land use, reinvent sectors and renew territories. If such strategic decisions were made, they would entail a fundamentally different political vision and spending patterns from those observed so far.

These more transformative adaptation options must therefore be addressed in a coordinated way. While measures to preserve existing models can often be designed independently – with each infrastructure or sector defining its own priorities – transformative options are inherently collective. Since they are highly interdependent, they must therefore be conceived and implemented as integrated regional or sectoral projects.

In some cases, such visions could require substantial new investment, but not always. Proactively transforming urban areas, relocating coastal zones, or radically reimagining economies all have major economic implications, particularly where private land acquisition is involved. However, some policy choices could rely mainly on redirecting existing funding – for instance, under an alternative agricultural policy (see **Chapte 3.1**) – or by discontinuing certain investments.

Such transformations could take many forms, from large-scale national programmes to autonomous local initiatives. In certain sectors, such as mountain areas (Giraud 2023) or forests (Jobert and Terra Nova 2025), there are no ready-made answers. Trying to implement large-scale adaptation “solutions” too quickly risks maladaptation. In these cases, directing resources towards pilot projects could help test and refine approaches to adaptation itself, rather than specific solutions, including implementation pathways.

Not all the conditions for successful transformation are currently in place, and some may emerge only in times of crisis – for example, by seizing a more favourable political window or the opportunities created through reconstruction. Even so, groundwork can already begin, for instance by assembling the land reserves needed for spatial restructuring projects. Capacity-building and development (through training, learning initiatives and R&D) must not be neglected either.

REINVENT, RESTRUCTURE, RENEW

TABLE 11. EXAMPLES OF ACTIONS AND INDICATIVE EXPENDITURE LEVELS REQUIRED TO REINVENT, RESTRUCTURE AND RENEW

Type of action	Examples and cost benchmarks
Urban transformations	
<p>Major urban regeneration projects (e.g. large-scale projects to reduce soil sealing and increase greenery, involving the mobilization of land (including private land), changes in building use, and transformation of the urban landscape, etc.)</p>	<p>Some initial prospective studies have highlighted these types of changes, such as those by Mission Paris à 50°C, which envisage a complete change in the use of the top floors and roofs of Parisian buildings (Paris 2022), and by the La Rue Commune consortium, which is reimagining ordinary metropolitan streets, particularly (but not exclusively) with a view to adaptation (ADEME <i>et al.</i> 2023).</p> <p>However, these prospective studies do not provide any figures for the transformations they describe. As the operations in question are all specific in nature, it is difficult to estimate generic costs. Nevertheless, a few costing exercises have attempted to calculate the costs of certain frequently mentioned measures:</p> <ul style="list-style-type: none"> • In his book, Maximilien Rouer estimates that urban greening of 2,000 to 5,000 km of urban roads would represent an investment of €6 to €14 billion (La France Bleu Blanc Vert 2024); • In its work for the FNTP in 2022, Carbone 4 estimated that urban greening of all major French cities (12,500 hectares in total) would represent an investment of €14 billion over the period 2021–2050 (Carbone 4 2022); • The Fondation pour le Logement, in its report on summer energy poverty, proposes the launch of a major plan to adapt to heatwaves by equipping all homes with air circulators and shutters by 2040. The costs of such a plan are estimated at €3.2 billion per year (Fondation pour le Logement 2025). <p>Although they have not been carried out with adaptation in mind, parallels can be drawn with large-scale operations that have led to significant urban redevelopment, such as Operations of National Interest (OINs):</p> <ul style="list-style-type: none"> • For example, the Euratlantique OIN aims to redevelop both banks of the Garonne in around twelve neighbourhoods (738 ha) in the Bordeaux metropolitan area. Between 2010 and 2030, the estimated financial commitment is over €800 million, including €100 million in public funds. In 2024, the operation was extended by ten years, with an additional €150 million in public investment;²⁷ • For example, the organization of the Summer Olympic Games in Paris, supported by significant resources, also enabled the rapid transformation of certain urban areas. The Cour des comptes estimated that Paris 2024 expenditure amounted to €1.24 billion for sports infrastructure, €839 million for urban development (a significant share financed by the State) and €595 million for transport infrastructure.²⁸ <p>In addition to significant financial resources, these two examples also benefited from tailored legal frameworks and specific governance arrangements, which have not been without controversy.</p>
Rural transformation	
<p>Restructuring of rural landscapes Large-scale accelerated hedge planting,²⁹ renaturation and re-meandering of watercourses, protection of wetlands, and the enrichment and diversification of forest stands could form the basis of a genuine national programme, supported at the State level.</p>	<p>These major restructuring projects have not yet been costed at the national level. They point to a genuine regional development policy that combines the creation of new economic activities (e.g. new agri-food sectors promoting newly established production), changes in ways of living (making use of the refuge spaces these areas can provide), and new approaches to mobility (systems that may be slower but more interconnected), with costs that are necessarily specific to each region.</p> <p>In the agricultural sector and in water resource management, several forward-looking reports have begun to outline what more resilient systems might look like (Solagro 2025; France Stratégie 2025). These redesigned systems would involve shifts in diet (for example, less meat, more legumes) and reductions in certain types of production (cereals, meat, milk), along with fewer imports and exports. Production would also move geographically (e.g. some crops relocating northwards). Such changes would in turn affect landscapes and water use (in terms of quantity and seasonality) and, more broadly, agricultural practices and therefore the sector's economy (lower target yields, greater diversification...).</p> <p>As in the urban case, heuristic estimates have been produced for certain "solutions" at the national scale, providing initial orders of magnitude:</p> <ul style="list-style-type: none"> • In La France Bleu Blanc Vert, Maximilien Rouer estimates that €41 billion in investment would be required over 25 years to enable all of France's agricultural land to benefit from agroforestry hedgerows (La France Bleu Blanc Vert 2024). • In work carried out for the FNTP in 2022, Carbone 4 made a more modest estimate of €16 billion between 2020 and 2050 for hedge planting and €57 billion over the period for the restoration of 150,000 km of waterways (Carbone 4 2022).³⁰

27 <https://www.bordeaux-euratlantique.fr/annuaire/faq> - accessed on 07/08/2025.

28 Noting that these investments were designed with a view to legacy, for use during and after the Games <https://www.ccomptes.fr/fr/publications/les-dependances-publiques-liees-aux-jeux-olympiques-et-paralympiques-de-2024-premier> - accessed on 07/08/2025.

29 The document accompanying the Hedge Pact, presented by the Government in 2023, noted that France had "approximately 750,000 linear kilometres of hedges" but also that "despite measures taken to preserve them, the length of hedges continues to decline in the country, due to the combined effect of removal and unsustainable land management and development practices that cause them to die off." The Pact aims for a net gain of 50,000 km by 2030, but this momentum remains fragile. <https://agriculture.gouv.fr/presentation-du-pacte-en-faveur-de-la-haie-dote-dun-budget-de-110-meu-des-2024> - accessed on 07/08/2025.

30 At a rate of 5,000 km per year, corresponding to the continuation of expenditure at the level observed in the reference year.

TABLE 11. EXAMPLES OF ACTIONS AND INDICATIVE EXPENDITURE LEVELS REQUIRED TO REINVENT, RESTRUCTURE AND RENEW *(suite)*

Type of action	Examples and cost benchmarks
Coastal reshaping	
<p>Operations to relocate activities and renature coastal areas</p> <p>Property buy-backs, deconstruction, renaturation; new development projects in the backshore zone</p>	<p>The only figures consolidated at the national level, by CEREMA (2024), concern the initial stages of relocation efforts, based on the assessment of the market value of buildings exposed to coastal erosion:</p> <ul style="list-style-type: none"> In the short term (five years), approximately 1,000 buildings are affected, representing €240 million; By 2050, 5,200 homes and 1,400 business premises could be affected, with a total value of €1.1 billion; By 2100, the figures could be much higher (500,000 buildings, €86 billion), depending on the assumptions made, particularly in the event of the complete removal of existing protective structures. <p>Based on this work, the general inspectorates (IGEDD and IGA 2023) have proposed the design of a public support scheme for the repurchase of threatened properties. This would be modulated according to various parameters (allowing for buy-backs of up to 70% of the market value) and would require public funding of around €10 million per year over 25 years.</p> <p>Added to these costs are those necessary for dismantling assets (deconstruction, decontamination and renaturation), relocation, and transitional measures (e.g. temporary maintenance of protective structures), which have not yet been estimated at the national level.</p> <p>More locally, in 2015, the GIP Littoral studied four scenarios deemed desirable for the relocation of activities and assets for the municipality of Lacanau (5,400 inhabitants in 2022). Implementation costs range from €44 million for the least interventionist and up to €366 million for the most interventionist scenario (GIP Littoral 2015).</p> <p>Another example is the municipality of Miquelon-Langlade, which is undergoing a major restructuring process that will ultimately involve the relocation of 580 people (200 homes and public services). The cost of phase 1, known as the “urgent” phase, covering preliminary planning (servicing 15 plots and initial public services) is estimated at €5.4 million. This is “a drop in the ocean” compared with the overall cost – currently being assessed by the DFIP – which is expected to be “astronomical” (IGEDD and IGA 2023).</p>
Economic reinvention of mid-mountain regions	
<p>Projects for economic diversification, tourism (e.g. from winter to summer) and other local activities (industrial, craft, agricultural, etc.)</p> <p>Abandonment, transformation and greening of certain historic tourist areas</p>	<p>To date, very little forward-looking work has been carried out on these transformation projects: existing adaptation measures remain largely focused on mountain resorts, without opening up more broadly to all possible adaptation options. Nevertheless, a few initiatives can be cited, although their economic implications have not yet been fully assessed:</p> <ul style="list-style-type: none"> The adaptation initiative led by the Métabief resort is often cited as a pioneering initiative of economic reinvention. It led to the reconsideration of an investment programme planned for 2015, with a total budget of €24 million (including €15 million for the construction of two new chairlifts), in favour of rationalizing existing facilities (through renovation at a cost of €2 million) and, more broadly, the ski area in anticipation of the partial closure of operations in the short term (already effective in 2025). These costs cover only part of the initiative, as a broader economic, tourism, industrial and agricultural action plan is also underway, with costs that are more difficult to consolidate (Syndicat Mixte du Mont d’Or 2022); The “Imaginons Tignes 2050” initiative is a consultation process launched by the town council in 2023, with the aim of imagining the desired vision for Tignes over the next 30 years, particularly in light of climate change (Commune de Tignes 2024). This initiative should result in a regional project including a multi-year investment plan. <p>Cases of profound transformation have also been observed, often at a rapid pace, when operations – which have become too costly – are suddenly halted without necessarily anticipating the consequences (e.g. the resorts of Céüse and Sambuy, and more recently L’Alpe du Grand Serre). Although adaptation costs are minor in such cases, these transformations nevertheless have significant socio-economic impacts (in terms of employment and, more broadly, attractiveness) at the regional level.</p>

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2.3. Developing coherent adaptation strategies

The actions presented above are not mutually exclusive and should be combined within coherent strategies. Defining the right balance will inevitably involve numerous sectoral and thematic debates. These debates are, however, interlinked: choices made in forestry policy will affect firefighting requirements; changes in building regulations will influence discussions on natural disaster insurance; water policies will depend on agricultural policies, etc.

This diversity of options calls for more extensive foresight and scenario-building exercises. To date, very little work has been undertaken to construct coherent visions of adaptation and to clarify their implications. In updating its *Transition(s) 2050 scenarios*, ADEME plans to address this issue by showing what each of its four scenarios³¹ implies in terms of adaptation. It would also be possible to imagine specific scenarios exploring the polarities mentioned above: forms of adaptation that are either more proactive or more reactive; more

focused on maintaining or transforming existing models (sectors, developments, etc.); with differing preferences for technological, behavioural or organizational solutions; high-tech or “low-tech”; “grey” or nature-based, and so forth.

The building blocks listed in the tables above and in the appendix can already support the development of programmatic work. Beyond analytical exercises, this is ultimately a question of politics and of visions of adaptation that must also be open to democratic debate, particularly during election campaigns.

³¹ <https://www.ademe.fr/les-futurs-en-transition/les-scenarios/> - accessed on 02/07/2025.

3. HOW SHOULD THE EFFORT BE DISTRIBUTED? CURRENT STATUS OF DISCUSSIONS AND AREAS FOR FURTHER CONSIDERATION

The various forms of adaptation presented above will not all follow the same economic model. The overall cost will depend on the objectives set and the approaches chosen, but also on the changing distribution of costs and benefits, as well as the possible types of financial arrangements. For instance, strengthening civil protection measures based solely on recruiting professional firefighters would raise very different questions (particularly in terms of public budgets) than a model promoting volunteerism and civic engagement. Similarly, relying on large-scale infrastructure and technologies (such as desalination) to secure water supplies would involve very

different types of projects (highly capital-intensive) and partnerships (with a small number of key companies able to deploy such technologies), compared with more distributed, collectively managed, nature-based solutions.

Although many of these strategic choices remain to be made, the accompanying debates on financing are already giving rise to a range of proposals for how these costs should be shared. The underlying issue is how to balance equity, territorial and social justice, and collective solidarity – a debate that must begin now in order to make informed decisions and prepare as effectively as possible.

3.1. The question of financing adaptation has already been raised, sector by sector

Discussions on how adaptation costs should be covered and shared have intensified in recent years, as this issue has become a growing concern in public policy. In some cases, these discussions have already produced tangible proposals to create or strengthen frameworks for financing adaptation. In others, the debate concerns the level of funding, eligibility criteria, or the allocation and use of existing instruments.

However, certain adaptation choices could raise specific questions about how costs should be covered. Choosing to invest in highly resilient infrastructure or to implement dedicated adaptation plans in the building sector would create needs that exceed current investment frameworks (both in scale and in implementation methods). Such options could therefore strain existing financial arrangements, making it necessary to initiate a dedicated reflection on how to finance adaptation at this level.

Adaptation as an additional requirement within broader sectoral financing debates

Several sectors already benefit from investment programmes and substantial financial resources to pursue long-standing objectives (productivity, competitiveness, carbon neutrality).

Adaptation is therefore sometimes incorporated – explicitly or implicitly, and to varying degrees – into ongoing sectoral financing discussions, for example in transport infrastructure or energy renovation policy.

TABLE 12. ADAPTATION AS AN ADDITIONAL FINANCING ISSUE IN EXISTING DISCUSSIONS

Adaptation issue	How does the issue of who bears the cost of adaptation actually emerge?
 <p>Adapting existing buildings to climate change</p>	Adaptation forms part of the broader debate on financing energy renovation, particularly through existing support mechanisms (e.g. Green Fund; MaPrimeRénov') and involves discussions on funding levels and allocation criteria. It represents an additional constraint in already tense budgetary debates. Adaptation therefore re-opens discussions on the scope and pace of energy renovation policy implementation (i.e. should we aim for greater effectiveness at a slower pace?).
 <p>Renewal and modernization of transport networks</p>	Adaptation is part of the wider debate on financing transport infrastructure. The impact of the adaptation component will depend on the strategies adopted. In a context of constrained resources, the potential to cover any additional costs for adaptation within current financing mechanisms remains to be determined.
 <p>Development and modernization of the electricity generation system</p>	Adaptation is emerging as an additional component in discussions on financing the electricity system (new nuclear power and existing production), without questioning the fundamentals of the current policy framework.
 <p>Renewal and modernization of the electricity network</p>	The issue of adaptation is clearly identified in discussions on financing electricity networks through the setting of the tariff for the use of public distribution electricity grids (TURPE). It now serves as a central component – indeed, the main rationale – for the need to strengthen financing in this sector, without, however, altering existing financing arrangements.

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In other areas, adaptation raises broader questions about how existing funding is being used. This is particularly true for forestry and agricultural policy, where current spending is contested. In these sectors, redirecting

existing funding channels or adjusting allocation criteria to make them compatible with climate change appears to be a more effective lever than creating new, dedicated adaptation mechanisms with limited resources.

TABLE 13. ADAPTATION AS A NEW CRITERION FOR EXISTING FUNDING

Politique à adapter	Enjeu de financement en matière d'adaptation
 <p>Agricultural policy</p>	Most public policy responses to adaptation rely on a limited set of peripheral measures (e.g. the Mediterranean Climate Agriculture Plan; farm resilience assessments), without questioning the overall direction of agricultural policy (European Court of Auditors 2024b). Acting on the principles of the Common Agricultural Policy (approximately €9 billion of the €16 billion in public funding for agricultural production) could make it possible to steer the sector more structurally towards more adapted models.
 <p>Forestry policy</p>	Significant public funds for forest renewal were mobilized following the bark beetle crisis (2018–2020), both to address the crisis and to support the role of forests in achieving carbon neutrality. However, there is still no consensus on how these funds should be allocated. The specifications for calls for projects have been revised several times – with a new version planned for autumn 2025 – and continue to generate tension (over the definition of eligible stands, diversification objectives, etc.), to the point of raising the risk of maladaptation (FNE <i>et al.</i> 2023). Some stakeholders are therefore calling for reduced investment, particularly in open plantations. This type of plantation is labour-intensive and costly, with no possibility of reversal, whereas other, more flexible interventions allow for gradual adaptation over time, informed by new observations and scientific advances. Stakeholders are thus urging a rethink of forestry policy in favour of “softer” interventions based more on observation and natural resilience, such as enriching existing stands (Jobert and Terra Nova 2025).

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Open discussions but difficult decisions ahead

In several areas, discussions are already underway on how best to finance adaptation needs.

Climate change is already stretching some traditional funding mechanisms to their limits. This situation has triggered various debates and proposals aimed at supplementing existing instruments or creating new ones to meet identified needs, for instance in the financing of risk prevention, departmental fire and rescue services, or water policy.

The avenues explored in these debates are diverse, reflecting both their varying degrees of maturity and the preferences of the actors promoting them. Some have been examined and found to be sound – by public authorities or the Cour des comptes, for example – while others remain at a more exploratory stage. In many cases, the actual capacity of these proposals to address identified needs, both in terms of the amounts that could be mobilized and their political or social acceptability, has yet to be assessed.

The table below provides an overview of several key financing issues specific to adaptation, together with associated proposals. All related information is available in Appendix A5.

TABLE 14. POSSIBLE SOURCES OF FINANCE FOR ADAPTATION IN CURRENT DISCUSSIONS

Financing challenge	Proposed financing options
 <p>Financing water policy</p>	<p>For the specific issue of renewing water networks, the main lever mentioned and mobilized is borrowing (which is not without its challenges). Several other avenues are mentioned for related aspects of this policy (resource conservation, environmental protection, etc.) (Cercle Français de l'Eau 2024):</p> <ul style="list-style-type: none"> • an increase in existing charges (e.g. for industrial users) or the creation of new ones; • greater use of the DGF (global operating grant) by making resource protection a criterion for allocation; • payments for services rendered (solidarity between actors or territories, such as charges for low-water support or upstream-downstream solidarity); • greater mobilization of European funding (in a context where this issue is being prioritized by the European Commission).
 <p>Financing additional risk prevention requirements</p>	<p>Debates on how to meet growing needs focus partly on the level of State support (particularly via the Barnier Fund), which is discussed each year in the budget debate. Another part concerns local taxation, particularly the GEMAPI tax, which is viewed as consistent but insufficient on its own to fund flood risk prevention. Its revenues are subject to trade-offs (e.g. financing the management of aquatic environments or the maintenance of dykes). Although the tax has potential for development, this remains limited, particularly for local authorities with a narrow tax base. Many stakeholders therefore consider that a shift towards a fairer distribution of revenue would be desirable (Rapin and Roux 2024; Fait and Barusseau 2025).</p>
 <p>Financing the natural disaster compensation scheme</p>	<p>In the short term, the current financing mechanism – the CatNat surcharge levied on all insurance contracts – is considered adequate to meet the scheme's growing financing needs. Ongoing discussions mainly concern the appropriateness and terms (amounts, schedule) of implementing a regular increase in the scheme's resources.</p> <p>In the medium term, however, its future development is under debate (Langreney <i>et al.</i> 2024; Lavarde 2024). A recent exploratory study by the High Commission for Strategy and Planning proposes three change scenarios with different financing options, such as using private insurance premiums or introducing a property tax (High Commission for Strategy and Planning 2025b).</p>
 <p>Financing a "Coastal Erosion Fund"</p>	<p>Beyond the debate on the level of State support, financing a possible Coastal Erosion Fund has been the subject of several proposals recently summarized by the CNTC. These include the use of earmarked taxation; a position on which there is no consensus:</p> <ul style="list-style-type: none"> • creation of an additional tax on DMTO (property transfer taxes); • allocation of a portion of the tax on wind energy production in the exclusive economic zone (EEZ); • creation of a tax on accommodation platforms and short-term tourist rentals; • harmonizing tourist tax rates for static caravans and chalets in campsites and holiday parks with those applied to hotels.

TABLE 14. POSSIBLE SOURCES OF FINANCE FOR ADAPTATION IN CURRENT DISCUSSIONS (suite)

Financing challenge	Proposed financing options
 <p>Funding for departmental fire and rescue services (SDIS)</p>	<p>Several financing options, in addition to the direct support deemed necessary from the State, have been proposed by various stakeholders and assessed by the administration, including:</p> <ul style="list-style-type: none"> removing the cap on contributions from local authorities; revising the criteria for allocating the special tax on insurance contracts and/or increasing its rate (TSCA); making SDIS eligible for the rural areas equipment grant (DETR); allocating a share of the tourist tax to SDIS; creating a fund financed by insurance companies based on the value of what is saved, although its practical implementation remains complex (theoretical assessments do not specify the share expected from insurers).
 <p>Financing adaptation strategies for mountain regions</p>	<p>In addition to State support through the creation of a national fund dedicated to mountain areas, several options have been proposed:</p> <ul style="list-style-type: none"> in its 2024 annual report, the Cour des comptes suggests greater use of the municipal tax on companies operating ski lifts: for the most profitable areas, this would involve extending the tax base to the total resort turnover and raising the maximum rate, then channelling the revenue to the most affected areas via the creation of a State-managed fund; the National Association of Mayors of Mountain Resorts (ANMSM) proposes allocating a portion (ideally around 20%) of the Inter-municipal and Municipal Resource Equalization Fund (FPIC) to mountain areas engaged in adaptation efforts. This fund is financed by levies of €1 billion on the resources of areas with the highest tax revenues. It should be noted that this proposal has not been discussed and raises the question of how FPIC revenues should be distributed.

Further details (amounts and explanations) for each line item are available in Appendix A5.

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Even when the issues are well defined, the needs are known and the funding options are clearly identified, discussions rarely lead to concrete decisions or meaningful changes in how these needs are addressed.

This is particularly true when there is no consensus on any proposal, whether to adjust existing mechanisms or to create new ones. In the field of civil protection, for instance, the measures adopted after the summer of 2022 (capacity agreements, the accelerated renewal of the air fleet) focused mainly on material investments. However, the question of sustainable financing for operations – particularly for SDIS staffing – remains unresolved due to a lack of agreement on revising local contributions or introducing new funding levers. Along the coast, despite significant progress in identifying future challenges and defining the terms and conditions for property relocation, none of the financing proposals has been accepted to date. In each case, the lack of consensus on how to share the effort in a constrained financial context has led to decisions being postponed.

Adjusting key mechanisms, even when they are considered essential, is not without consequences: including political ones. This reflects the difficulty in accepting certain options. In the field of water resource management, several avenues have been explored to meet identified needs, including greater use of the GEMAPI tax, the DGF (by making resource protection an allocation criterion), as well as payments for services rendered. While experts generally agree that user fees remain the central and most structuring lever, their revision faces strong resistance, as illustrated by the suspension of elements of the Water Agency fee reform following the agricultural crisis of 2024.

Deferring these decisions only widens the gap between identified needs and the actual capacity to meet them, while it is unlikely that new evidence will emerge in the short term to make those choices any clearer. Far from being purely technical adjustments, choices about how to allocate resources are likely to prove contentious, but they will nonetheless have to be made – and accepted.

The need for an overview of adaptation financing challenges

To date, discussions on the scale of needs and how they should be financed have remained largely confined to sectoral debates, rather than feeding into a broader cross-cutting strategy or planning approach.³² Examples include: the Beauvau Civil Security Forum, the Water Conferences, the National Coastal Erosion Committee, and the Infrastructure Financing Conference. The annual drafting of the finance bill (PLF) provides an important opportunity to address how adaptation costs should be covered and shared across sectors, but it remains insufficient. A significant proportion of the financing issues raised is not strictly linked to the State budget. Other levers are relevant but are not all considered within the PLF (e.g. local taxation, user fees, insurance mechanisms, etc.).

This fragmentation limits the ability to coordinate efforts, making it difficult to prioritize and potentially generating tensions when several mechanisms are implemented in parallel without prior coordination or consultation.

³² Unlike the challenges associated with carbon neutrality which, although discussed at the sectoral level (e.g. in relation to financing energy-efficient housing renovation or the rollout of electric vehicle charging infrastructure), are embedded within an overall financing strategy, as reflected in the Multi-year Strategy for Financing the Ecological Transition (SPAFTE) or the work of the SGPE on developing a framework for analysing ecological transition finance.

3.2. Who will pay? Different approaches to burden sharing

Taken together, discussions on adaptation financing reveal several possible approaches to sharing the effort. These range from direct contributions by users of the services that need to be adapted to forms of national solidarity, and various intermediate arrangements for sharing costs between territories and actors.

The ideas presented in this more exploratory section are not intended to prescribe any particular course of action. Rather, they help clarify the terms of a debate on financing that is often implicit and diffuse. They are grouped under several “visions” advocated by different stakeholders. These do not cover every possible approach, but they do reflect the main options that are regularly considered. The aim is to inform collective discussion on the political choices that arise in determining how the costs of adaptation should be shared.

Should users of affected services contribute?

One initial approach is to ask users of services affected by climate change to contribute directly. This is not, in itself, a new principle: for example, the energy and transport sectors have long involved users in the operation and maintenance of their infrastructure. What is new is the expectation that they may be asked to contribute more to meet the growing needs linked to climate change. Ultimately, such a choice would mean higher tariffs for these services, raising questions about affordability for users and fairness between users with different capacities to pay.

TABLE 15. OVERVIEW OF DISCUSSIONS ON INCREASING USER CONTRIBUTIONS

Challenge	Historical user contributions and planned developments
 Water resource conservation	The reform of fees paid by different water users (households, businesses and industries, farmers, etc.) to the Water Agencies, which are responsible for implementing programmes to promote adaptation, is central to discussions on increasing the resources allocated to this policy area. These charges have so far represented the bulk of water policy funding ³³ and remain an essential lever for financing the additional needs identified.
 Modernization and renewal of electricity networks	The financing of electricity networks is covered by the tariff for the use of public distribution electricity grids (TURPE). Any changes to this tariff to incorporate adaptation requirements are passed directly on to consumers: the TURPE currently accounts for around 30% of household electricity bills.
 Modernization and renewal of transport networks	Until recently, financing debates had not addressed the question of how much users should contribute. The conclusions of the Mobility Financing Conference now explicitly identify the “lever of user and customer contributions” as a priority to be mobilized. However, they also highlight social acceptability challenges in financing rail and road infrastructure, where user charges are already substantial (Ambition France Transports 2025).
 Implementation of adaptation strategies for mountain regions	Among the financing options identified, increased use of the municipal tax on companies operating ski lifts has been proposed. Applying this additional tax would effectively pass part of the adaptation burden on to ski lift users. ³⁴

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33 We refer here to the “large water cycle” (€1.9 billion in annual expenditure). Drinking water and sanitation services (€21.5 billion per year) are mainly financed through the tariff paid by users for each cubic metre consumed. However, the two components (the small and large water cycles) are not entirely separate: Water Agencies may, under certain conditions, contribute to the improvement of water networks, while drinking water and sanitation services also contribute to environmental conservation through environmental taxes.

34 It should be noted, however, that the logic is slightly different in this case: it is not a question of adapting these infrastructures but of using the additional revenue to finance new adaptation projects.

Some financing mechanisms have already begun to gradually adjust in this direction. This is particularly the case for electricity networks (transport and distribution): the regulation of network financing is based on the tariff for the use of public distribution electricity grids (TURPE), set by the Energy Regulatory Commission (CRE). In preparing TURPE 7, the CRE explicitly included adaptation considerations in its guidelines, identifying “improving the resilience of networks in the face of climate change” as a priority (CRE 2025). This recognition has led RTE and ENEDIS to increase investment to strengthen network robustness. Both operators now have detailed roadmaps for adapting their infrastructure, including quantified objectives,³⁵ investment programmes already underway, and a major contributor: the consumer.

The implementation of adaptive control mechanisms within these financing frameworks shows that it is possible to anticipate imbalances rather than endure them. The TURPE, for instance, includes a review mechanism that enables management to adjust at the appropriate level of need: the tariff value is set for a defined period³⁶ following a consultation process involving network operators and all users. For each period, an investment programme is established that anticipates future challenges to the networks. Conversely, and in a very different context, between 2016 and 2022, the Natural Disaster Compensation Scheme faced a structural deficit that threatened its sustainability, owing to the absence of any adjustment in its main financing mechanism for 25 years. Although a recent increase has been approved, there is still no provision for regular adjustment.

This user-financing approach has the advantage of transparency but raises questions about the actual capacity of users to absorb the additional costs of adaptation. In practice, increasing fees or tariffs amounts to passing on the cost of adaptation to private actors (households, businesses), without necessarily providing for redistribution or modulation of the burden. In sectors where price increases are already frequent for reasons other than adaptation, this dynamic could become difficult to sustain, particularly for low-income households: energy prices, for example, are already a source of tension, quite apart from adaptation issues, despite the existence of redistributive mechanisms, such as energy vouchers.

Developing mechanisms for solidarity between regions

A second approach to sharing the effort under discussion concerns the possibilities of better distributing the costs of adaptation between regions.

These questions arise in a context marked by significant inequalities – in terms of exposure to risks, vulnerability and financial capacity – which raise issues of interregional solidarity.

In some cases, the aim is to narrow the gap in financial capacity between areas facing similar challenges.

In mountain regions, for example, while some resorts – often small and located at medium altitude – are already facing severe budgetary constraints or even deficits, a small number of large resorts remain profitable or even highly profitable. In response to this situation, the Cour des comptes (2024g) has proposed creating a national fund, financed through an increase in the additional tax on ski lifts. This would amount to reallocating part of the current economic profits captured in certain localities and redistributing them to those already in difficulty.³⁷

It is also worth examining the extent to which regions that benefit from adaptation efforts undertaken elsewhere could contribute more directly to their financing.

In the case of flood risk, for example, prevention work is often carried out in upstream areas (e.g. through the creation of flood expansion zones and reservoirs), while downstream areas reap the benefits. However, apart from State support (via the *Barnier Fund*, for example), funding for these policies is raised locally (GEMAPI tax). Beneficiaries therefore have no means of contributing directly to the adaptation measures from which they benefit. Given this inequality, several stakeholders have called for changes to the management of this tax to introduce redistribution mechanisms that would strengthen solidarity between regions, particularly between upstream and downstream areas (Rapin and Roux 2024, Pointereau *et al.* 2025).

In some cases, the areas that must shoulder the main adaptation efforts are also those with the weakest capacity to contribute.

In mountain areas exposed to flood risk, for example, it is often the upstream municipalities at higher altitudes (at the head of the catchment) that must implement adaptation measures, while the downstream municipalities are those that benefit. However, the upstream municipalities are typically smaller and have more limited tax bases than the larger towns and cities located downstream. These inequalities have prompted some to explore new redistribution mechanisms (Rapin and Roux 2024, Pointereau *et al.* 2025) and to consider ways of incorporating climate risk exposure into existing financing frameworks (Ferrari and Mandon 2025).

35 For example, RTE aims to have 80% of its network “adapted to climate change” by 2040, with precise specifications for the operational implementation of this objective.

36 TURPE 6 covers the period 2021–2025, while TURPE 7 is planned for 2025–2028.

37 Organizing solidarity between mountain regions would not be a new concept. Since 2021, the “Nivalliance” mutualization scheme created by *Domaines Skiables de France (DSF)* has aimed to mitigate the financial consequences of insufficient snowfall for ski resorts. The principle is based on solidarity between resorts: contributions are proportional to each operator’s turnover, enabling larger resorts to support smaller ones that are often more vulnerable to climatic variations. However, this system is limited to covering operating losses.

■ Is there a case for national solidarity?

A third option under discussion is to distribute adaptation costs across the entire French population, in other words, to rely on national solidarity.

In crisis management, national solidarity already plays an important role when major climate-related events occur. These policies, which are collectively viewed as the foundations of a resilient economy, are based on the principle that managing major crises and their consequences is a collective responsibility, irrespective of their geographical location.³⁸ This principle applies, for example, to the natural disaster compensation scheme, which is mainly financed through a tax – the CatNat surcharge – levied on all property insurance contracts and covering almost the entire population.³⁹ It also applies to civil protection, where significant resources, particularly aerial firefighting assets, are managed at the national level, and where reinforcement teams are deployed between departments during crises.⁴⁰

However, climate change is gradually putting pressure on these long-standing solidarity mechanisms and exposing their limits. As compensation needs grow, observers generally agree that the CatNat scheme still has some financial flexibility, yet questions remain about the sustainability of further increases in the surcharge, particularly for households (Lavarde 2024; Langreny *et al.* 2024). In the same way, the ability to transfer personnel and equipment between departments during crises has so far relied on the fact that some areas were historically less affected by forest fires. The increasing spread and intensity of fire risk now raise difficult questions about how to balance local needs and allocate national resources when several events occur simultaneously (Départements de France 2022).

Some stakeholders also argue that actions to reduce vulnerabilities should be able to draw on national solidarity when they exceed local capacities or serve the public interest. This position is supported, for example, by certain parliamentarians (Fait and Barousseau 2025) and by the National Committee for the Coastal Line (CNTC), which has proposed financing the Coastal Erosion Fund through a 0.01% levy on all property transfer taxes (DMTO), thereby establishing a national tax base. The CNTC justifies this proposal by noting that all French citizens benefit from access to the coast and share a responsibility to protect it. However, this view raises questions of territorial equity. If national solidarity were considered justified in the public interest, other regions could legitimately claim comparable support, for instance, urban areas affected by heatwaves or mountain regions impacted by declining snowfall. Moreover, there is no consensus on this proposal: in response, the government

opened consultations in May 2025 with elected representatives to explore the creation of “contributions targeted at uses linked to coastal amenities,” following the Prime Minister’s statement that “the coastline must finance the coastline”.

Towards a broader debate on the role and limits of national solidarity in adaptation. In a recent report, the High Commission for Strategy and Planning explored the idea of “climate social security” through three scenarios for reforming the current risk-pooling system (with varying degrees of solidarity and regulation) up to a scenario of universal public coverage modelled on the social security system. Beyond the technical mechanisms and proposals, this work lays the foundations for a genuine “societal debate on climate and risk protection”. The authors call on experts and policy-makers to engage with these scenarios and to launch a collective discussion on how to balance solidarity and individual responsibility – a fundamental democratic choice that deserves to be openly and deliberately debated.

38 This principle is set out in the Preamble to the Constitution: “The Nation proclaims the solidarity and equality of all French people in the face of the burdens resulting from national disasters.”

39 The number of comprehensive home insurance policies, for example, stood at 45.9 million in 2023.

40 Although this solidarity takes the form of transfers between departments, it is the State – via budget programme 161 – that bears the financial cost of this mobilization under the explicit heading of national solidarity. It should be noted that these principles of national solidarity are complemented by European solidarity mechanisms.

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LIST OF ABBREVIATIONS

ADEME	French Agency for Ecological Transition
AFPCNT	French Association for the Prevention of Natural and Technological Disasters
ANCT	French National Agency for the Cohesion of Territories
ANRU	National Agency for Urban Regeneration
ART	French Transport Regulatory Authority
BRGM	French geological survey
CCR	Reinsurance company owned by the French state
CELRL	Conservatory of Coastal Areas and Lakeshores
CEREMA	Centre for Studies and Expertise on Risks, the Environment, Mobility and Urban Planning
CGAAER	General Council for Food, Agriculture and Rural Areas
CGEDD	General Council for the Environment and Sustainable Development (now IGEDD)
CNPF	National Centre for Private Forest Ownership
CNR	Compagnie nationale du Rhône (electricity generation company)
CNRS	French National Centre for Scientific Research
CNTC	National Committee for the Coastal Line
COI	French Council for Infrastructure Orientation
CRE	French Energy Regulatory Commission
CSFB	French Strategic Committee for the Wood Sector
DETR	Dotation d'équipement des territoires ruraux (Rural Development Grant)
DFCI	Forest fire protection
DGF	Global operating grant
DGSCGC	Directorate General for Civil Security and Crisis Management
DIVAE	Interministerial Delegate for the Varenne agricole de l'eau (Agricultural Water and Climate Initiative)
DMTO	Property Transfer Taxes
DSEC	Exceptional solidarity grant
EEZ	Exclusive Economic Zone
FTE	Full-time equivalent
FIRE	ENEDIS Rapid Electricity Intervention Force
FNE	France Nature Environnement
FNTP	National Federation of Public Works
FPIC	Inter-municipal and municipal resource equalisation fund
FPRNM	Fund for the prevention of major natural hazards
GEMAPI	Aquatic environment management and flood prevention
GICC	Management and Impacts of Climate Change
IPCC	Intergovernmental Panel on Climate Change
GIP	Public Interest Group
HCC	High Council on Climate
HCSP	High Commission for Strategy and Planning
HMUC	Hydrology, environments, use and climate

IAOM	Overseas Adaptation Initiative
IDDR	Institute for Sustainable Development and International Relations
IGA	General Inspectorate of Administration
IGEDD	General Inspectorate for the Environment and Sustainable Development
IGN	National Institute of Geographic and Forest Information
INRAE	National Research Institute for Agriculture, Food and Environment,
LFI	Initial Budget Act
LOPMI	Ministry of the Interior's Programming Law
LPO	French League for the Protection of Birds
MIG	Mission of General Interest
MIRAPI	Build Back Better after flooding
MTE	French Ministry of Ecological Transition (since 2020) / and Solidarity (2017-2020)
NPNRU	New National Plan for Urban Renewal
OFB	French Biodiversity Agency
OIN	Operation of National Interest
ONF	National Forest Office
NGO	Non-Governmental Organization
CAP	Common Agricultural Policy
PACC	Climate Change Adaptation Plan
PEPR	Priority Research Programme and Equipment
PLF	French Budget Bill
PNACC	French national climate change adaptation plan
PNSE	National Plan for Health and Environment
QPV	Priority urban neighbourhood
ReUt	Reuse of treated wastewater
RGA	Clay shrink swell
SDIS	Departmental Fire and Rescue Service
SNBC	National Low-Carbon Strategy
TACCT	Territorial climate change adaptation trajectories
TRACC	Reference warming trajectory for adaptation to climate change
TSCA	Special tax on insurance agreements
TURPE	Tariffs for the use of public distribution electricity grids
EU	European Union
IUCN	International Union for Conservation of Nature
UIE	French association of industries and companies in the water and environment sectors
VNF	French Waterways Authority
WWF	World Wide Fund for Nature

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- A3. **The current status of additional adaptation needs**.
- A4. A specific focus on the issues of **coordination, technical expertise and governance capacities**.
- A5. The main current financing mechanisms, with an assessment of their ability to meet additional needs and, where relevant, additional funding options under discussion.

To facilitate cross-referencing between the study and the appendix and vice versa, the main figures used in the study and detailed in the appendix are highlighted as shown above.

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