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15

Special report

Climate adaptation in the EU

Action not keeping up with ambition

EUROPEAN
COURT
OF AUDITORS

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Executive summary

I The frequency and severity of extreme climate and weather events such as heatwaves, drought and flooding are increasing. There is an urgent need to adapt to these climate conditions. While mitigation actions reduce greenhouse gas emissions, adaptation actions aim to adjust to climate change in order to reduce its impacts. Mitigation actions alone cannot prevent the effects of climate change, even if greenhouse gas emissions are successfully reduced.

II The EU published its first adaptation strategy in 2013 and another in 2021, confirming the EU's high vulnerability to climate change. During the last decade average economic losses from extreme climate-related events in the EU amounted to €26 billion per year. The strategy sets an objective for the EU to become climate resilient by 2050. This objective is also enshrined in the 2021 European Climate Law. Given the cross-cutting nature of actions related to climate adaptation, estimating the relevant EU funding is difficult. However, at least €8 billion in 2014-2020 and €26 billion in 2021-2027 were budgeted for climate adaptation.

III The objective of this audit was to assess the EU's climate adaptation framework and funding and how they address the impacts of climate change in the EU. We examined whether EU and national strategies and plans provided a sound framework for climate adaptation, and whether they covered reporting arrangements and awareness of strategies, plans and EU tools at local level. We also analysed whether a selection of EU adaptation projects from the 2014-2020 period contributed to climate adaptation effectively. Our audit scope did not include EU actions and support for climate adaptation outside the EU.

IV We decided to carry out this audit given the high priority of the topic and its materiality. We expect our findings and recommendations to provide useful input for improving the general framework on adaptation in order to better address the impacts of climate change. We also expect our work to help the EU focus its funding on actions tailored to current and future climate conditions and promote long-term solutions for climate adaptation.

V We found that the overall EU framework for adaptation policy was sound. However we found that the member states sometimes used outdated scientific data for their national adaptation strategy documents. Overall, the national adaptation frameworks audited were consistent with the EU adaptation strategy, although we identified conflicting priorities at sectorial and regional level. These concerned opposing needs for increased irrigation and reduced water consumption.

VI We also found that the member states' reporting on climate adaptation was insufficient and added little value in terms of tracking progress and supporting future policy decisions. We surveyed 400 municipalities and found that they were largely unaware of climate adaptation strategies and plans and were not using the EU adaptation tools (Climate-ADAPT, Copernicus and the EU Covenant of Mayors).

VII As adaptation is cross-cutting, the relevant EU funding is spread across several other EU policies such as agriculture, cohesion and research. While over half of the 36 projects in our sample (19) addressed climate risks effectively, we found that 13 had little or no impact on increasing adaptive capacity, and that there is a risk that two may result in maladaptation. Examples of maladaptation include promoting irrigation of a greater area instead of switching to less water-intensive crops; constructing dykes instead of relocating residents of coastal areas at risk of flooding or erosion; and investing in artificial snow cannons instead of focusing on year-round tourism. Due to these weaknesses, there is a risk that the EU adaptation policy and action might not keep pace with climate change.

VIII Based on our findings, we recommend that the Commission:

(1) improve reporting on climate adaptation through common indicators to measure progress and follow up on the weaknesses identified;

(2) better develop and promote the EU tools for climate adaptation to increase their usage and promote knowledge sharing;

(3) ensure that all relevant EU-funded projects are adapted to the current and future climate conditions, strengthening promotion of long-term solutions for climate adaptation.

Introduction

Climate adaptation and why it is important

01 The Paris Agreement aims to limit global warming to 1.5 °C compared to preindustrial levels (1850-1900). However, according to the latest report from the Intergovernmental Panel on Climate Change (IPCC), there is a 50 % chance that the 1.5 °C threshold will be reached by 2030-2035[1]. Recent data for Europe shows that the average temperature for 2018-2022 was around 2.2 °C higher than preindustrial levels. 2023 was the warmest year yet, with a global temperature increase of close to 1.5 °C[2].

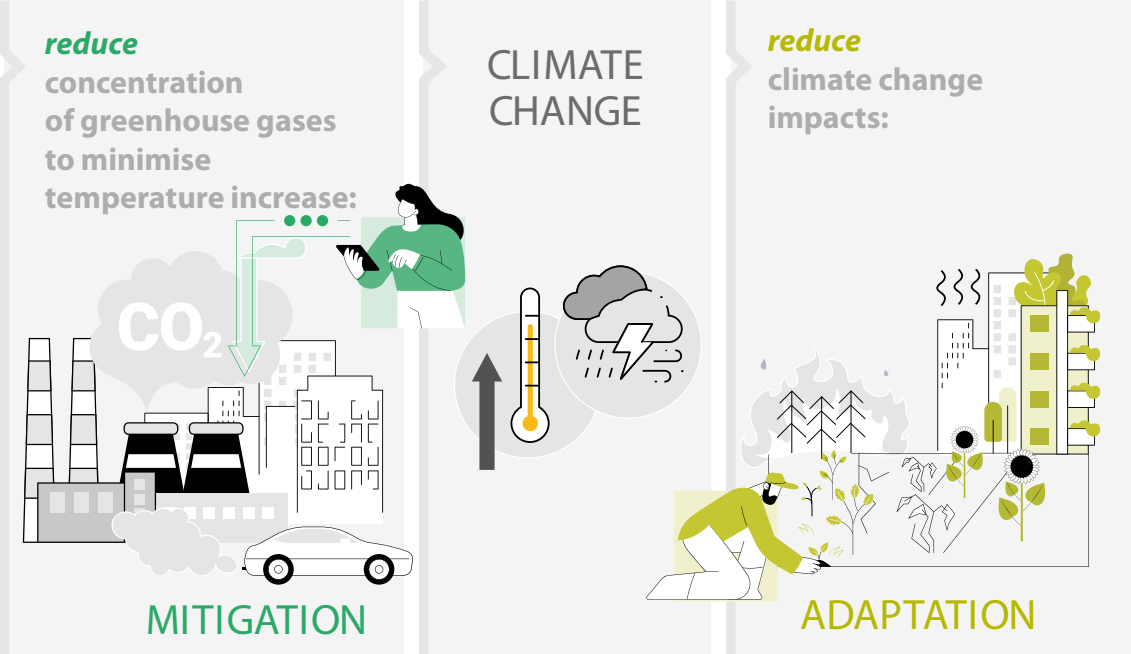
02 Mitigation actions are actions to reduce greenhouse gas emissions. These actions alone cannot prevent the effects of climate change that are already occurring, even if global efforts to cut greenhouse gas emissions are effective. The EU now produces less than 7 % of global greenhouse gas emissions[3]. Adaptation efforts are becoming increasingly necessary and climate adaptation is essential as a complement to climate mitigation (***Figure 1***).

[1] Climate change 2023 – Synthesis report – Summary for Policymakers.

[2] Copernicus Climate Change Service, Global Climate Highlights 2023.

[3] Statista – Distribution of greenhouse gas emissions worldwide in 2022.

Figure 1 – Complementarity between mitigation and adaptation



Source: ECA.

03 ***Box 1*** presents climate adaptation and other related concepts. The 2023 IPCC report[4] highlighted global adaptation gaps, which will continue to grow. It also showed that current global financial flows for adaptation are insufficient, and maladaptation is taking place.

[4] Summary of the sixth IPCC assessment report (AR6) – Climate Change, March 2023.

Box 1

Climate adaptation

The process of adjustment to actual or expected climate and its effects. Not a one-time emergency response, but a series of prevention, protection and preparedness measures to address hazards (e.g. drought, sea-level rise), exposure (e.g. less water), and vulnerability (e.g. poverty or lack of education). A policy of adaptation is a policy of anticipation of impacts of climate change, and measures to address them. It also includes taking advantage of opportunities that may arise due to climate change (e.g. new crops, higher yields).

Maladaptation

Adaptation that increases vulnerability or exposure to climate change instead of reducing it.

Climate resilience

Goes beyond climate adaptation, covering the ability to prepare for, recover from, and adapt to the impact of climate change.

Source: IPCC, European Environment Agency (EEA), United Nations Framework Convention on Climate Change, Glossary.

04 According to the EEA[5], heatwaves, droughts, flooding and heavy precipitation are the most frequently reported extreme weather events. Most coastal member states have reported coastal erosion and a rise in sea levels[6]. The EEA mentions the following key risks: health, the built environment (i.e. cities, roads, bridges), energy, marine and coastal regions, agriculture, forestry, water management and biodiversity[7].

[5] Is Europe on track towards climate resilience? – Status of reported national adaptation actions in 2023.

[6] Commission Staff working document (2023) 932 – Assessment of progress on climate adaptation in the individual member states according to the European Climate Law.

[7] EEA, EU climate risk assessment, 2024.

05 The frequency and severity of extreme climate and weather events is increasing[8]. This has led to a surge in the number of disasters in the EU over the last two decades and in the level of damage caused. Recent examples range from unprecedented forest fires (e.g. Greece and Spain, 2023) to flooding (e.g. Italy and Slovenia, 2023; France, 2024), heatwaves and devastating droughts (e.g. EU-wide, 2022; Spain, 2024).

06 Economic losses from extreme climate-related events in the EU averaged €26 billion per year over the last decade[9]. Exposing today's EU economy to global warming of 1.5 to 3 °C above pre-industrial levels – a conservative estimate – would result in an annual economic loss of between €42 and €175 billion[10].

[8] Intergovernmental Panel on Climate Change – Weather and Climate extreme events in a changing climate, 2021.

[9] Eurostat – Climate related economic losses.

[10] JRC PESETA IV project – Task 14 – Economic analysis of selected climate impact, 2020.

The framework for climate adaptation

07 *Figure 2* summarises the international and EU frameworks on climate adaptation.

Figure 2 – International and EU frameworks on climate adaptation – main elements

International

Paris Agreement

- **Global goal** on adaptation
- Adaptation planning and monitoring
- **Cooperation** with developing countries

Sustainable Development Goal 13 – Climate Action: Take urgent action to combat climate change and its impacts

- Target 13.1: **Strengthen resilience and adaptive capacity** to climate-related hazards and natural disasters in all countries

European Union

EU Climate Law

- Enhancing **adaptive capacity**, strengthening resilience, reducing vulnerability to climate change
- **Coherent policies** on adaptation

Regulation on the Governance of the Energy Union and Climate Action

- **Reporting** on climate adaptation (articles 17 and 19)

EU adaptation strategy and EU climate risk assessment documents*

- A climate-resilient Europe by 2050

* Commission Communication on Managing climate risks and EEA European climate risk assessment, 2024.

Source: ECA.

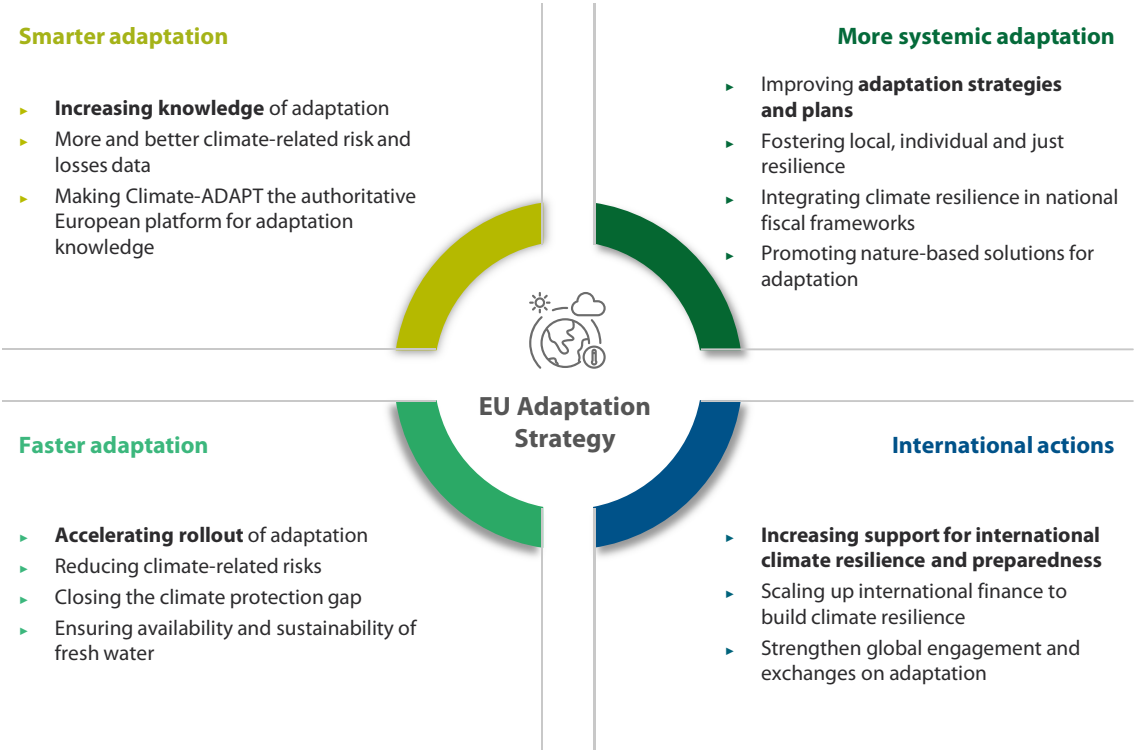
08 The first EU Adaptation Strategy was published in 2013. Its 2018 evaluation[11] confirmed that this strategy met its objectives overall, but concluded that Europe remained highly vulnerable to the consequences of climate change. In February 2021,

[11] Report from the Commission to the European Parliament and the Council on the implementation of the EU strategy on adaptation to climate change.

the new EU Strategy on adaptation to climate change was published with the ambition of "Building a Resilient Europe by 2050", as provided by the European Climate Law.

09 ***Figure 3*** shows the four main objectives of the new EU adaptation strategy.

Figure 3 – EU adaptation strategy, 2021



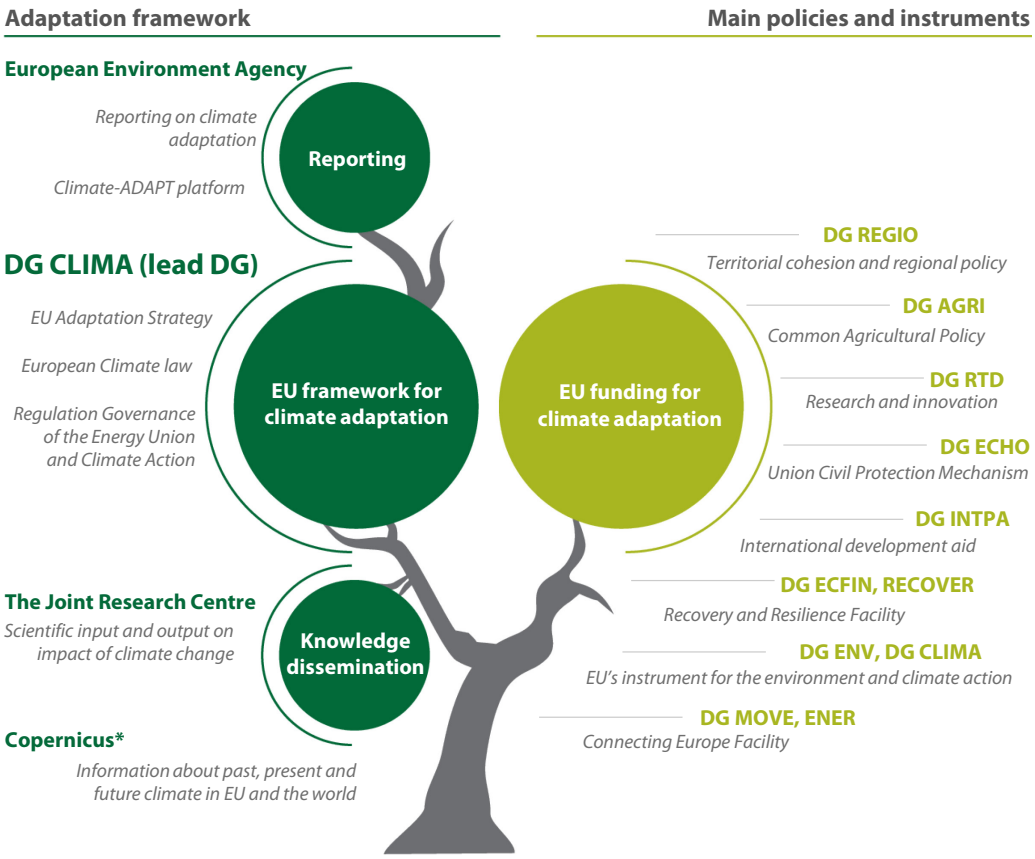
Source: ECA, based on the EU's 2021 adaptation strategy.

EU and member state roles and responsibilities

10 As shown in ***Figure 4***, various EU bodies are involved in the overall EU adaptation policy. As adaptation is a cross-cutting theme, many other policies such as regional, agricultural or environmental policies tackle adaptation, although funding does not always differentiate between climate adaptation and mitigation. While the EU provides a common general framework on climate adaptation, and member states decide the implementation approaches, the Commission has recently stressed the need to further clarify governance responsibilities and risk ownership to better manage the increasing climate risks[12].

[12] Commission Communication on Managing climate risks, 2024.

Figure 4 – Roles and responsibilities of Commission's main services



* Copernicus is managed by the European Centre for Medium-Range Weather Forecasts and the EEA.

Source: ECA.

11 The European Climate Law requires the EU and member states to ensure continuous progress in enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change. Member states must have a national adaptation strategy and a national adaptation plan and have to update them regularly based on the latest scientific data available. The Regulation on the Governance of the Energy Union and Climate Action also requires the member states to assess and rate climate-related hazards and monitor and evaluate adaptation actions.

Audit scope and approach

12 The audit looked at the EU climate adaptation framework and funding and how it addressed the impacts of climate change in the EU.

- We analysed whether the EU and national strategies and plans provided a sound framework for climate adaptation and were reported on properly[13], also assessing the awareness of the strategies, plans and EU tools at local level.

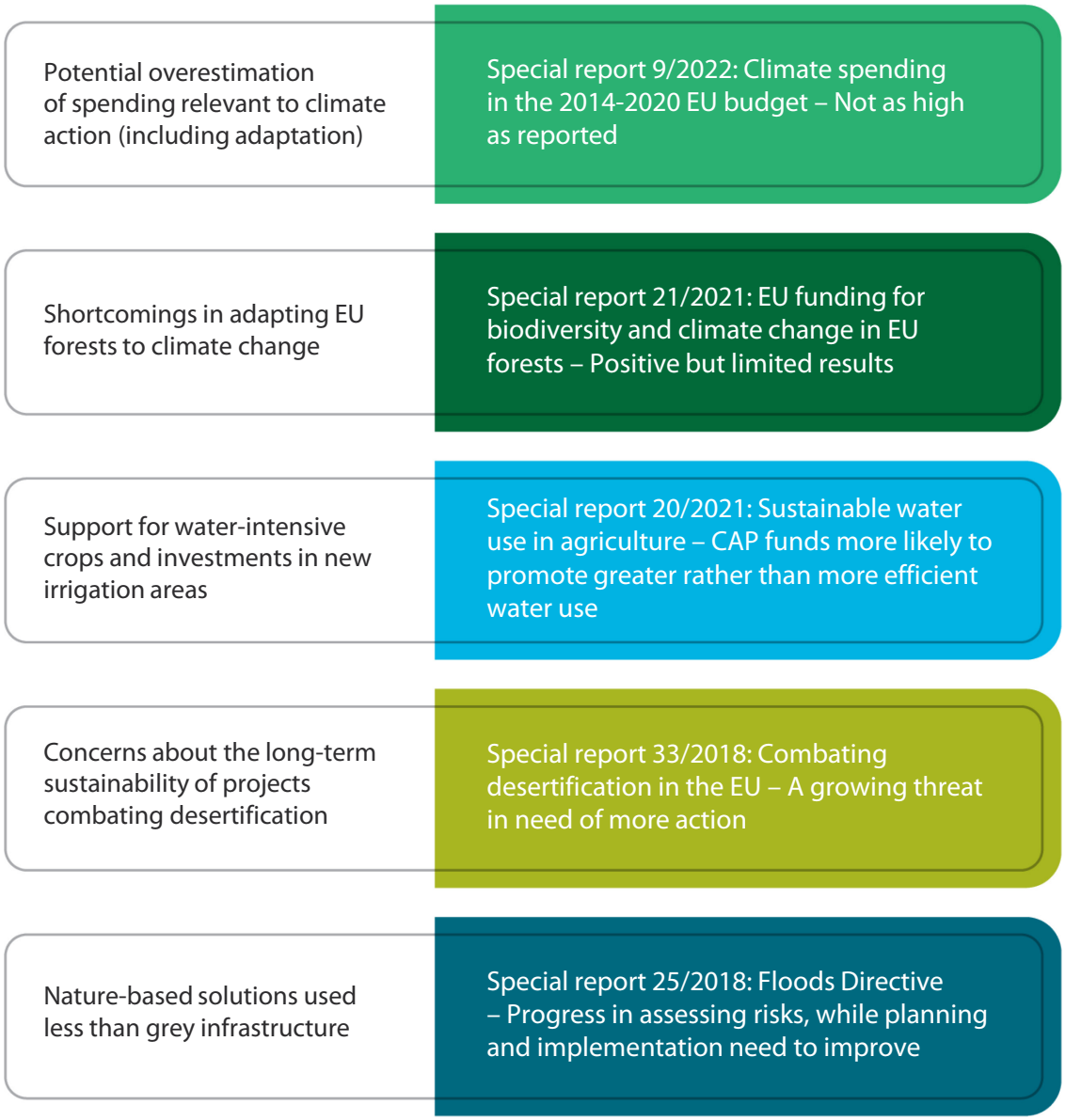
- We tried to identify the EU funds for climate adaptation and assessed whether the relevant EU projects from 2014-2020 contributed to climate adaptation effectively.

13 This audit focused on adaptation actions within the EU. The audit scope did not include EU action and support outside the Union. The audit did not assess national-level processes such as spatial planning, critical infrastructure, procurement and fiscal policies.

14 We decided to conduct this audit in response to significant interest from our stakeholders and given the materiality and importance of the topic (paragraphs ***01*** and ***02***). Our previous work on climate adaptation targeted specific risks, flagging issues related to EU-funded actions in this area (***Figure 5***). We expect our work to help the Commission improve the general framework on adaptation to better address the current and future impacts of climate change. We also expect our findings and recommendations to be relevant for improving the effectiveness of the EU funds used for adaptation purposes and preventing maladaptation projects in future.

[13] Article 19 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

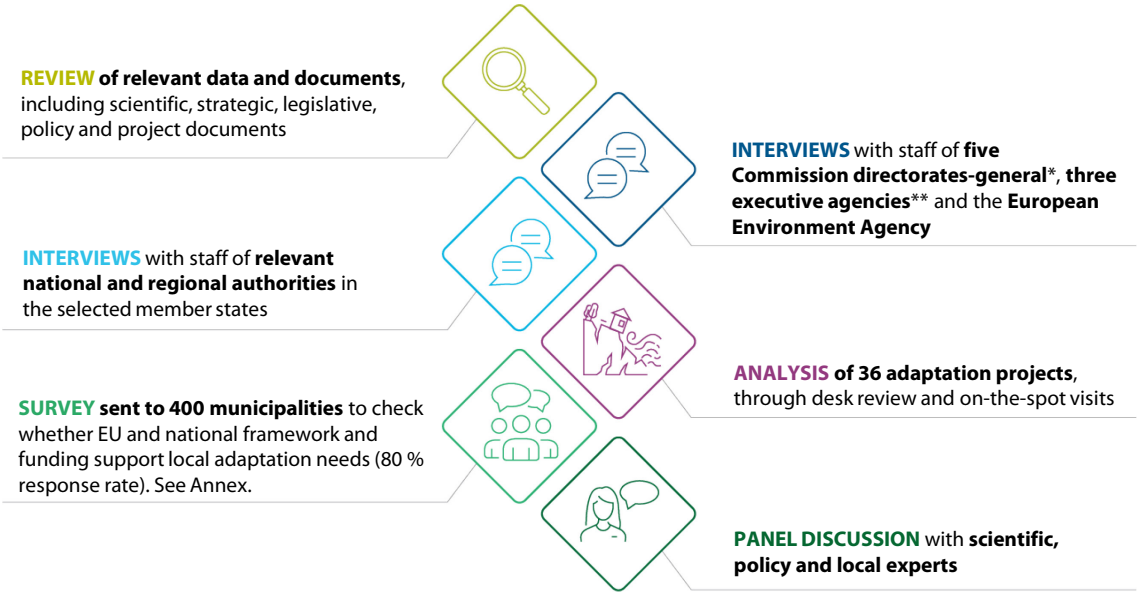
Figure 5 – ECA work related to climate adaptation and issues raised



Source: ECA.

15 Our audit covered the period from January 2014 to December 2023. We carried our audit at the Commission and visited four member states: Austria, Estonia, France (Nouvelle-Aquitaine and Sud regions) and Poland (Pomorskie and Małopolskie regions). We selected large and small member states with a mix of centralised and regionalised management of EU funding, with varying degrees of risk exposure regarding the impacts of climate change. Our sample of 36 projects from 2014-2020 aimed to ensure broad coverage of areas exposed to climate change and various EU instruments, taking into account their materiality and status of implementation. ***Figure 6*** shows how we collected audit evidence.

Figure 6 – Collecting audit evidence



* Climate Action, Agriculture and Rural Development, Regional and urban policy, Research and Innovation, Environment.

** European Research Executive Agency, European Climate Infrastructure and Environment Executive Agency and European Research Council Executive Agency.

Source: ECA.

Observations

Sound EU adaptation framework, but ineffective reporting and low local awareness

A sound EU framework for climate adaptation

16 As provided by article 5 of the European Climate Law, the EU's strategic and legal framework should be based on a sound risk analysis, resulting in effective and consistent actions to address climate adaptation. We reviewed the EU framework on climate adaptation and analysed its main features and evolution.

17 Recognising the reality of climate change impacts and the urgent need to act, the 2021 EU strategy on adaptation to climate change proposes actions to reinforce adaptive capacity, enhance resilience and reduce vulnerability to climate change. The overarching vision is that "the EU will be a climate-resilient society, fully adapted to the unavoidable impacts of climate change" by 2050. We looked into three of the four objectives set in the EU adaptation strategy (paragraph ***13*** and ***Figure 3***): smarter adaptation, more systemic adaptation, and faster adaptation. Paragraphs ***18*** to ***20*** present the Commission's key actions in this area.

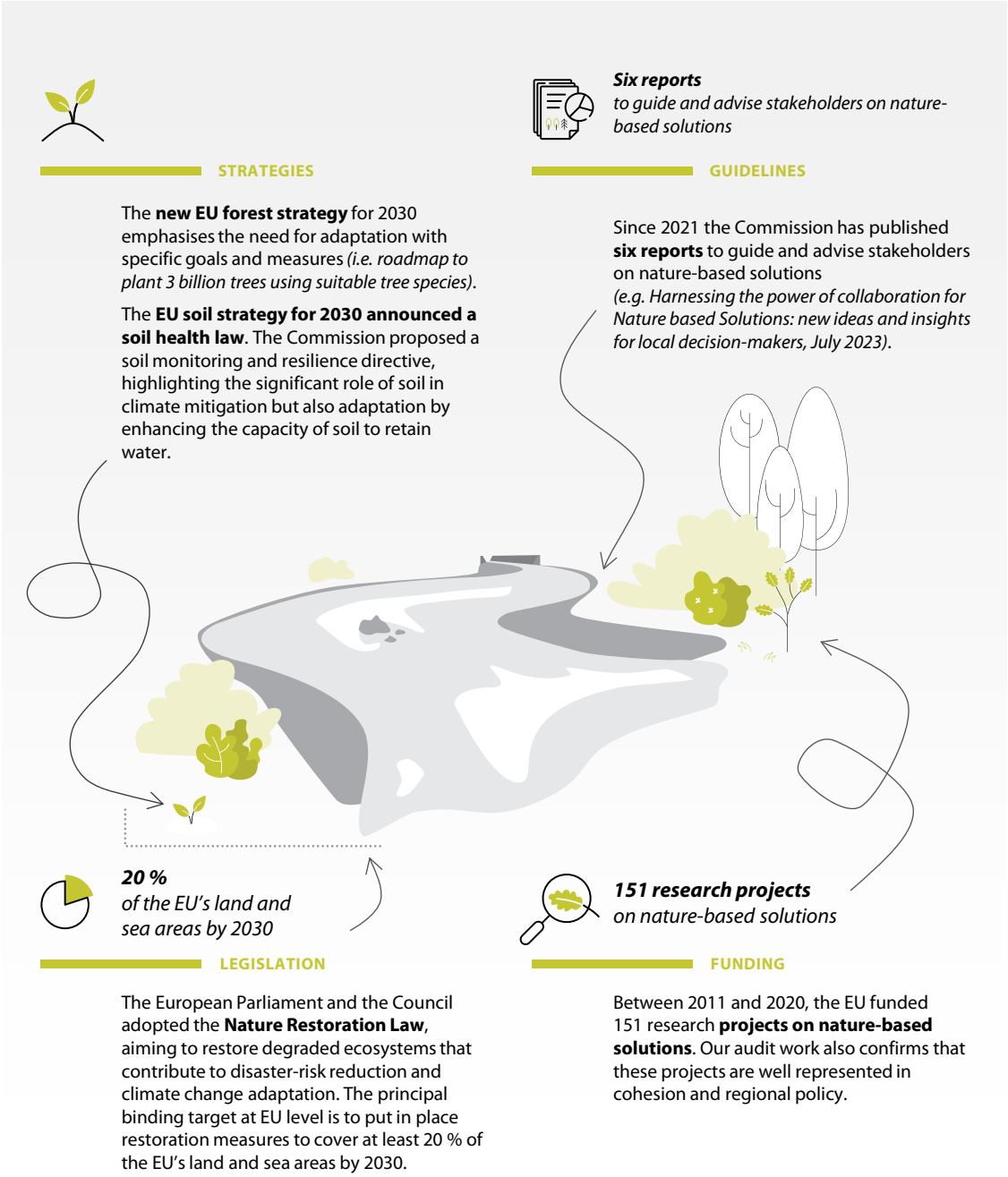
18 **Smarter adaptation** refers to improving knowledge and managing uncertainty. Since 2021, the Commission has:

- launched and developed several tools such as the Risk Data Hub, to share data on disaster risks, vulnerability to disasters and disaster loss;
- worked with the EEA to update and expand the Climate-ADAPT platform, a platform designed to share information about EU, national, regional and local policy and initiatives on climate adaptation, vulnerabilities, case studies and tools supporting adaptation planning.

19 To support a **systemic approach** to policy development, the Commission has incorporated climate adaptation into several policies including the new EU forest strategy. Climate change is a key feature of the common agricultural policy, but the objective on climate action does not distinguish between mitigation and adaptation. In addition, in 2023, the Commission issued updated guidelines on national adaptation strategies and plans. As an example, we noted good progress in the sub-objective of

promoting nature-based solutions for adaptation in EU law, guidelines and funding (*Figure 7*).

Figure 7 – Promoting nature-based solutions for climate adaptation in the EU



Note: According to the Commission, nature-based solutions are "solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience".

Source: ECA.

20 To support **faster adaptation**, the Commission:

- launched the EU mission for adaptation to climate change to boost research and innovation in this area and to accelerate climate adaptation at regional and local level;
- published technical guidance on climate-proofing infrastructure and on adapting buildings to climate change. For the 2021-2027 period, member states have to incorporate climate change mitigation and adaptation measures into the development of all EU co-funded infrastructure investment projects;
- reinforced the regulatory framework to protect freshwater. The Water Reuse Regulation and the recast of the Drinking Water Directive entered into force in 2021.

To sum up, we consider that the Commission developed relevant tools and initiatives to share knowledge on climate adaptation. The EU framework is comprehensive and incorporates climate adaptation into relevant policy areas. The EEA published an European climate risk assessment identifying key climate risks and evaluating how urgent it is to address them. Along with the Commission's communication on managing climate risks, this complements the EU framework and provides a sound risk analysis.

National adaptation frameworks generally consistent with EU strategy

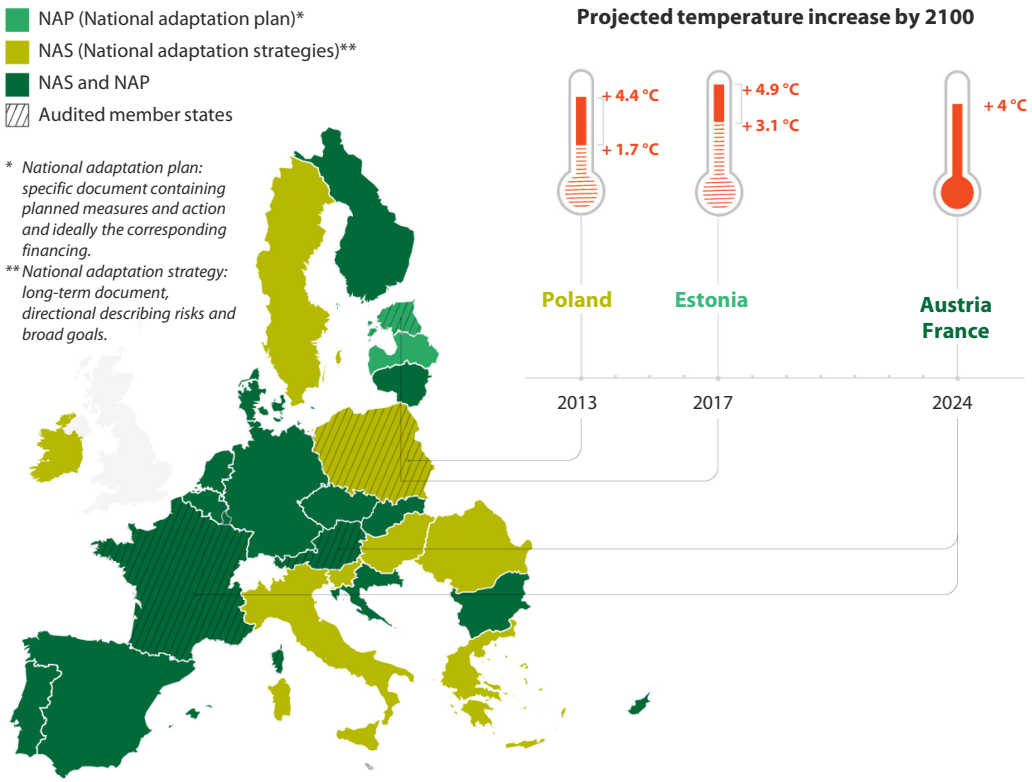
21 The overarching objective of the EU adaptation framework is to become climate resilient by 2050. This complements the EU objective of achieving climate neutrality by 2050 set out in the European Climate Law. These targets apply at EU level rather than to each member state. A national climate law would translate the strategic requirements from the European Climate Law and EU adaptation strategy into a legal requirement at national level. Within our sample of member states, only France had adopted a national climate law (in 2021), exceeding EU requirements.

22 As provided by the European Climate Law, member states should identify their vulnerabilities in relation to climate change, establish national adaptation strategies (NAS) and a national adaptation plan (NAP) and regularly update them (paragraph ***11***). We analysed these strategic documents for the four selected member states, focusing on their status, estimated costs for adaptation or non-action, risks identified, and consistency of the actions planned with the EU adaptation strategy. Our scope was limited to the hazards, sectors or areas identified as most exposed to climate change in

those member states, namely flooding, water scarcity, forest management, coastal erosion and mountainous areas.

23 The EU adaptation strategy calls for immediate action so that the EU is fully adapted to the unavoidable impacts of climate change by 2050. ***Figure 8*** summarises the status of national adaptation strategies and plans in the EU, providing updates on our sample of member states. We noted that Poland was in the process of updating its climate adaptation strategy. It was unclear whether Poland would take into account the expected scenario for Europe[14].

Figure 8 – Status of national adaptation strategies/plans in the EU and latest climate change estimates for selected member states



Note: As at September 2024, the new French national adaptation plan has not been published.

Source: ECA, based on EEA data. For the four member states we visited, the years indicate the latest update of the NAP/NAS, and the temperature increase refers to the projections for 2100 used in those documents.

[14] Copernicus Climate Change Service, Global Climate Highlights 2023.

24 National adaptation strategies and plans can serve as a basis for determining adaptation needs and estimating their costs, but it is a dynamic process that requires ongoing assessment. ***Table 1*** shows the estimated adaptation costs identified in the selected member states. We highlight the risk of underestimating adaptation investment needs in the member states that quantified these needs:

- Estonia originally planned to mobilise €44 million between 2017 and 2030[15]. The estimated cost of NAP implementation over that period is now €598 million.
- Austria used data from 2014 to estimate its adaptation needs in its 2024 NAP.

Table 1 – Estimated cost of non-action/adaptation costs in selected member states (million euros/year, at current prices)

Task	Austria	Estonia	France	Poland
Cost of non-action (damage caused if no/limited policies/interventions implemented)	2 000 (estimated annually, until 2030)	Not calculated		2 760 (27 600 estimated for 2021-2030)
Cost of planned adaptation measures	488 (annual estimate made in 2014)	59 (296 estimated for 2021-2025)	1 740 (8 700 estimated for 2018-2022)	Not calculated

Source: Austria – *PACINAS "Ausgaben des Bundes für Klimawandelanpassung"* factsheet and COIN study, June 2020; Estonia – KOHAK action plan; France reporting document; Poland SPA 2020.

25 We found that all the member states selected for this audit conducted climate risk assessments and identified the most vulnerable sectors in their climate adaptation plans or strategies (paragraph ***22***). They also planned actions towards better climate adaptation.

26 **Water management** involves two main aspects linked to climate adaptation: water scarcity and flooding. The EU's 2021 adaptation strategy put more emphasis on the risk of water scarcity than on the flood risk. Overall, we found that the national climate adaptation frameworks of the four selected member states were consistent

[15] Estonian Climate Change Adaptation Development Plan until 2030, table 6.1.

with the EU adaptation strategy in relation to flooding and water scarcity. The national adaptation frameworks for Austria, France and Poland promoted a decrease in water consumption at national level. However, the incentive to reduce water consumption was much less obvious in the regional and sectorial plans (***Box 2***).

Box 2

Increased irrigation needs versus reducing water consumption

The Austrian national adaptation plan recommends reducing water consumption in industry and agriculture through more efficient technology. However, it also forecasts an increase in areas to be irrigated. Calculations in the Austrian plan suggest that agricultural irrigation needs will double in some regions by 2050[16].

The French national adaptation plan aims to reduce water consumption[17].
The agricultural plan for water and climate adaptation (Varenne de l'eau) and the regional plans for the Nouvelle-Aquitaine and Sud regions aim to develop efficient irrigation systems but at the same time increase the irrigated area, without mentioning a reduction in water consumption.

Although the plan for Nouvelle-Aquitaine sets a goal of reducing agricultural water consumption by 30 %, this only applies to low-water periods. Outside these periods, there is no incentive to reduce water consumption. The 2021-2026 climate plan for the Sud region aims to "increase the current irrigated area by 15 % within 10 years".

Source: ECA, based on national/regional documents in our sample of member states.

27 For the **forestry** sector, which is heavily affected by climate change, we noted that the national strategies and plans of the selected member states were aligned with the EU strategy. They aim to increase forest resilience by incorporating adaptation considerations into the way forests are managed (e.g. forest diversification, management practices). We found, however, that the Estonian adaptation plan did not clearly identify the need to diversify forests.

[16] Adaptation strategy, Part 2, p. 57.

[17] Varenne agricole de l'eau et de l'adaptation au changement climatique.
Sud region climate plan: Gardons une COP d'avance.
Nouvelle Aquitaine region climate plan: NeoTerra.

28 The EU and national adaptation strategies/plans to tackle the **coastal erosion** risk were broadly consistent, promoting nature-based solutions (France and Poland) and strategic relocation (France). Estonia recognised the coastal erosion risk but planned no activities to address it at national level, other than taking it into account for land use planning.

29 **Mountainous regions and ski tourism** need to adapt to reduced snow and the inevitable melting of glaciers. The EU, national and regional adaptation strategies and plans are cautious regarding the need and means to adapt ski resorts to future climate conditions:

- France identified alternatives such as diversifying activities and developing year-round tourism, but only nine measures out of 470 directly addressed the issue of adapting mountain tourism to climate change[18]. The French Climate Law requires each mountainous area to develop a strategic plan for adapting to climate change, identifying ways of diversifying economic and tourist activities.

- The Austrian strategy concludes that increasing snow production at lower altitudes would represent a mismatch, as it would be achieved at the expense of water and energy consumption. Austria also promotes four-season tourism.

30 Early warning systems support climate adaptation by helping societies prepare for and respond to the negative impacts of a changing climate. Europe is a world leader, with an early warning system covering about 75 % of its population[19]. In our sample, Estonia, France and Poland had a Short Message System (SMS) in place, while Austria was working on one.

Ineffective and insufficient reporting on climate adaptation actions in the EU

31 As provided by article 19 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, the strategic framework for adaptation should be supported by an effective reporting system. Such a system would assess the progress made and help member states and the EU to adequately address climate risks and

[18] French Court of Audit – report: *Les stations de montagne face au changement climatique*, 2024.

[19] Copernicus Climate Change Service, Global Climate Highlights 2023.

refine their climate adaptation plans and strategies. We looked into reporting on climate adaptation and how it is used to evaluate progress.

32 **Article 19** of Regulation (EU) 2018/1999 requires member states to report from 2021 and "every two years thereafter information on national climate change adaptation planning and strategies, outlining their implemented and planned actions".

33 By March 2023, member states were required to report on their national adaptation actions for the second time[20]. This reporting is mainly descriptive, containing only general, qualitative assessments[21]. Member states do not provide quantitative assessments of progress and do not use common basic indicators. The lack of common indicators or a reference basis makes it difficult to assess the progress made by member states in implementing their adaptation actions and, therefore progress at EU level (***Table 2***).

[20] Article 19 of Regulation (EU) 2018/1999 and Annex I of the Implementing Regulation 2020/1208.

[21] Regulation 1999/2018, Annex VIII, Part 1.

Table 2 – Article 19: reporting on progress towards meeting adaptation priorities for our sample of member states

Member state	Summary of reporting	Examples from forestry sector and water management	Weaknesses/strengths we identified
Austria 	Reports on progress in selected sectors with examples of adaptation achievements.	Continuing decline in proportion of spruce, and trend towards mixed stands with higher proportion of hardwoods. Various measures taken to improve water ecology, such as restoring river continuity.	Highly developed national monitoring of adaptation (criteria developed for each area), but only partial reporting to the Commission.
Estonia 	Refers mostly to specific climate-affected regions and threats.	No progress mentioned.	Weak coordination between national framework for climate risks and adaptation actions.
France 	Description of current national adaptation plan (NAP).		Same reporting for 2021 and 2023 (mid-term evaluation of 2022 French NAP not taken into account).
Poland 	Describes examples of planned actions and state-of-play of adaptation strategy.	No progress mentioned in forestry sector. Publication of 2021-2027 Water Shortage Prevention Programme to reduce risk of flooding and mitigate effects of drought.	No national reporting on adaptation actions. Available data on individual adaptation measures/projects not compiled or used.

Source: ECA, based on member states' 2023 reporting under article 19.

34 We acknowledge that reporting on adaptation policies under article 19 is a positive development. However, its effectiveness is currently hampered by the lack of relevance, quality and comparability of data submitted by the member states. We found the data insufficient for evaluating progress on climate adaptation in the member states. Consequently, the Commission and member states may miss the opportunity to assess their progress on climate adaptation and on addressing risks and vulnerabilities with a view to becoming more climate resilient.

35 We found that the information provided by the member states using the current approach limits the value of the progress assessment on climate adaptation actions. The EEA carries out quality controls of the reports submitted under article 19 and gives voluntary feedback to the member states, but it has no means of requesting more relevant, complete or up-to-date information. In December 2023, the Commission issued its assessment of national progress under the European Climate Law, along with recommendations to the member states.

Low local awareness of EU tools, strategies and plans for climate adaptation

36 Climate adaptation is a cross-cutting policy that should be addressed at a global, EU, national, regional and local level[22]. On the one hand, national laws and political priorities can set goals, standards, and guidelines that ensure a consistent adaptation approach. On the other, local communities are better placed to tackle their unique climate vulnerabilities. The EU adaptation strategy considers "the local level to be the bedrock of adaptation, so EU support must help increase local resilience".

37 According to the EU adaptation strategy, the Commission should foster local resilience and step up support for planning and implementing local adaptation actions. Local communities should be aware of EU tools and use them to make progress in terms of their adaptation needs.

38 We launched a survey of 400 municipalities in our sample of member states to assess local awareness of EU and national adaptation frameworks, funding and other EU tools (***Figure 6***). According to our survey results (***Annex***), most municipalities were not aware of the different adaptation strategies and plans. We found that, of the municipalities surveyed:

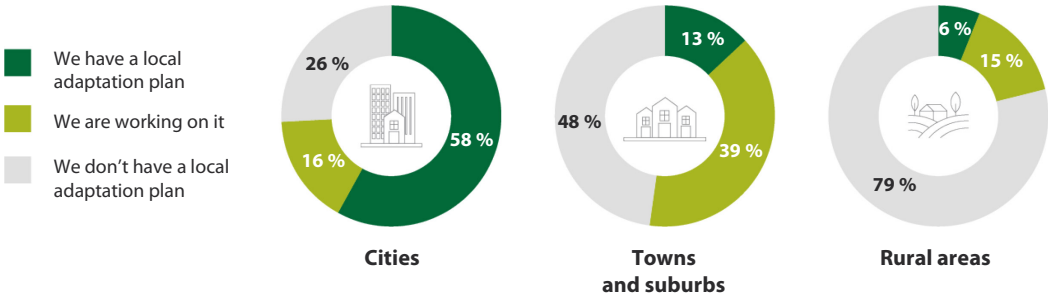
- Almost 70 % were not aware of the EU adaptation strategy;
- 60 % were not aware of the national adaptation plans;
- 54 % were not aware of the regional adaptation plans.

39 Only 16 % of the municipalities surveyed had developed a local adaptation plan, although a further 21 % were working on one. This shows a positive trend at local level. Our survey results showed that the percentage of cities with a local adaptation

[22] Adaptation in EU policy sectors – Climate-ADAPT platform.

plan was 10 times the corresponding percentage of municipalities in rural areas (*Figure 9*).

Figure 9 – Local adaptation plan according to the degree of urbanisation of the municipalities surveyed



Cities: densely populated areas – **Towns and suburbs**: intermediate density areas – **Rural areas**: thinly populated areas
This classification (DEGURBA) classifies the territory of a country on an urban-rural continuum according to the population size and the population density thresholds.

Source: ECA.

40 The transposition of the EU and national adaptation policies into local rules is a challenging process. Even when municipalities are aware of the overarching strategies and implement adaptation projects, they are not always ready to accept certain trade-offs for adaptation such as rigorous land use planning (*Box 3*).

Box 3

Conflicting objectives between construction and climate adaptation

A stormwater protection project we selected in Austria received EAFRD funding to build a flood-control reservoir and a drainage ditch. We found that the project provided the local community with effective flood protection.

However, we also noted that the authorities had given planning permission for new houses in a flood risk area.

Source: ECA.

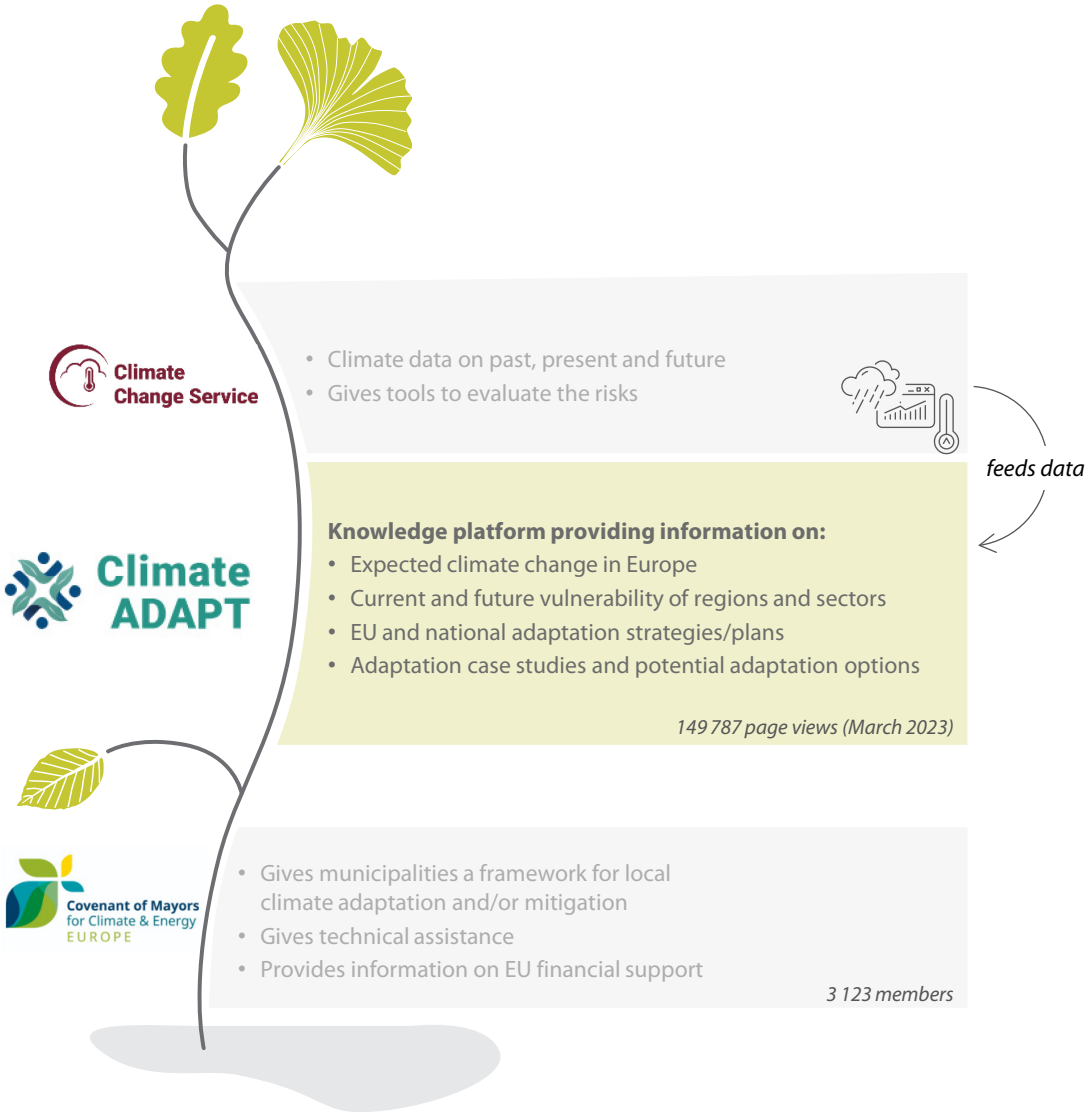
41 ***Figure 10*** shows three EU tools aiming to boost local actions and share knowledge regarding adaptation to climate change.

- Created in 2013, Climate-ADAPT offers useful information to support the EU in adapting to climate change.

- Since 2014, the Climate Change Service from Copernicus has provided the latest scientific data on climate change.

- The EU Covenant of Mayors, created in 2009, brings together municipalities that are committed to implementing EU climate and energy objectives (i.e. developing a local adaptation plans and reporting on their progress).

Figure 10 – EU tools for climate adaptation



Source: ECA, based on information received from the Commission.

42 We consider that these tools provide useful data, share knowledge, and offer technical support on climate adaptation in the EU. Our survey showed that unfortunately they were not well known or used at local level. Of the municipalities that responded to the survey, 77 % were not aware of the Climate-ADAPT platform. Similarly, 74 % of respondents were not aware of the Copernicus services. In our previous work, we noted that "Copernicus provides valuable services and data, which

the Commission promoted in various ways, but it has not done enough to harness the full potential of the programmes and capitalise on the significant investment made to achieve the expected benefits"[23]. Finally, only 10 % of the municipalities surveyed were part of the EU Covenant of Mayors.

43 The language barrier is one reason for this low awareness at local level. As of 2022, the Climate-ADAPT platform was only available in English. In 2024, Climate-ADAPT is partially available in German, French, Spanish, Italian and Polish. In addition, we identified national tools similar to the EU climate adaptation tools (***Box 4***).

Box 4

National climate adaptation tools not interlinked with EU tool

The French and Polish national climate adaptation platforms (Centre de ressources pour l'adaptation au changement climatique and KLIMADA, respectively) do not refer to their EU equivalent, Climate-ADAPT. KLIMADA was financed by EU funds.

Austria's Klar! programme has been endeavouring to enable regions and municipalities to prepare for climate change since 2016. Only three of the 79 regions and municipalities taking part in the programme have committed to climate adaptation actions under the EU Covenant of Mayors. There is no synergy between the two programmes.

Source: ECA, based on national authority documents and websites.

EU climate adaptation funding – relevant projects are difficult to track and favour short-term rather than long-term solutions

Challenges in tracking EU climate adaptation funding

44 According to article 7 of the Paris agreement, the Commission and member states should allocate adequate financial resources to support their climate adaptation strategies and action plans. This funding should be monitored to assess progress and evaluate the results of EU climate adaptation actions. To quantify EU spending on climate adaptation, we looked into the relevant funding allocated by the Commission and member states.

[23] Special report 07/2021: "EU space programmes Galileo and Copernicus: services launched, but the uptake needs a further boost".

45 The EU budget has several funds and instruments that support climate adaptation, particularly in agriculture, research and innovation, or cohesion and regional development. However, given the cross-cutting nature of actions related to climate adaptation, it is difficult to identify all relevant EU-funded projects. For example, EU-funded projects flagged as protecting nature can also serve the purpose of climate adaptation. Some projects might also have been incorrectly flagged as relevant for climate adaptation, as noted in our previous work[24].

46 ***Table 3*** presents examples of EU-funded projects that the Commission and member states considered relevant for climate adaptation.

Table 3 – Examples of climate-adaptation projects financed under the different EU funds

Rural development (EAFRD)	Cohesion and regional funds	Research and innovation (Horizon Europe)	Environment and climate (LIFE)
- water efficiency (irrigation, water storage investments) - restoration of forest damaged by storms or pests	- green infrastructure: nature-based solutions to reduce risks of flooding, coastal erosion, landslides or drought - grey infrastructure for flood/coastal protection - rainwater retention ponds to address the issue of droughts and water scarcity - wetland and peatland restoration	- weather forecast modelling and risk analysis for climate change - research on new solutions for climate adaptation	- testing of nature-based solutions to reduce risks of flooding, coastal erosion, fire, landslides or drought - innovative methods to combat different threats such as heat island effects in big cities, desertification, etc.

Source: ECA based on Commission information.

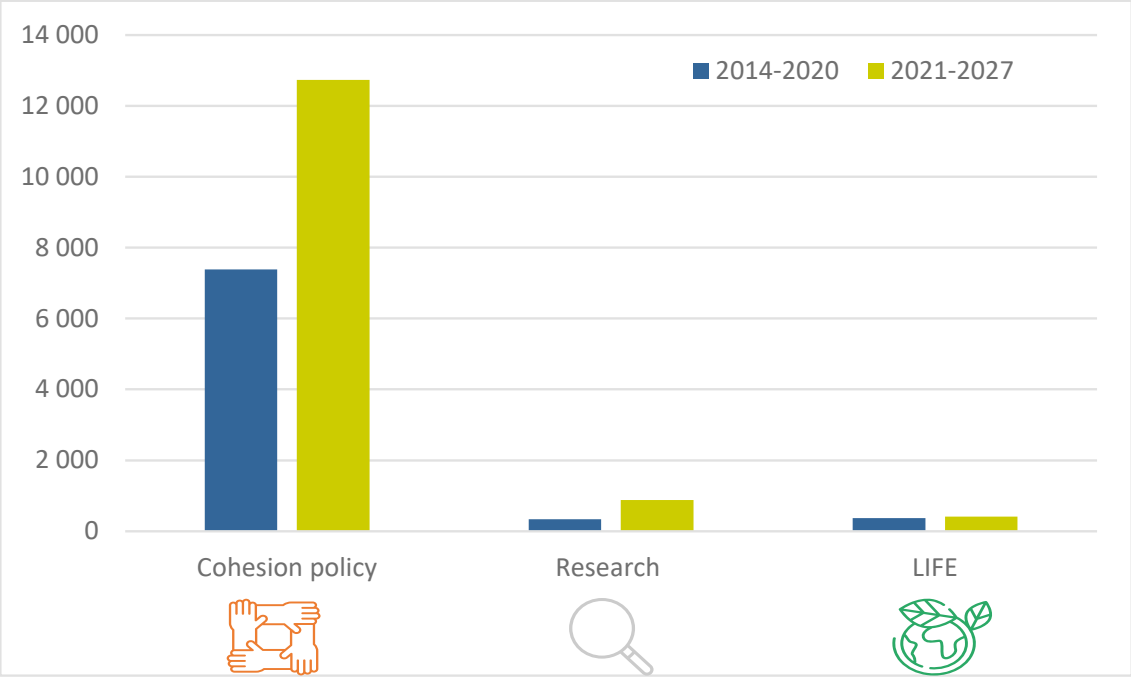
47 The EU budget encompasses numerous objectives that must coexist with the climate adaptation objective, such as promoting social, economic and territorial cohesion. It is inherently difficult to weigh a programme's contribution to each objective. For example, cohesion funding aims to reduce disparities between member

[24] Special report 14/2024: "Green transition – Unclear contribution from the Recovery and Resilience Facility", Figure 10.

states and regions, but funding infrastructure to support economic development and competitiveness may result in deforestation or increase pressure on water resources.

48 ***Figure 11*** shows examples of the main EU funding sources flagged for climate adaptation for 2014-2020 and 2021-2027. The contribution of the common agricultural policy to climate adaptation is not included, due to various limitations and challenges (***Box 5***). The member states also allocated about €12 billion of EU funds for adaptation under the Recovery and Resilience Facility.

Figure 11 – Evolution of main EU climate-adaptation funding (million euros)



Source: Regional and cohesion funds – Cohesion data portal; research: based on information received by the Commission. For the 2021-2027 LIFE programme, the ECA estimated that 43 % of the budget is for climate adaptation (similar to the previous programme).

Box 5

Climate adaptation in the common agricultural policy – mixed results

Direct payments

Our previous work found that the impact of direct payments on climate adaptation was mixed:

↑	income from direct payments increased farms' capacity to deal with negative shocks from climate change;
↓	dependence on direct payments may maintain non-viable farms, slowing structural changes that could be necessary for adaptation.

Rural development

The €10 billion allocated to rural development funding for climate adaptation (2014-2020) comes from three main areas:

↑	increasing the efficiency of water use in agriculture;
→	supporting farm risk prevention and management (via harvest insurance). We consider the risk management a tool to transfer climate risks rather than addressing them;
↓	fostering local development in rural areas, which, based on our previous audit work on these projects, is not linked to climate adaptation.

Monitoring adaptation

↑	One impact/context indicator on resilience "Improving the resilience of agriculture to climate change" [I.09/C.45].
→	One generic result indicator[25] for adaptation "Share of utilised agricultural area under supported commitments for better adaptation to climate change". It is not comparable across member states, as the area included can cover arable land using livestock manure, permanent grassland, or areas of vineyard maintenance, resilient/adapted crop varieties, or efficient water use. Estimated budget for the measures contributing to R12: €28.7 billion (2021-2027).
↓	Climate actions don't distinguish climate mitigation and adaptation.

Source: ECA review 01/2020 "Tracking climate spending in the EU budget"; special report 09/2022 "Climate spending in the 2014-2020 EU budget – Not as high as reported"; special report 10/2022 "LEADER and community-led local development facilitates local engagement but additional benefits still not sufficiently demonstrated"; Regulation 2115/2021.

EU Mission on adaptation to climate change, an ambitious initiative

49 Under Horizon Europe, the EU research programme for 2021-2027, the Commission launched a specific Mission on adaptation to climate change (EU Mission)[26]. The aim of this mission is to accelerate adaptation by offering concrete solutions, sharing knowledge and enabling regions to become climate-resilient by 2030. ***Table 4*** sets out the objectives and the progress made so far.

Table 4 – EU Mission on adaptation – objectives and progress so far (April 2024)

Objectives	Progress
150 climate-resilient communities and regions by 2030	311 regional and local authorities signed the mission charter
75 demonstration sites for climate adaptation	The EU Mission platform provides technical assistance to the regions and shares good practices
Budget allocation for 2021-2027: €874 million	39 research projects between 2021 and 2023 (total cost €368 million), conducting climate risk and vulnerability assessments, and demonstrating innovative solutions (e.g. flood-proof buildings, more drought-resistant crops) or tools to engage citizens

Source: ECA, based on Commission's information.

50 One significant challenge of enabling 150 regions and communities to become climate-resilient by 2030 is leveraging funding so that the EU Mission can deliver on its objectives. This would require an estimated additional €10 billion[27]. It is currently unclear how this funding will be raised.

51 In addition, "mainstreaming climate change adaptation in a large number of programmes, funding lines and other actions remains a major task going forward for

[25] European Parliament study on the impact of extreme climate events on agricultural production, p. 61.

[26] Commission's Communication on EU Missions two years on: assessment of progress and way forward, COM(2023) 457 final.

[27] Climate Change Adaptation Mission Implementation Plan, 2021.

the Mission to reach its goal"[28]. One of our previous reports[29] found that synergies between the research programme and the other EU funds were not fully exploited and that those funds were not used in a complementary way. This limits the impact of research and innovation projects. However, the Mission aims to address this issue, but it is still too early to see the actual impact.

52 Our survey (which did not specifically address signatories to the Mission on adaptation) showed that 75 % of the municipalities sampled were not aware of the EU Mission portal for climate adaptation, 17 % were aware of it but did not use it, and only 8 % were using it. Given the uncertainty over available funding, we wish to point out that it might not be possible to enable 150 regions and communities to become climate resilient by 2030. Greater awareness at local level would also be important to achieve the Mission's full potential.

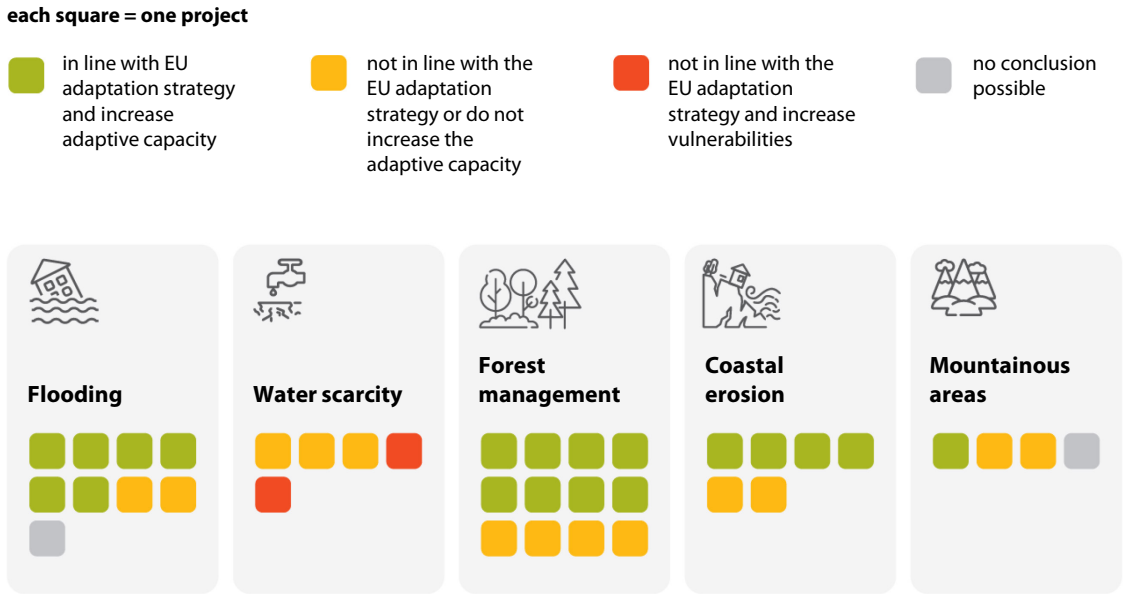
EU-funded 'climate-adaptation' projects – preference for short-term rather than long-term solutions

53 We analysed 36 EU-funded projects flagged as climate-adaptation projects in the four audited member states. We assessed whether these projects were consistent with the national/sectorial and regional strategies, and whether they addressed climate adaptation effectively rather than providing a short-term solution, which could result in maladaptation. This analysis was carried out with regard to the five sectors and areas mentioned in paragraph ***22***. Overall we found that 19 projects increased the adaptive capacity in the sectors concerned, 13 projects did not increase the adaptive capacity or were not consistent with the EU adaptation strategy and two projects increased the vulnerability, i.e. leading to maladaptation. We couldn't conclude for two projects as they were too recent (***Figure 12***).

[28] Commission Staff working Document SWD (2023) 260 final. EU Missions two years on.

[29] Special report 23/2022: "Synergies between Horizon 2020 and European Structural and Investment Funds – Not yet used to full potential".

Figure 12 – Overview of the 36 selected adaptation EU projects



Source: ECA.

Flooding and water retention – promoting nature-based solutions

54 Flooding is one of the main risks that the EU is facing. Our 2018 report on the Floods Directive acknowledged that its overall effect was positive. The report emphasised that incorporating climate change more fully into land use planning to mitigate flood risk, and using nature-based solutions, remained major challenges for climate adaptation.

55 Our analysis of the nine projects sampled revealed that:

- four projects promoted nature-based solutions, such as river renaturalisation or peatland restoration (***Box 6***);
- all projects were consistent with the EU and national strategies, but two projects did not increase adaptive capacity:
  - one project was effective in protecting a new housing development against flooding, but the development was authorised for construction in a high-risk flood zone (***Box 3***);
  - another project developed a green index in 2018 to increase the water retention capacity of cities, but this index was never used;

- two projects only used historical data to build the flood infrastructure, without considering future weather conditions, creating a risk of insufficient flood protection for the area in the medium- and long-term.

Box 6

Peatland restoration: win-win for climate adaptation and mitigation

In Estonia, an area of 2 000 hectares of peatland had been drained, excavated and depleted, then abandoned. We noted in our previous work that the CAP supports farmers who cultivate such drained peatlands[30]. One project attracted €3.9 million in non-CAP EU support for a total project cost of €4.6 million to restore this area.

Drained peatland is a source of greenhouse gas emissions, but when restored, peatland becomes a carbon sink. It also absorbs water during heavy rainfall periods and retains water during droughts.

The restoration project contributes effectively to climate adaptation. As well as retaining water, it helps enhance biodiversity and soil health.

Source: ECA.

[30] Special report 16/2021: "Common agricultural policy and climate – Half of EU climate spending but farm emissions are not decreasing".

Water scarcity – irrigating water-intensive crops counter to climate adaptation

56 The development of agriculture has historically been closely linked to irrigation. The new climate conditions – higher temperature and extended periods of drought – undeniably increase the water needed for crops, given the extended growing season and more evapotranspiration (i.e. the sum of plant transpiration and soil evaporation). To adapt to the new climate conditions, there are several possibilities: developing irrigation to compensate for additional water needs, improving soil to retain moisture, and switching to crops more suited to the new climate conditions (less water-intensive or winter crops).

57 Existing water bodies (rivers and ground water), rainwater or reuse of recycled water are alternative sources for irrigation. The EU mainly supports irrigation through the EAFRD, which can fund investments in irrigation systems (equipment, networks and reservoirs). In addition, member states can receive support for certain sectors under the European Agricultural Guarantee Fund (fruit and vegetables, olives and olive oil, wine) to finance the modernisation or installation of irrigation equipment and networks.

58 Since 2014, the EU funds have only been able to finance improvements to existing irrigation installations, if potential water savings are demonstrated in advance[31]. But efficiency may not necessarily result in lower water consumption overall, as new irrigation areas and extended periods of drought would require additional water resources. These could potentially offset water savings from modernising existing irrigation systems[32]. For example, between 2010 and 2020, the French Sud region increased its irrigated area by 26 % to 125 700 hectares, and 20 % of its utilised agricultural area is currently irrigated.

59 For the 2023-2027 period, 19 member states plan to support irrigation under the EAFRD, through 52 different interventions. Twenty-one of these will support the expansion of irrigation systems and reservoirs. We identified only three member states (Belgium -Flanders-, Bulgaria and Greece) which plan to use area-based support specifically for more climate-resilient and/or less water-intensive crops or varieties. For

[31] Regulation 1305/2013, article 46, and Regulation 2115/2021, article 74.

[32] Special report 20/2021: "Sustainable water use in agriculture: CAP funds more likely to promote greater rather than more efficient water use", paragraphs 77-78.

example, Greece plans to support the use of drought-resistant crops and switching from water-intensive summer crops to winter crops[33].

60 We reviewed five irrigation projects, and found that:

- three projects increased the irrigated area, which risks increasing overall water consumption. This is not consistent with the aim of reducing water consumption, and therefore these projects were not consistent with the EU and national strategies, in particular for areas under water pressure;

- two projects did not take sufficient account of the medium- and long-term climate change scenarios for rain and water scarcity. Authorising water extraction based on past climate data could lead to inappropriate water use. As an example, one EAFRD project financed a follow-up analysis in connection with 16 reservoirs in Nouvelle-Aquitaine. The construction of the reservoirs was based on a study that only considered the meteorological conditions from 2000 to 2011. It did not take into account climate change in the region, in particular the reduction in water availability. In October 2023, the authorisation to build these reservoirs was withdrawn, as they were excessively large and put increased pressure on bodies of water in the area, given the current and future climate conditions[34];

- none of the projects were conditional on agricultural practices that retain soil moisture in order to reduce water consumption, or on the use of less water-intensive crops.

61 Irrigation investments can help make farms more competitive[35], either through increased or guaranteed production, or through crops with higher added value (but a more water-intensive crops). ***Box 7*** illustrates a potential conflict between increasing competitiveness (growing a profitable crop) and adapting to climate change (decreasing dependency on water, which is becoming scarce).

[33] Eco-scheme in Greece P1-31.1.

[34] Judgments 2101394 and 2102413.

[35] Regulation 2115/2021, article 6(b).

Box 7

Irrigating water-intensive crops versus climate adaptation

Kiwis are a thirsty crop, requiring up to 2 000 m^3 of water per hectare. A new irrigation project in Nouvelle-Aquitaine, France, received €110 064 in EAFRD funding to build a reservoir designed to irrigate five hectares of kiwi vines.

However, the reservoir is filled in winter by pumping water from a river that is already under significant irrigation pressure.

While we understand the competitiveness angle of this project, we consider it maladaptation. The project promotes production methods that are ill-suited to the new climate conditions, rather than switching to less water-intensive crops.

Source: ECA, based on information received by French authorities.

62 Products recognised as having specific qualities linked to traditional expertise or the geographical area of production pose opportunities and challenges regarding adaptation to climate change. These products can be labelled as having a 'protected designation of origin' or 'protected geographical indication'. They can enhance the adaptive capacity of their regions by promoting local, more resilient varieties and breeds, or improving soil health. A different example is the "kiwi de l'Adour", for which irrigation is mandatory. This irrigation requirement fails to acknowledge that the characteristics of a geographical location, such as temperature, precipitation or soil type, may alter due to climate change. Such requirements may slow down climate adaptation in the corresponding areas.

63 A study financed by the Commission[36] notes that "there is an overall emphasis on productive investments into water storage (reservoirs) and irrigation installations and infrastructure as a response to scarcity and drought. Other solutions could have been put further forward, including supporting, and a switch to soil and cropping patterns that are more resilient to water scarcity and drought". Given the longer, more frequent drought periods threatening the EU, and the pressure on bodies of water, we find that irrigation does not provide a sustainable response to agricultural adaptation needs. Long-term solutions such as changing the crop/variety and adapting farming practices to new climate conditions are not sufficiently promoted.

[36] European Commission, Mapping and Analysis of the CAP strategic plans, 2023.

64 Collecting and storing rainwater and reusing recycled wastewater are more sustainable sources of irrigation than over-extracting groundwater. We identified a good practice in Poland where projects using groundwater for irrigation are not financed under the CAP, but only closed reservoirs for rainwater retention can be financed.

Forest management – climate adaptation means forest diversification

65 Climate change has various effects on forests in the EU, impacting ecosystems and biodiversity. Higher temperatures influence the distribution of tree species – some species may disappear, while others can become more dominant. Changes in precipitation patterns affect soil moisture, potentially leading to droughts and an increased risk of forest fires. Heavy rains reduce the stability of the forests and can lead to landslides in mountainous regions. All these stresses weaken trees and make them less resistant to pests and diseases[37].

66 The EU supports forestry through its rural development and cohesion policies. Our sample of 12 projects included seven involving reforestation or forest management and five concerning preparedness for forest fires. We concluded that all the fire-preparedness projects, made the forests more accessible to firefighters or developed an early fire detection system. We found that three of the seven reforestation projects, in Estonia and Nouvelle Aquitaine, not only replanted the forests with a single species, but used the species present before the destruction of the forest. For example:

- a spruce forest destroyed by storms in Estonia was replanted with spruce as before; spruce is known for having low resistance to strong winds[38];
- in Nouvelle-Aquitaine, more than 97 % of the trees used for replanting were maritime pine, which is highly resistant to water scarcity and excess water, but sensitive to forest fires and wind (both expected to increase due to climate change).

[37] "Climate change impacts on plant pathogens, food security and paths forward".

[38] JRC – Picea abies in Europe: distribution, habitat, usage and threats.

These projects did not increase the adaptive capacity of the forests, which face the same risks as before. Therefore, they were not consistent with the EU and national strategies, which stress the need to diversify forests.

67 In Austria, the alpine forest provides protection against natural hazards like avalanches, landslides, rock falls and flash floods. Austria invests in early detection of forest pests and attempts to diversify its forest by introducing more resilient domestic and foreign species. This includes planting suitable species at higher elevations or latitudes based on their optimal climate conditions. ***Box 8*** describes a good-practice reforestation project.

Box 8

Reforestation with mixed species

A monoculture spruce forest in Austria suffered a bark beetle infestation in 2018. The EAFRD provided €27 041 towards replanting the forest with species such as beech, larch, and Douglas fir.

The project aim was to increase climate adaptation, as mixed-species forests are more pest-resistant and climate-resilient than forests with just one species.

Source: ECA – mixed reforestation with conifer (left) and broad-leaved trees (right).

68 Our previous report[39] found that, overall, the 2014-2022 rural development measures did not sufficiently promote the diversity of species for reforestation. In the case of afforestation, minimum environmental requirements imposed the use of tree species that are resilient to climate change or mixed-species planting[40]. However, in practice, these rules were interpreted as allowing clusters of trees of the same species, bringing only limited improvements in biodiversity and climate adaptation[41]. We did not find any reference to a requirement to diversify forests in the 2023-2027 CAP. This means that single-species forests can be funded by the CAP but will not address climate adaptation.

69 In Poland, given the significant pressure on water resources, it is essential to protect natural water retention areas, collect rainwater and build reservoirs in order to adapt to changing climate conditions. Recognising the great potential of forests for water retention[42], Poland used EU funding for this purpose (***Box 9***). We consider that this project helps forests to adapt to the new climate conditions.

[39] Special report 21/2021: "EU funding for biodiversity and climate change in EU forests: positive but limited results".

[40] Commission delegated Regulation No 807/2014, article 6.

[41] Special report 21/2021, paragraphs 56-57.

[42] EEA technical report No 13/2015, Water-retention potential of Europe's forests – A European overview to support natural water-retention measures.

Box 9

Retention ponds in forests

A cohesion project in Poland received €37 million in EU funding to build retention ponds in mountain forests.

The project aimed to reduce the risk of drought by preventing water loss and counteracting erosion. It also strengthened forest ecosystems.

Source: ECA – retention pond in mountain forest, Poland.

Coastal erosion in rural areas – long-term solutions needed

70 In our sample of six projects involving coastal protection, five used nature-based solutions (restoration and protection of sand dunes, ***Box 10***), and one concerned the consolidation of a dyke. We found that all these projects were consistent with the EU and national strategies. As regards their adaptive capacity, we consider that the five projects using nature-based solutions had a positive impact, while the renovation of an existing dyke to its initial dimensions did not offer sufficient added value for climate adaptation.

Box 10

Nature-based solutions to address coastal erosion

Two ERFD projects in France and Poland supported dune restauration (France – €3.6 million, of which €1.8 million EU support; Poland €17.3 million, of which €14.7 million EU support).

We consider these projects good practice, as they promote nature-based solutions. Dunes offer natural sand retention and provide effective protection against coastal erosion.

Pampelonne Beach – France

Hel Peninsula – Poland

Source: ECA.

71 One solution to managing the risk of coastal erosion is beach filling (adding sand). This technique increases beach size and helps maintain seaside tourism. However, beach filling is costly, repetitive, and labour-intensive. We found one project in France that aimed to restore a sand dune and relocate buildings threatened by rising sea levels. Beach refilling accounted for 75 % of expenditure, or €1.8 million over four years, yet only provided a short-term solution. Without a long-term plan to address the rise in sea levels, and definitive dune renaturation, we consider that EU support for beach filling does not provide a sustainable, long-term solution to coastal erosion.

72 The relocation of buildings is a key challenge in managing coastal erosion. In Poland, no construction is legally allowed on dunes, which cover 70 % of the Polish coast. The French Climate Law strengthens the legal provisions to facilitate the relocation of endangered assets. However, property prices continue to be higher close to the sea. In France, at least 50 000 buildings are threatened by coastal erosion[43].This raises the question of who will pay to relocate privately owned buildings threatened by coastal erosion.

Mountainous areas – reduced snow poses challenges for ski tourism

73 We analysed four projects related to mountainous areas, and found that:

- all four were consistent with the EU and national strategies;
- one project to replace an avalanche blaster did not increase adaptive capacity.

74 Recent studies confirm that with global warming of two degrees above pre-industrial levels[44], there would be a very high risk of insufficient snow in around half of European ski resorts. The sole exceptions would be resorts above 2 000 m. Global warming of four degrees above pre-industrial levels would lead to a very high risk of insufficient snow in almost all ski resorts. The tourism industry is tackling the situation with technical measures such as artificial snowmaking. In Austria, for example, around 70 % of ski slopes are equipped with snowmaking systems. However, these systems increase water and energy consumption, and consequently the carbon footprint.

75 Some EU projects received funding for more energy-efficient snow cannons under operational programmes promoting competitiveness. The French Court of Audit recently reported that making artificial snow can potentially lead to maladaptation, as it increases pressure on water use and only offers a short-term solution to address climate change[45].

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[43] Information from the French government, 2022.

[44] Climate change exacerbates snow-water-energy challenges for European ski tourism – 2023.

[45] French Court of Audit – report: "*Les stations de montagne face au changement climatique*", 2024.

76 The regional authorities we interviewed expect diversification to take place when snow conditions become insufficient and operating costs too high for the ski resorts. However, they aim to create incentives to invest in local, “slow” tourism, cycling, hiking, and climbing. These activities are considered to be sustainable and spread tourism more evenly throughout the year, providing a long-term solution for the area.

Conclusions and recommendations

77 We conclude that the EU-level adaptation framework was sound, but there were weaknesses and gaps when it was put into practice. The reporting lacks common indicators for measuring progress toward climate resilience by 2050, so adds little value in terms of tracking progress and supporting future policy decisions. There are challenges in tracking funding related to climate adaptation, making it difficult to assess its impact. In our sample of 36 projects, 19 addressed climate risks effectively, 13 had little or no impact on adaptive capacity and two may result in maladaptation. Due to these weaknesses, there is a risk that EU adaptation policy and action might not keep pace with climate change. This would adversely affect the EU's ability to achieve climate resilience by 2050.

78 We found that the overall EU framework for adaptation policy was sound (paragraphs ***16***-***20***), but the member states sometimes used outdated scientific data. All the member states in our sample had either underestimated the cost of adaptation measures in their strategies or plans, or omitted these costs altogether (paragraphs ***21***-***24***).

79 Furthermore, the national frameworks on adaptation were supported by a risk assessment and were consistent with the EU adaptation strategy. However, we found that the priorities of the regional/sectorial plans sometimes conflicted with those of the EU/national strategies or plans, particularly regarding agriculture and forestry. For example, the objective of increasing the irrigated area could conflict with the objective of reducing water consumption (paragraphs ***25***-***30***).

80 We also found that reporting on adaptation was largely descriptive and did not provide quantifiable data. Reporting was therefore insufficient for an evaluation of progress on climate adaptation in the member states (paragraphs ***31***-***35***).

Recommendation 1 – Improve reporting on climate adaptation

The Commission should:

(a) strengthen the requirement for reporting on adaptation to include common indicators and criteria for measuring progress;

(b) work with the member states to address weaknesses identified in their reporting on climate adaptation.

Timeframe: March 2027

81 The majority of respondents from the 400 municipalities surveyed across the four member states we audited were unaware of climate adaptation strategies and plans. Only 16 % of the municipalities surveyed had established a local adaptation plan, and this limited their ability to tackle climate change (paragraphs ***36***-***40***). The EU provides useful tools, data and knowledge on climate adaptation. However, our survey showed that the vast majority of local communities were unfamiliar with the EU tools and did not use them (paragraphs ***41***-***43***).

Recommendation 2 – Making better use of the EU tools

With the goal of reaching local communities better, the Commission should:

(a) propose practical and simple tools targeting local communities (e.g. local risk assessment, funding options, best practices for adaptation) and make them available in all the official EU languages on the CLIMATE-ADAPT platform;

(b) work with member states to better incorporate and promote the EU tools and initiatives (CLIMATE-ADAPT platform, EU Covenant of Mayors) on national and regional climate adaptation platforms.

Timeframe: December 2026

82 As adaptation is cross-cutting, the relevant EU funding is spread across several other EU policies such as agriculture, cohesion and research. As a result, it is generally difficult to identify which projects are relevant for climate adaptation. This is because climate adaptation objectives must coexist with other objectives such as competitiveness or regional development, potentially leading to maladaptation. Under the research budget, the Commission dedicated a specific and ambitious EU Mission to climate adaptation. We noted that good progress had been made in this regard, but

delivery of the Mission goals was threatened by the lack of clarity on securing the additional funds needed (paragraphs ***44***-***52***).

83 We concluded that the majority (53 %) of our 36 selected projects addressed climate risks effectively, but 42 % had little or no impact on adaptive capacity. For the remaining projects it was too early to conclude (see paragraph ***53***). We identified projects concerning flooding, coastal erosion and irrigation that only used historical data rather than future climate scenarios. We also noted that, under the CAP, irrigation was the preferred solution for adapting agricultural practices, potentially leading to maladaptation (see paragraphs ***54***-***64***). We noted good forest management practices in terms of increasing climate resilience via retention ponds and forest diversification. However, single-species planting was still supported (see paragraphs ***65***-***69***). Nature-based solutions had a positive impact on coastal erosion. We concluded that expensive but short-term solutions such as beach filling did not add much value without long-term considerations such as relocation (see paragraphs ***70***-***72***). This also applied to mountainous areas, where snow cannons increase pressure on water use and only offer a short-term solution to address climate change (paragraphs ***73***-***76***).

Recommendation 3 – Future-proofing EU funding for climate adaptation

The Commission should:

(a) provide guidance on actions relevant to climate adaptation and provide member states with examples of projects leading to maladaptation;

(b) strengthen the promotion of long-term solutions for climate-adaptation for all relevant EU-funded projects and assess the need for eligibility conditions that take account of future climate conditions;

(c) propose climate-proofing guidelines for agriculture investments and assess the need for new eligibility conditions for forestry measures to avoid funding single-species forests.

Timeframe: December 2026

This report was adopted by Chamber I, headed by Ms Joëlle Elvinger, Member of the Court of Auditors, in Luxembourg at its meeting of 3 July 2024.

For the Court of Auditors

Tony Murphy
President

Annex

Climate adaptation survey

The main objective of our survey was to gather representative, up-to-date information on municipalities' exposure to extreme events related to climate change, what they need in order to adapt to the impacts of these events, the strategies they already use, and their knowledge of regional, national and EU strategies, plans and tools to facilitate adaptation.

How we conducted the survey

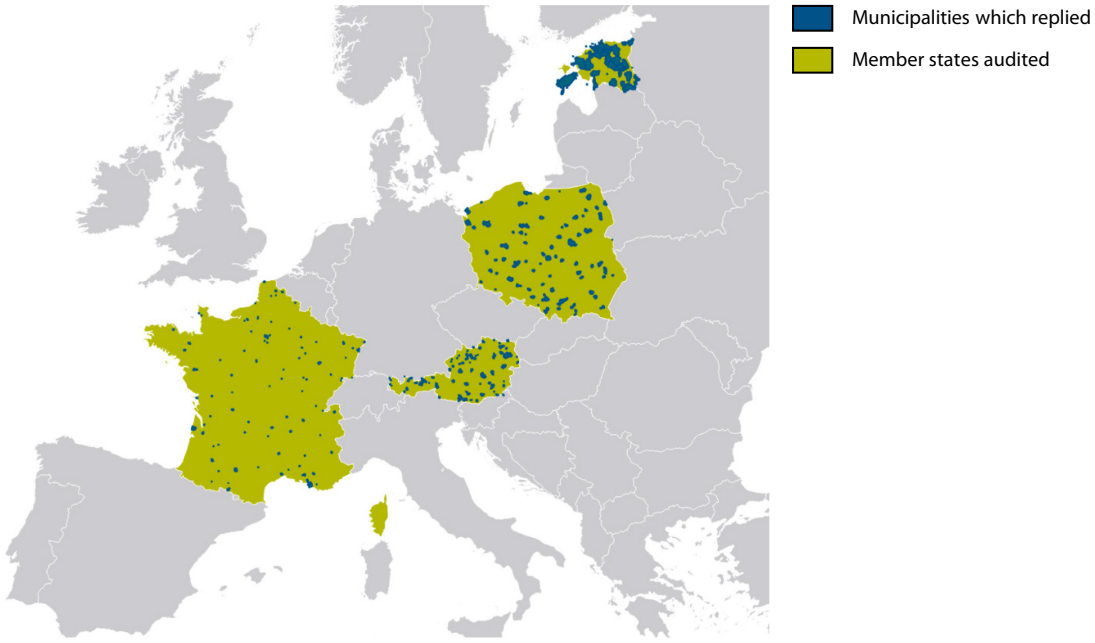
We conducted the survey between September and December 2023. The questionnaire was sent to 400 municipalities located in the four different member states we audited: Austria (113), Estonia (56), France (117) and Poland (114). The sample size was large enough to be nationally representative on the condition that at least 75 % of the municipalities in each member state replied to the survey. The municipalities were selected randomly.

The sample was organised into five clusters of municipalities based on population size: 1) large – more than 200 000 inhabitants; 2) medium – between 40 000 and 200 000 inhabitants; 3) small – between 5 000 and 40 000 inhabitants; 4) very small – between 200 and 5 000 inhabitants; 5) tiny – fewer than 200 inhabitants. The capital cities of all four member states audited were included in the sample.

Response rate

We received a total of 318 replies, i.e. a response rate of 79.5 % (Austria: 80 %; Estonia: 75 %; France: 82 %; Poland: 80 %). The results of this survey are statistically representative. ***Figure 13*** shows the municipalities which replied to the survey.

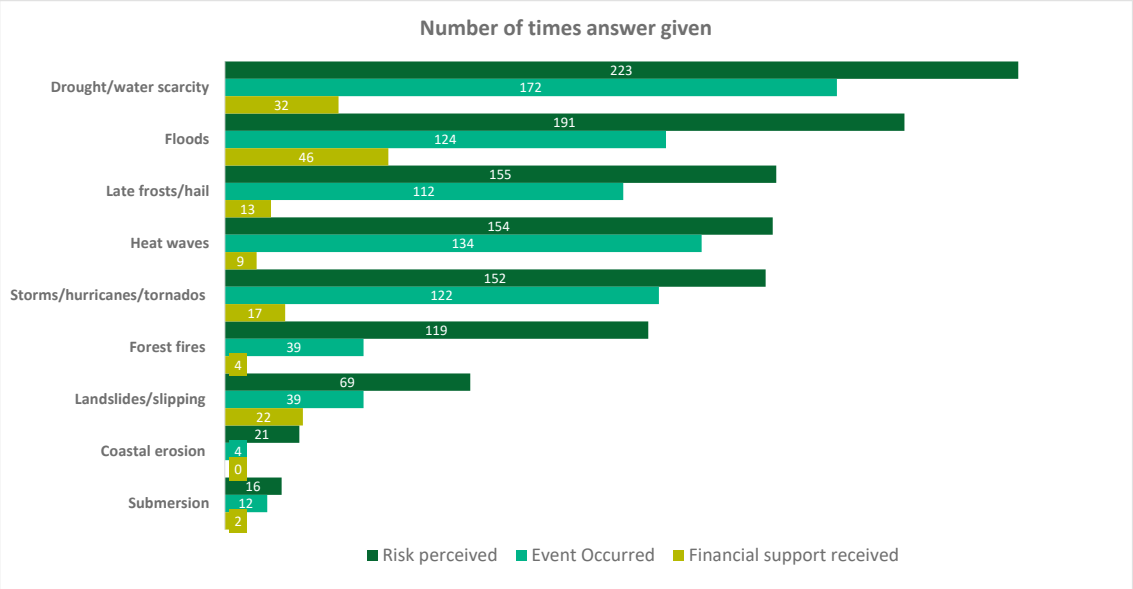
Figure 13 – Map showing the municipalities which replied to the survey



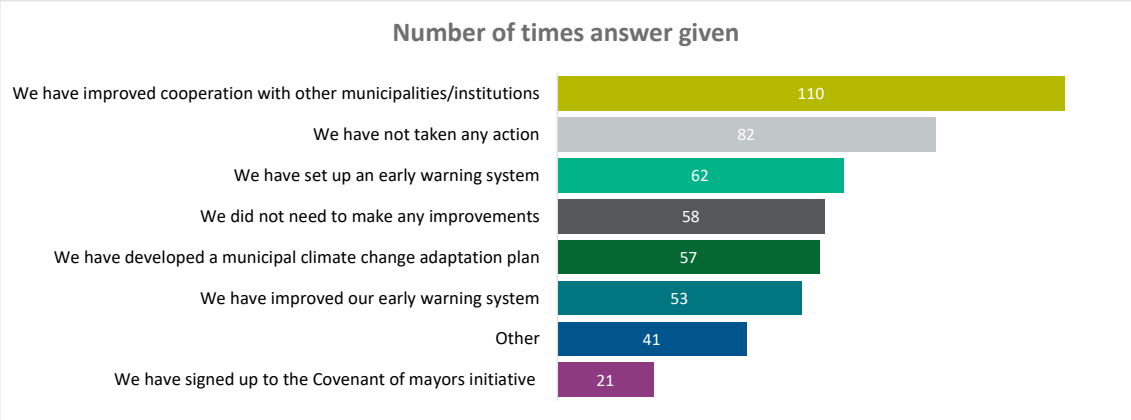
Source: ECA.

Main survey questions and results

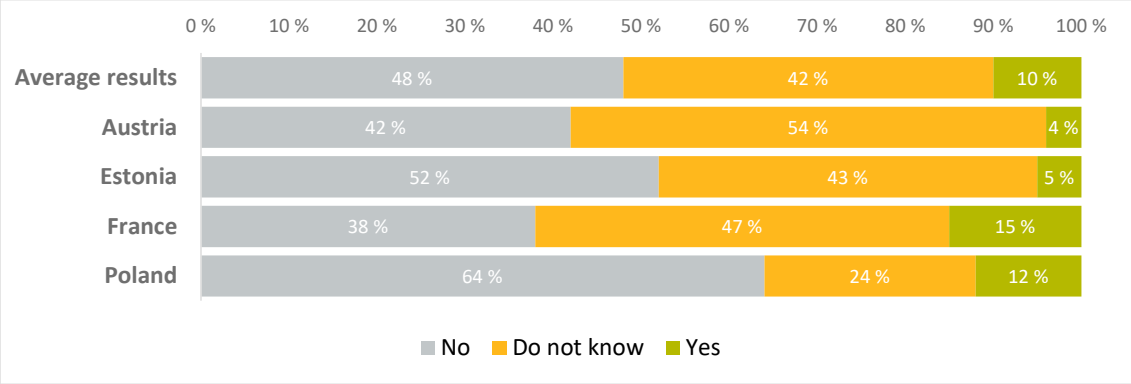
(1) Is your municipality exposed to climate-related events/risks? Has your municipality been exposed to climate-related extreme events in the past 5 years? If so, did your municipality receive public financial support?



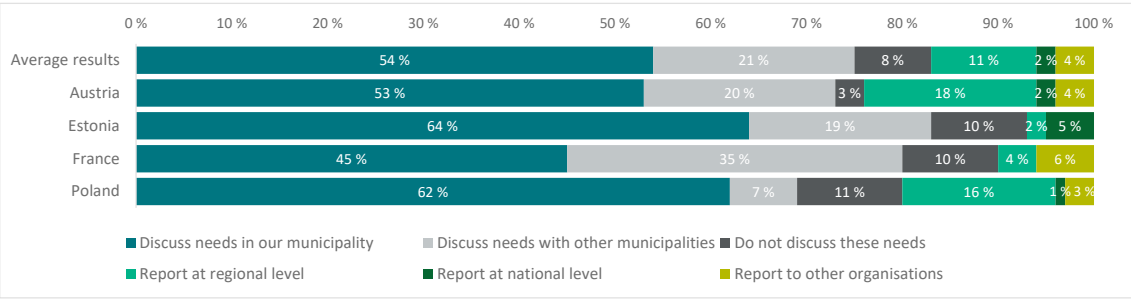
(2) Have you taken any action since these extreme events occurred?



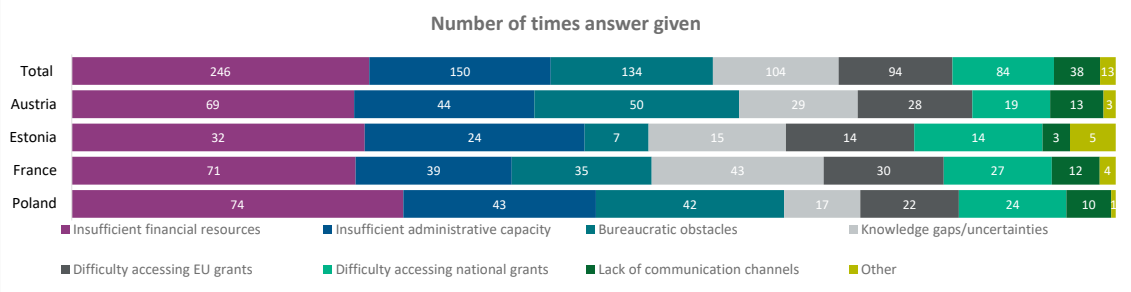
(3) Is your municipality part of the EU Covenant of Mayors initiative?



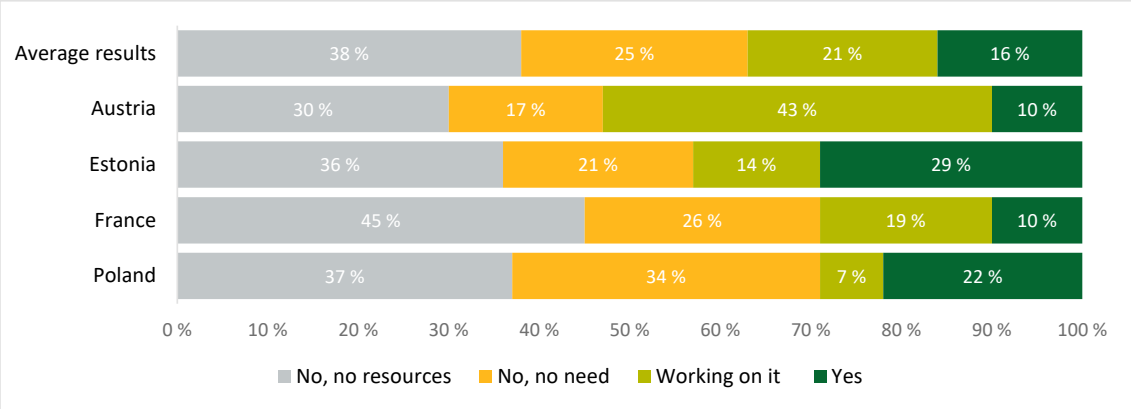
(4) How do you address local issues related to climate adaptation needs?



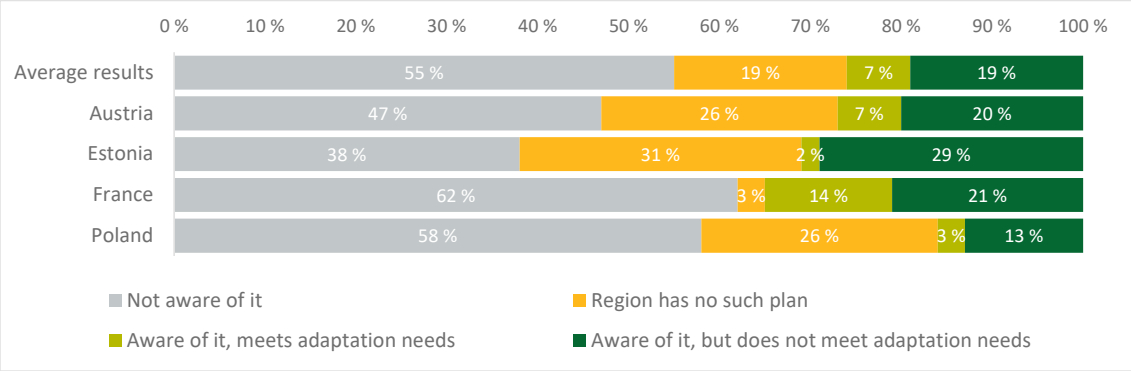
(5) What obstacles does your municipality face in meeting climate adaptation needs?



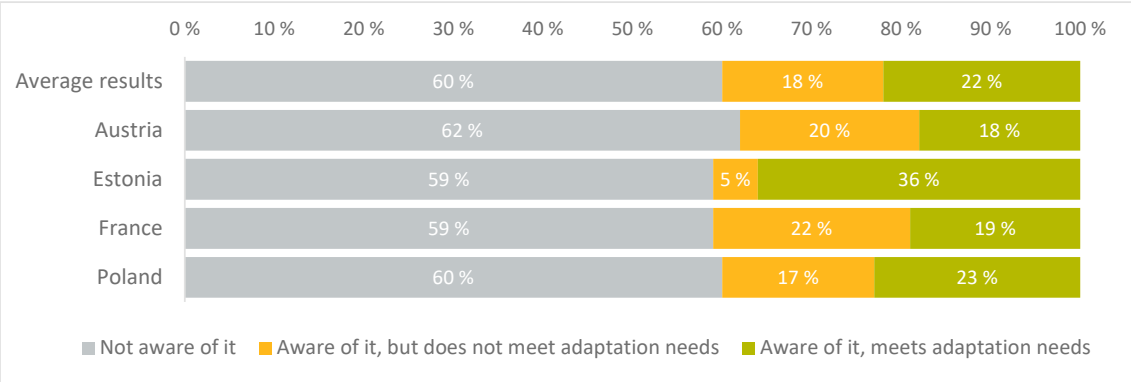
(6) Does your municipality have a local adaptation plan?



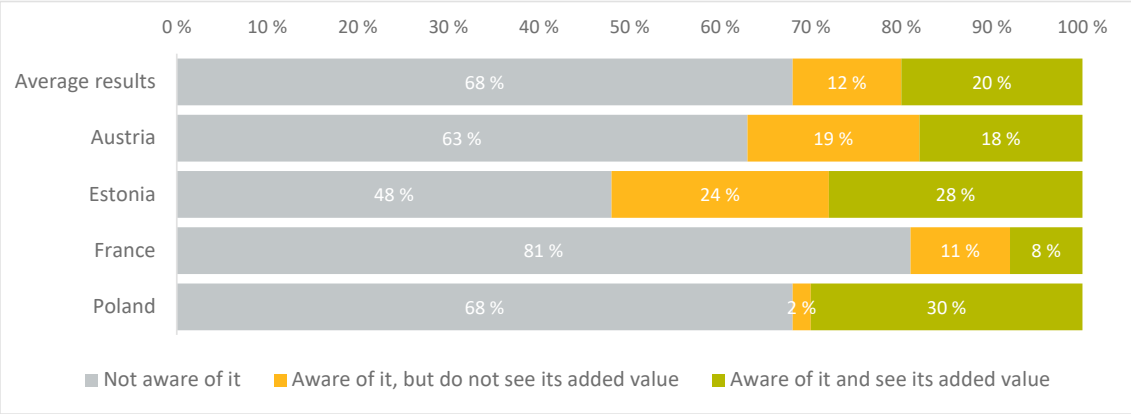
(7) (a) Is your municipality aware of your region's adaptation plan, and does this plan meet your municipality's adaptation needs?



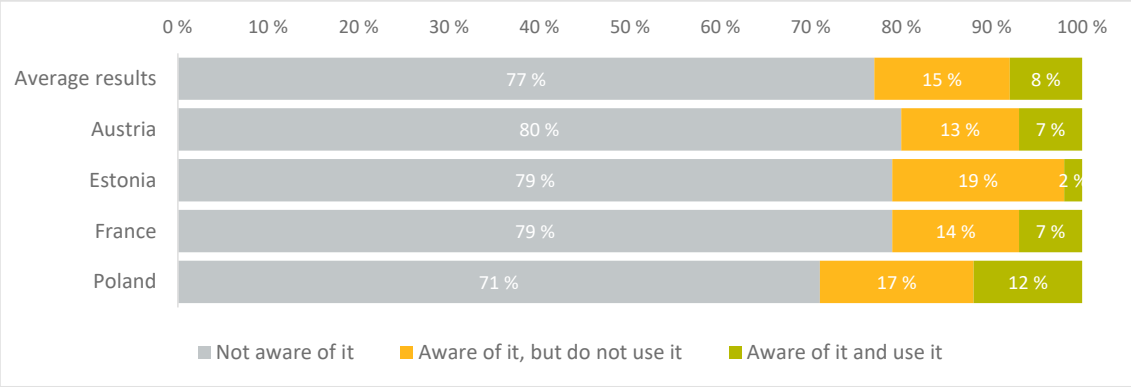
(b) Is your municipality aware of your country's adaptation plan?



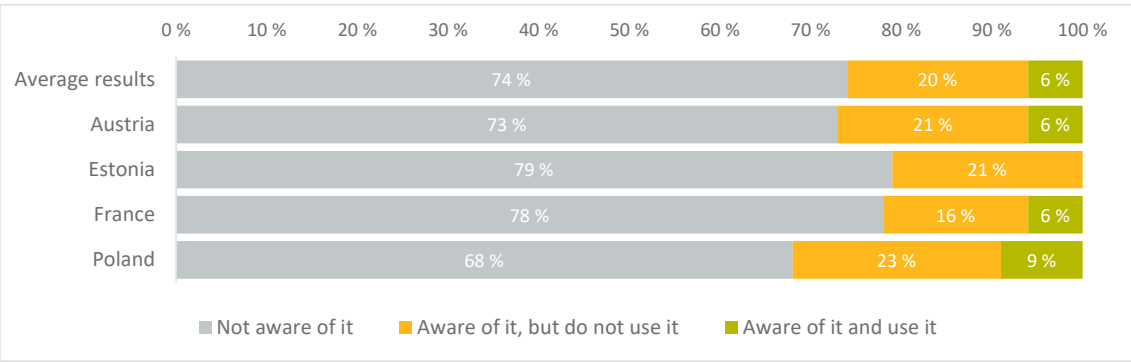
(c) Is your municipality aware of the EU strategy for adaptation, and do you see its added value?



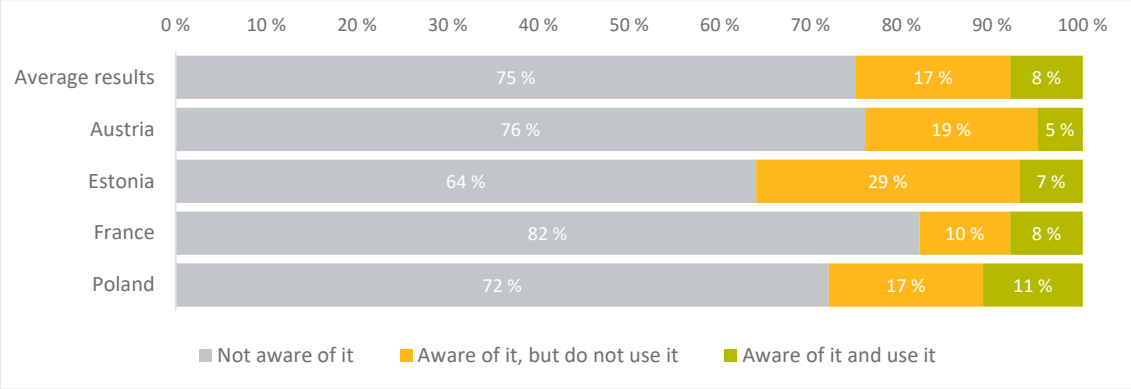
(8) (a) Is your municipality aware of the Climate-ADAPT platform, and does your municipality use it?



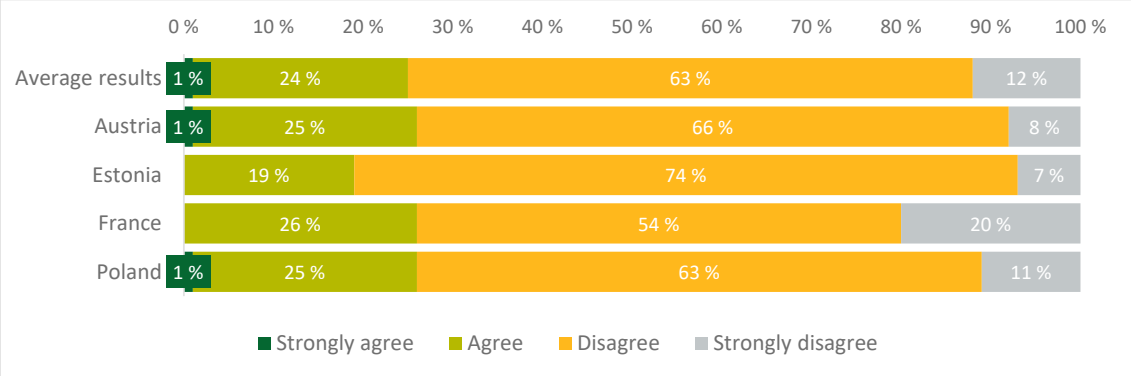
(b) Is your municipality aware of Copernicus, and does your municipality use it?



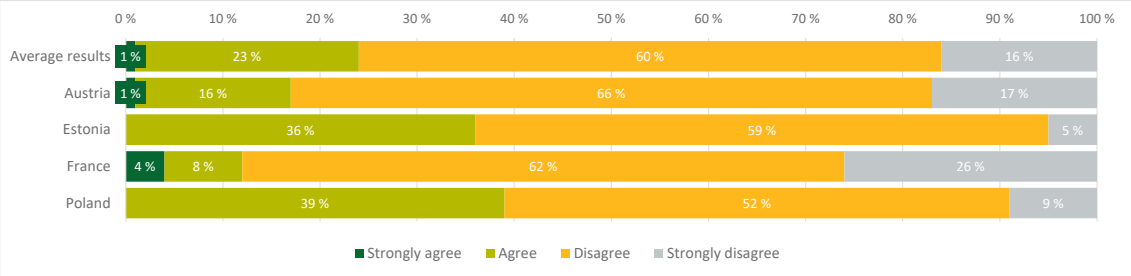
(c) Is your municipality aware of the EU Mission on Adaptation to Climate Change portal, and does your municipality use it?



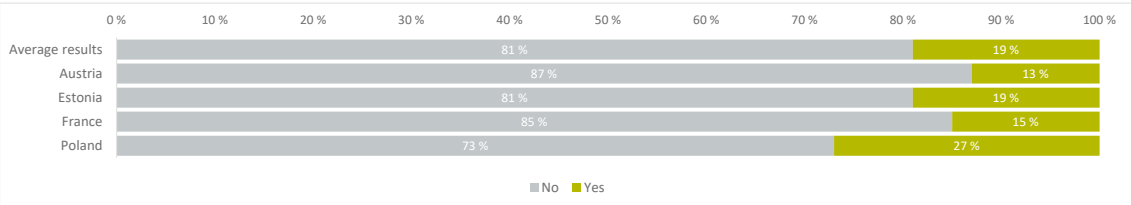
(9) "Public financial support for adaptation measures/projects is satisfactory and meets our needs." Do you agree?



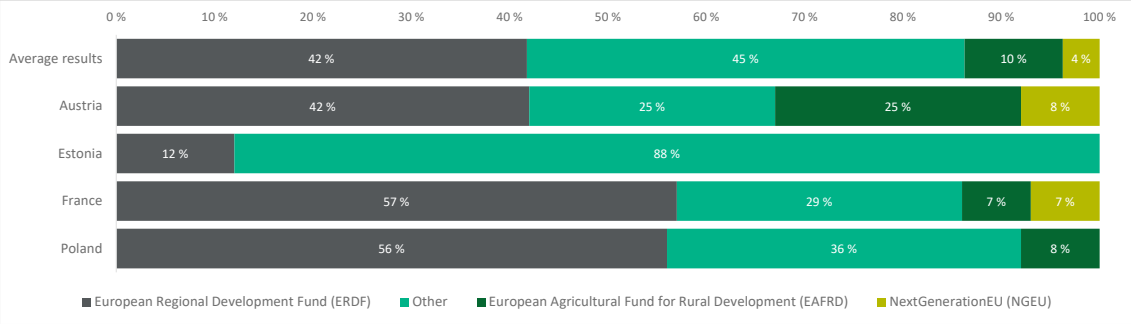
(10) "Information available on EU funding for climate adaptation projects is sufficient." Do you agree?



(11) (a) Has your municipality received EU funds for an adaptation measure/project in the past 5 years?



(b) If so, from which source?



Abbreviations

CAP: Common agricultural policy

EAFRD: European Agricultural Fund for Rural Development

EEA: European Environment Agency

ERDF: European Regional Development Fund

IPCC: Intergovernmental Panel on Climate Change

JRC: Joint Research Centre

LEADER: *Liaison entre actions de développement de l'économie rurale* – Links between actions for the development of the rural economy

NAP: National adaptation plan

NAS: National adaptation strategy

RRF: Recovery and Resilience Facility

Glossary

Adaptation to climate change: adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC Fourth Assessment Report (AR4), 2007).

Adaptive capacity: potential or ability of a system, region, or community to adapt to the effects or impacts of climate change.

Climate-ADAPT platform: a platform for collecting and sharing information on climate change adaptation in Europe.

Climate change: any change in climate over time, whether due to natural variability or as a result of human activity (IPCC AR4, 2007).

Climate resilience: ability to prepare for, recover from, and adapt to the impacts of climate change.

Copernicus: the EU's Earth observation and monitoring system, which collects and processes data from satellites and Earth-based sensors to provide environmental and security information.

Horizon 2020: the EU's research and innovation funding programme for the 2014-2020 period.

Horizon Europe: the EU's research and innovation funding programme for the 2021-2027 period.

IPCC (Intergovernmental Panel on Climate Change): the United Nations body, that prepares comprehensive assessment reports about the state of scientific, technical and socio-economic knowledge of climate change.

LIFE: financing instrument supporting implementation of the EU's environmental and climate policy through co-financing of projects in member states.

Nature-based solutions: solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience (EC).

Replies of the Commission

https://www.eca.europa.eu/en/publications/sr-2024-15

Timeline

https://www.eca.europa.eu/en/publications/sr-2024-15

Audit team

The ECA's special reports set out the results of its audits of EU policies and programmes, or of management-related topics from specific budgetary areas. The ECA selects and designs these audit tasks to be of maximum impact by considering the risks to performance or compliance, the level of income or spending involved, forthcoming developments and political and public interest.

This performance audit was carried out by Audit Chamber I – Sustainable use of natural resources, headed by ECA Member Joëlle Elvinger. The audit was led by ECA Member Klaus-Heiner Lehne, supported by Thomas Arntz, Head of Private Office and Marc-Oliver Heidkamp, Private Office Attaché; Ramona Bortnowschi, Principal Manager; Céline Ollier, Head of Task; Angelika Zych, Deputy Head of Task, Irina Flat, Liia Laanes and Jarosław Śmigiel, Auditors; Wesley Reverdy, Trainee; Alexandra Damir-Bînzaru and Marika Meisenzahl provided graphical support.

From left to right: Irina Flat, Liia Laanes, Ramona Bortnowschi, Céline Ollier, Thomas Arntz, Klaus-Heiner Lehne, Marc-Oliver Heidkamp, Wesley Reverdy, Jarosław Śmigiel, Angelika Zych.

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Extreme climate events such as heatwaves, drought and flooding are increasing. There is an urgent need to adapt to these climate conditions. We assessed the EU's climate adaptation framework and how a selection of EU adaptation projects addressed the impacts of climate change. We found that the overall EU framework for adaptation policy was sound but there were weaknesses and gaps in its implementation. While most of the projects we audited addressed climate risks effectively, some had little or no impact on increasing adaptive capacity and a few may result in maladaptation. We make recommendations to improve reporting and knowledge-sharing on climate adaptation and to ensure that all relevant EU-funded projects are adapted to current and future climate conditions.

ECA special report pursuant to Article 287(4), second subparagraph, TFEU.

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