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Assessment of progress on climate adaptation in the individual Member States according to the European Climate Law

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Introduction

The 2021 EU Climate Law[1] places, for the first time, a legal obligation on the European Union and its Member States regarding adaptation to climate change (Article 5(1)). The EU Climate Law also requires the Commission to assess the consistency of relevant national measures with ensuring progress towards the climate adaptation objective it defines (i.e. continuous progress in enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change) (Article 7(1)(b)). The present assessment is part of a package by which the Commission responds to that requirement. The package consists of:

1. a **high-level summary of adaptation progress** in the Commission's Climate Action Progress Report published in October 2023 (Chapter 5) [2], accompanied by:
    a. staff working document reporting on the implementation of the 2021 EU Adaptation Strategy [3]; and
    b. an overview of collective progress in the EU Member States, included in a staff working document on technical information supporting the Climate Action Progress Report [4];
2. this present staff working document, which assesses **adaptation progress in the individual Member States**, complementing the overview referred to in point 1(b);
3. **country-specific recommendations** on adaptation policies provided by the Commission to the individual Member States under Article 7(2) of the European Climate Law. These have been formulated on the basis of this staff working document. They are issued jointly with the Commission's recommendations on the draft updated national energy and climate plans, and will be made available alongside this document [5].

The package used as its main source the reporting by the Member States on their national adaptation policies under Article 19 of the Governance Regulation[6] in March 2021 and March

[1] Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), Official Journal of the European Union, L 243, 9 July 2021 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R1119

[2] Report from the Commission to the European Parliament and the Council EU Climate Action Progress Report 2023, COM(2023)653. https://eur-lex.europa.eu/legal-content/MT/TXT/?uri=COM:2023:653:FIN

[3] Commission Staff Working Document Report on the implementation of the EU strategy on adaptation to climate change Accompanying the document Report from the Commission to the European Parliament and the Council EU Climate Action Progress Report 2023, SWD(2023)338. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023SC0338&qid=1700578834458

[4] Commission Staff Working Document Technical information Accompanying the document Report from the Commission to the European Parliament and the Council EU Climate Action Progress Report 2023, SWD(2023)339, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52023SC0339

[5] C(2023) 9600 – 9616 and C(2023) 9618 - 9627

[6] Regulation (EU) 2018/1999 of the European Parliament and the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU,

2023, comparing them in order to identify the extent of progress. Other sources were also used, as mandated by the European Climate Law (for example, research conducted by the Commission[7]; reports by the European Environment Agency; Intergovernmental Panel on Climate Change resources; national adaptation strategies; and the Member State's national risk assessments under the Union Civil Protection Mechanism). The assessment was also an occasion to assess the extent to which the guidance provided in the Commission's July 2023 guidelines on Member States' adaptation strategies and plans [8] already represented practice in the Member States.

The assessment methodology was coordinated with the Member States' experts in the Climate Change Committee's Working Group on Adaptation to Climate Change. The European Climate Law sets an obligation on Member States (as on the relevant Union institutions) in Article 5 to ensure continuous progress on adaptation. The focus of the current assessment is therefore not the state of play of adaptation policies and measures in the Member States today, but whether progress has been made. In order to assess such progress, the two instances of reporting under Article 19 of the Governance Regulation in 2021 and 2023 constitute a comparable basis, as they followed the requirements of the same implementing act setting out the structure and format of the reporting [9]. This assessment therefore focuses on the progress made in national adaptation policies in the last two years in the different steps of the adaptation policy cycle around which the Member State reporting is organised, according to the implementing act. Most of the questions examined in the different sections of the assessment are designed to check the progress made, while a minority target the current features of national adaptation policies, such as the completeness of the range of climate hazards considered in a context of fast-rising occurrences of heatwaves, droughts, storms and floods.

In March 2023, the Member States also reported, under Article 17 of the Governance Regulation, on how adaptation measures supported the achievement of Energy Union objectives in their national energy and climate plans (NECPs), notably in the areas of decarbonisation, energy efficiency, energy security, internal energy market and research. The Member States were also invited to submit draft updated NECPs by 30 June 2023 under Article 14 of the Governance Regulation. The adaptation measures supporting the energy and climate-mitigation areas covered

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2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council, Official Journal of the European Union, L 328, 21 December 2018, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.328.01.0001.01.ENG

[7] This includes, in particular, the INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC) https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool and the JRC's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up analysis) https://joint-research-centre.ec.europa.eu/peseta-projects_en.

[8] https://climate.ec.europa.eu/system/files/2023-07/Guidelines%20on%20MS%20adaptation%20strategies%20and%20plans.pdf

[9] Commission Implementing Regulation (EU) 2020/1208 of 7 August 2020 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) 2018/1999 of the European Parliament and of the Council and repealing Commission Implementing Regulation (EU) No 749/2014, Official Journal of the European Union, L 278, 26 August 2020, .https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R1208

by the Energy Union are subject to (i) a high-level progress assessment in this document in the context of the national adaptation policies that include them; and (ii) more targeted assessments in dedicated staff working documents on the draft updated NECPs that accompany the joint Commission recommendations.

The Commission previously evaluated Member State adaptation policies before the adoption of the European Climate Law. This was in connection with the evaluation of the 2013 EU Adaptation Strategy in 2018, which aimed to provide a snapshot of the situation in that year.

Looking into the future, this staff working document should also inform the Commission's planned Communication on climate risk preparedness, complementing the findings of the planned European climate risk assessment in March 2024.

The assessments of adaptation progress in the Member States have generated 10 main findings.

1. The most observed acute climate hazards in the EU include heatwaves, droughts, floods, heavy rainfall and wildfires. Changing temperature, rainfall patterns, sea-level rise and hydrological variability are frequently considered as chronic hazards.
2. Health, agriculture, forestry, biodiversity, energy, and water management are reported by Member States as being among the sectors most affected by climate threats in the EU.
3. Almost all Member States have conducted climate risk assessments (14 have been recently updated and the others will be updated in the future). However, robust comprehensive climate risk assessments across more than five sectors are an exception rather than a standard rule.
4. All Member States have national adaptation strategies and/or plans, many of which have been recently renewed or are currently under revision.
5. Governance structures and mechanisms for adaptation are in place, with a large degree of diversity in institutional arrangements. Eight Member States have embedded elements of their adaptation policy systems in their domestic legal frameworks. The prime minister's office or another body with strong political authority across all sectoral policies concerned is rarely involved in the management of interministerial coordination on adaptation.
6. International and transnational cooperation on adaptation has progressed in two thirds of the Member States.
7. Member States are making progress in implementing adaptation measures, but significant gaps exist in assessing the investment needs for adaptation by Member States (as at the EU level), and most countries lack dedicated budgets for financing these actions[10].

[10] EU funding can provide an important source of investment for climate adaptation in EU Member States. The planned amount of EU investments under the Cohesion Policy 2021-2027 related to climate adaptation, following the definitions in the Common Provision Regulation, is EUR 12.9 billion, adding up to EUR 17. 3 billion with national contributions also included. The Recovery and Resilience Facility (up to EUR 723 billion) includes a requirement to contribute to the green transition pillar, and the funding dedicated to adaptation in national recovery and resilience plans amounts to about 2% of the overall committed envelope (5% of the climate related spending). Further important EU funding streams include the European Agricultural Fund for Rural Development, the LIFE programme, Horizon Europe, InvestEU and others.

8. Nature-based solutions are included only to a limited extent at the strategic level and through the policy documents, especially in sectoral strategies and plans. This may hamper their more systemic use and deployment for climate adaptation.
9. The impact of adaptation measures on reducing vulnerabilities and risks is not widely measured and remains conceptually and practically challenging. However, good examples of progress exist both for measurement of vulnerabilities and risks and for impactful nature-based solutions. Monitoring, reporting and evaluation mechanisms are missing in several Member States.
10. Progress remains unclear with regard to adaptive capacity, and there is therefore a need for more evidence-based harmonisation of criteria at the EU level.

Table 1 provides a snapshot of the findings for each Member State. The results are arranged according to (i) questions for which the 2021 and 2023 situations can be compared and progress can be assessed (these questions are highlighted with a light-green background); and (ii) questions that seek to confirm the presence or absence of important parameters.

It is important to note that any change between 2021 and 2023 is not in itself informative about the level of maturity of the adaptation frameworks, policies or implementation in a Member State. Some Member States were already relatively well developed in 2021 and saw little change since, thereby marked with no progress, while other Member States started from a less mature base but have made progress in filling gaps in the last 2 years. The assessments in the chapters specific to individual Member States provide a broader view (to the extent that information is available) of the level of development of adaptation in each Member State.

Overview of progress made since 2021 for a set of adaptation policy indicators

	Assessment question	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK
Section 1.1, 1.2: Circumstances, Monitoring and Modelling	1. Climate monitoring and modelling framework	↑	↑	•	•	•	↑	↗	•	↗	↗	↑	↑	↑	•	↑	↗	↑	•	↗	↗	↗	↑	↑	↗	↑	•	↑
Section 1.3 - Assessment of climate impacts, vulnerability and risks, including adaptive capacity	2. Agriculture, food and water as key affected sectors	Y	P	Y	P	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	Y	Y	P	Y	P	Y	Y	Y	Y	Y	Y	P	Y
	3. Changes in the reported vulnerabilities and risks	↑	↑	•	•	•	↑	↑	•	•	•	↑	↑	•	↑	•	•	↑	↑	•	↑	↑	•	↑	•	↑	↑	•
	4. Risks from INFORM tool identified	Y	Y	Y	N	Y	Y	Y	Y	P	Y	Y	P	Y	Y	Y	Y	P	Y	Y	N	Y	Y	Y	Y	Y	P	Y
	4a. Heatwaves identified as future hazard	Y	Y	P	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. National governance structures in place	Y	Y	P	P	P	Y	P	P	Y	Y	Y	Y	P	P	Y	?	Y	Y	P	P	Y	Y	Y	Y	P	Y	Y
	6. National governance structures evolve	↗	↗	•	•	•	↑	•	↑	↑	↗	•	↑	↗	↗	↑	Y	•	•	↗	↗	↗	•	↑	↗	•	↗	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Adaptation efforts correlate with identified risks	?	Y	P	P	Y	?	P	P	Y	Y	Y	Y	P	P	Y	P	Y	P	P	P	Y	Y	?	Y	Y	P	P
	8. Decrease in 2023 challenges, gaps & barriers	•	↑	•	•	•	•	↗	•	•	•	•	•	↗	•	•	↑	•	•	•	•	•	↗	•	•	•	•	↗
	9. New efforts aligned with risks in strategies	↗	↗	↑	•	•	↗	↑	•	•	↑	↑	•	↑	↗	↑	•	↑	•	↗	↗	↗	•	•	•	•	↑	↑
	10. Nature-based solutions in national plans	Y	Y	Y	P	P	P	N	N	N	N	Y	P	P	P	N	?	?	P	P	P	P	Y	P	N	N	P	P
	11. Integration of adaptation in sectoral policies	↗	↑	?	?	?	↗	↑	↑	↑	↑	↑	↑	↑	•	↑	•	•	↑	↑	?	↑	↑	↑	↑	•	↗	↑
	12. Engagement with vulnerable stakeholders	↗	↑	↗	•	↑	?	?	↑	↑	•	↑	↑	•	↑	↑	•	•	↑	•	•	•	↑	•	•	↑	•	•
	13. Engagement with private sector	↗	↑	↑	•	•	•	↗	↗	•	•	↑	↑	•	•	?	•	•	•	•	↑	•	↑	•	•	•	•	•
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Monitoring mechanisms improvements	↑	•	•	?	↑	↑	•	•	↑	↑	↑	•	↑	•	•	•	•	•	↑	•	↑	•	↑	•	↑	↗	↑
	15. Implementation of adaptation measures	↑	↑	↑	?	•	?	↑	↗	↑	↑	↑	↑	?	↑	↑	•	•	•	↑	?	↑	?	↑	•	↑	↗	↑
	16. Reduction of climate impacts, vulnerabilities, risks	?	↑	↗	↗	↗	↗	↗	?	?	?	↑	•	↗	•	?	?	?	•	↑	•	?	↑	•	?	↗	?	↑
	17. Increase adaptive capacity	↗	↑	↗	↗	↑	↗	↑	?	?	↑	↑	↑	?	•	↑	↑	↑	•	↑	?	?	↑	↑	•	↑	?	?
	18. Meeting adaptation priorities	↗	?	↗	↑	↑	?	↑	?	?	?	↑	•	↑	↑	↑	↑	↑	•	↑	?	?	↑	↑	•	↑	↗	↑
	19. Addressing barriers to adaptation	↗	?	↗	?	↑	•	↑	?	•	↑	↑	↑	?	•	↑	↑	?	•	?	?	?	↑	?	•	↑	•	?
	20. Reviewing/updating vulnerability assessments	↑	?	↑	•	↑	↑	?	•	↑	↑	↑	↑	?	•	↑	•	↑	•	•	↑	•	↑	•	↑	↑	•	?
	21. Reviewing/updating national adaptation policies	↑	↑	↑	•	↑	?	↑	↑	↑	↑	↑	↑	↑	↑	↑	?	↑	•	•	↑	↑	↑	↑	•	↑	•	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. New 'good practices & lessons'	↑	•	•	?	↗	↑	•	?	↑	•	•	•	•	•	↑	•	↑	•	?	•	•	↑	↑	?	•	?	•
	23. New synergies with international frameworks	•	•	•	•	•	•	↑	↑	•	↑	↑	•	•	•	↑	•	↑	↑	•	•	•	↗	↑	•	•	•	•
	24. International cooperation progress	↑	↑	•	?	↑	?	↑	↑	↗	↑	↑	↑	•	↑	↑	•	•	•	↑	↑	•	↑	↑	↑	↑	•	•
Section 6 - Subnational level information	25. Subnational governance structures	Y	Y	N	P	P	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	N	P	N	Y	Y	Y	Y	Y	Y	Y
	26. New key efforts in subnational actions	↑	↗	•	•	•	↑	•	↑	↑	↑	↗	↗	↑	•	↑	•	↑	↗	↗	•	•	↑	•	↑	•	•	↑
	27. Engagement with stakeholders	↑	↑	?	•	↗	↗	↑	↑	↑	↑	↑	↑	↗	↑	↑	•	↑	?	•	•	↑	↑	?	↑	↑	•	↑
	28. Reviewing/updating subnational adaptation plans	↑	↑	?	•	?	↑	•	↑	↑	↑	↑	↑	?	?	↑	•	?	•	?	•	?	↑	?	↑	↑	•	?
	29. Sub-national level cooperation	↑	↑	↗	?	↑	↑	↑	↑	•	↑	↑	↑	↑	•	↑	?	↑	↑	•	•	•	↑	?	↑	↑	↑	↑

Full questions assessed in the table above

SECTION 1.1, 1.2: NATIONAL CIRCUMSTANCES RELEVANT TO ADAPTATION ACTIONS AND CLIMATE MONITORING AND MODELLING FRAMEWORK
1. Have there been any changes to the climate monitoring and modelling framework since 2021?
SECTION 1.3: ASSESSMENT OF CLIMATE IMPACTS, VULNERABILITY AND RISKS, INCLUDING ADAPTIVE CAPACITY
2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?
3. Have there been any changes to the reported vulnerabilities and risks since 2021?
4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?
4a. Are heatwaves identified as a future climate hazard by the Member State?
SECTION 2: LEGAL AND POLICY FRAMEWORKS AND INSTITUTIONAL ARRANGEMENTS
5. Are there relevant national governance structures in place to support adaptation actions?
6. Have there been any changes to the national governance structures since 2021?
SECTION 3: ADAPTATION STRATEGIES, POLICIES, PLANS AND GOALS
7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?
8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?
9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?
10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?
11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?
12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?
13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?
SECTION 4: MONITORING AND EVALUATION OF ADAPTATION ACTIONS AND PROCESSES
14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?
15. Has progress been made in the implementation of adaptation measures?
16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?
17. Has progress been made towards increasing adaptive capacity?

18. Has progress been made in meeting adaptation priorities?
19. Has progress been made in addressing barriers to adaptation?
20. Has progress been made in reviewing and updating vulnerability and risk assessments?
21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?
SECTION 5: COOPERATION, GOOD PRACTICES, SYNERGIES, EXPERIENCE AND LESSONS LEARNED IN THE FIELD OF ADAPTATION
22. Are there any new 'good practices and lessons learnt' compared to 2021?
23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?
24. Has progress been made with regards to cooperation?
SECTION 6 - SUBNATIONAL LEVEL INFORMATION
25. Are relevant subnational governance structures in place to support adaptation actions?
26. Are there any new key efforts identified in subnational strategies, polices, plans and efforts?
27. Has progress been made in engaging with stakeholders in relation to adaptation policy?
28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?
29. Has progress been made with regards to cooperation at a subnational level?

Assessment of progress on climate adaptation in Austria according to the European Climate Law

Summary

Austria's proactive approach to climate change adaptation is evident from the reports received in 2023.

The country has started to update its climate monitoring and modelling framework. It is currently revising its national assessment of climate vulnerabilities, impacts and risks which will be published in 2026. These updates are feeding into a new Austrian adaptation strategy and national action plan that are also expected to be published by the first half of 2024.

Complementing the federal governance structures, Austria's effective coordination mechanisms include regional and local initiatives, such as the funding programme *Klimawandel-Anpassungsmodellregionen (*KLAR!), the natural hazard and climate change check for municipalities, the climate change adaptation network for practitioners, and the Austrian platform of the United Nations International Disaster Risk Reduction Programme, with a high level of activity and good achievements in recent years.

Climate adaptation has been integrated into sectoral policies and initiatives to varying degrees. While awareness-raising, capacity building and other support activities take place in many areas, there are also highly climate risk-prone sectors where more work is still needed and partly already ongoing.

Areas for improvement include aligning priorities with vulnerabilities and risks; addressing identified gaps; promoting nature-based solutions; providing specific information on reducing climate change impacts, vulnerabilities, and risks; and involving the private sector.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to adaptation actions, the climate-monitoring and modelling framework, and climate risk and vulnerability assessments

1. Climate monitoring and modelling framework

According to the reported information, the overall national climate monitoring and modelling framework (ÖKS15), which is based on 13 regional climate models and two greenhouse gas scenarios continues to be in use. 2023 saw the start of a broad, interdisciplinary and participatory process to update the Austrian climate scenarios by 2026 (ÖKS26).

The second progress report on Austria's adaptation strategy and action plan from 2021 stresses that climate change is increasingly affecting the country, and that the associated damages and losses are projected to rise from about EUR 2 billion per year currently to at least EUR 3-6 billion in 2030 and EUR 6-12 billion by 2050.

Austria has published an annual climate status report since 2017 with the latest report from 2022.

2-3-4. Changes to the reported vulnerabilities and risks since 2021

Austria is currently in the process of updating its national climate risk assessment in 2023. The country's research community has worked on an IPCC-style initiative to set out in more detail the structural changes required for both climate mitigation and adaptation. For this work, they have drawn on literature-based meta-analyses and projects that build the knowledge base on climate vulnerabilities and risks. The findings from this exercise are informing the second revision of the Austrian national adaptation strategy and adaptation plan, expected to be completed in the first half of 2024.

The current Austrian climate vulnerability, impact and risk assessment identified heatwaves and cold/frost, droughts and water scarcity, heavy precipitation and floods, soil erosion and landslides, wildfires, permafrost thawing, and changes in temperature and precipitation patterns as climate hazards with a 'significantly increasing' trend.

Against this backdrop, the assessment considers that ecosystems and biodiversity face 'high' risks of potential future impacts, due to their high vulnerability to the expected rise in temperatures and changing precipitation patterns. Projected impacts include changes in species composition, spread of alien species, and loss of habitats and species. Regions with a high share of endemic species, like alpine regions, are considered particularly vulnerable.

Considering their lower levels of observed impacts, likelihood of occurrence, exposure and vulnerability, the assessment ranks the risk of potential future impacts as 'medium' in the areas of disaster management, agriculture, forestry, water resources and management, tourism, energy, construction and housing, health, transport, industry and trade, cities, protection from natural hazards and spatial planning.

Conclusions. Austria is in the process of updating its national climate risk assessment, demonstrating good progress in the field. It also launched a significant update of national climate modelling methods and monitoring frameworks during the reporting period.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

Governance structures for climate adaptation are already in place at the federal level.

The Federal Ministry for Climate Action oversees and coordinates adaptation policy in Austria.

The Environment Agency Austria regularly acts as a semi-public support unit providing expertise and policy support along all stages of the adaptation policy cycle.

Other relevant bodies included the National Climate Committee and the Conference of Provincial Climate Ministers.

While these overall governance structures remain unchanged, some new developments have been reported, like the integration of climate change considerations into Environmental Impact Assessment procedures.

Austrian Strategy for Adaptation to Climate Change with its integrated action plan adopted in 2017, is currently being revised and is expected to be published by the first half of 2024.

Conclusions. While there is currently no national legal requirement for climate adaptation, Austria has been working to improve and strengthen the existing federal governance structures to support climate adaptation. The ongoing update of the national adaptation strategy and national adaptation plan is a core element of this work, which involves all relevant ministries and stakeholders.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The adaptation challenges, gaps and barriers reported in 2023 remain the same as those reported in 2021.

As explained by Austria, while the current national adaptation strategy and action plan do not prioritise areas for action, the strategy identifies possible criteria for such prioritisation.

It remains to be seen how the perception of vulnerabilities, risks and challenges will have shifted compared to their previous versions, and how these shifts will have been reflected in the revised Austrian adaptation strategy and action plan.

10. Nature-based solutions in national adaptation policies

The current Austrian action plan includes many measures that can be considered nature-base solutions, including nature and soil protection, integrated landscaping, promotion of diverse forests, and urban greening and ecosystem-based water retention measures.

The government published in 2022 the report *Klimawandelanpassung und Biodiversität* on the links between climate change adaptation and biodiversity. It encourages the use of nature-based

solutions for climate adaptation, reflects on how nature conservation should address climate change and highlights several good practices in the field, such as wetland floodplain restoration.

The national implementation framework for the EU Mission on Adaptation to Climate Change pledges to bring nature-based solutions forward. The related action plan is currently under development. Also, a recent call of the 'Austrian Climate Research Programme Implementation' includes the topic area 'Adaptation to extreme weather events using nature-based solutions', and the adaptation network for practitioners *Anpassungsnetzwerk* set up a working group 'Land consumption, unsealing and nature-based solutions' in 2023.

11. Integration of adaptation into sectoral policies

Austria reported that climate change adaptation is being mainstreamed into other policies, plans, and programmes of directly-affected sectors, including emergency and crisis management, disaster risk reduction, flood risk management and river basin management.

Climate change considerations have also been better integrated into environmental impact assessment (EIA) procedures. Project developers are now encouraged to use the EIA climate-fit portal (*UVPklimafit Infoportal*), which helps anticipate the consequences of climate change in the design of projects that are subject to an EIA, and the EIA guidance document refers to climate-proofing.

Austria expects heavy precipitation and flood hazards to increase significantly. The second flood risk management plan from 2021 reflects these risks. Although climate scenarios have so far not been explicitly used in the development of hazard maps of the federal water engineering service and the federal torrent and avalanche control service, their strategic planning and prevention measures do increasingly consider climate impacts and adaptation needs.

12. Engaging with stakeholders who are vulnerable to climate change impacts

Compared to the information reported in 2021, the number of climate change adaptation model regions (KLAR!) active in awareness-raising, planning and implementing adaptation measures has risen substantially.

In addition, a series of new multi-purpose dialogue events with various stakeholder groups began in spring 2023 and will continue into 2024.

13. Engaging with private-sector stakeholders

Private stakeholder involvement has not changed between the 2021 and 2023 reporting periods. Austria flagged that a broad range of national stakeholders were consulted during the drafting and revision of the National Adaptation Strategy and Plan.

Conclusions. The reported information indicates good progress overall in this area – most notably the ongoing updates of the national climate risk assessment, the national adaptation strategy and the national adaptation plan. However, the level of detail provided is sometimes low.

Section 4 – Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

The second progress report on climate change adaptation in Austria, published and presented to the Council of Ministers in September 2021, used an improved methodology compared to the first report from 2014. The new report kept the two main pillars (including 47 quantitative and qualitative criteria/indicators, and expert assessments) of the previous version, but also included new elements developed in the meantime, like replacing the written expert questionnaire with stakeholder workshops and more emphasis on regional/sub-national activities.

15. Implementation of adaptation measures and financing

According to the most recent progress report, there have been advances in measures for flood risk management and aquatic ecology, early warning systems have been set up and heat protection plans have been developed.

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Austria provided updated information on adaptation-related initiatives including the revision of the Austrian adaptation strategy and action plan and the KLAR! Programme. Helped by information on regional climatic vulnerabilities and risks, the regions draw up a targeted adaptation concept and they must implement ten specific measures to improve individual regional resilience. This process also increases awareness significantly in the regions.

Examples of new actions to address adaptation priorities were provided, such as improved adaptive flood risk management systems and newly created retention areas.

The barriers to adaptation mentioned in 2023 remain the same as those reported in 2021. One such barrier is knowledge gaps, which points to the need for more research. Domestic research programs such as StartClim, ACRP and ACRPI aim to address this gap.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Austria's adaptation strategy and action plan, adopted in 2017, are currently being revised. Both updated documents are expected to be published by the first half of 2024.

The parallel update of Austria's vulnerability, impact and risk assessment is feeding into the revision of the adaptation strategy and plan, i.e. both processes are interconnected and work in tandem.

Conclusions. The reported information indicates good progress in this area, as demonstrated by the interconnected updates of the national climate risk assessment, adaptation strategy and adaptation plan currently under way. However, the level of detail provided varies between sectors.

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Austria reported several recent good practices, including peatland restoration projects.

The information on synergies with other international frameworks and/or conventions remains unchanged between 2021 and 2023.

New cooperation activities were also reported, such as the transnational online knowledge portal 'Climate Adaptation Platform for the Alps, CAPA' and capacity building projects with Western Balkan countries and Türkiye.

Finally, Austria is making use of EU funding schemes for transnational cooperation (such as the EU Interreg programmes), research (such as Horizon Europe, ERA NET, ERA-NET+) and the ERDF mainstream programme to support national adaptation policy processes and help implement cross-border adaptation measures.

Conclusions. The reported information shows that Austria's portfolio of adaptation projects, international cooperation initiatives and EU-supported schemes continues to be developed.

Section 6 – Subnational level information

25. Subnational governance structures for adaptation action

On subnational governance structures, all federal states are involved in the development of the Austrian strategy for adaptation to climate change, in implementing adaptation-related initiatives federal state and in setting up inter-organisational working groups.

Austria runs the 'KLAR! Climate Change Adaptation Model Regions' programme, which is funded by the Austrian Climate and Energy Fund. Through the KLAR! Service platform and KLAR! Events, the Climate and Energy Fund ensures that participating regions can make use of scientific findings and information in their work. Altogether, 15 new regions joined the programme between 2022 and September 2023, bringing the total number of KLAR! Regions to 92. Employees, awareness-raising measures and model region coordinators are grant-aided, while 25% co-financing by municipalities is obligatory.

To date, 13 Austrian subnational entities are involved in the EU Mission on Adaptation to Climate Change, including several members of the KLAR! Programme, the city of Graz and the federal states of Lower Austria and Styria.

Launched in 2021, the *Österreichisches Netzwerk innovativer Klimawandelanpassung für Praktiker: innen auf regionaler Ebene* (Austrian network on innovative climate adaptation for practitioners at the regional level) connects existing adaptation activities and helps to use available resources efficiently.

26-27-28-29. Subnational policies and cooperation

Austria's federal states take different approaches when formulating their climate change adaptation policies, ranging from dedicated adaptation strategies (Styria, Vorarlberg, Salzburg) to integrating adaptation into other strategies and sectoral programmes.

Multiple federal provinces have updated their strategic policy documents on adaptation recently, and several have reported new subnational cooperation activities, including Interreg cross-border cooperation programmes.

The information on engaging with stakeholders remains largely the same in 2023 as in 2021, but additional events with stakeholder groups are planned for 2023 and 2024.

Based on the reported information, certain adaptation activities organised in Austrian KLAR! Regions include private sector involvement. These activities address a wide range of climate impacts and sectors.

Conclusions. The reported information indicates continued progress in climate adaptation policy and action at both regional and local level in Austria.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 – National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 – Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 – Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	?
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↗
	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	Y

	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↗
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↗
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↗
Section 4 – Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	↗
	18. Has progress been made in meeting adaptation priorities?	↗
	19. Has progress been made in addressing barriers to adaptation?	↗
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 – Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↑
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	•
	24. Has progress been made with regards to cooperation?	↑
Section 6 – Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y

	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Belgium according to the European Climate Law

Summary

Belgium has taken initiatives to address climate change impacts and continued to make progress on climate adaptation between 2021 and 2023, at federal and regional (Flanders, Wallonia, Brussels) levels. A new Flemish adaptation plan was published in 2022 and a new federal adaptation plan has been developed in 2023. There is no legal requirement in relation to climate adaptation. Since 2021 several new thematic and sector-oriented climate risk and vulnerability assessments on a national scale have been published. Belgium is revising and updating its comprehensive national climate and vulnerability assessment, which is due in 2024. Belgium has reported progress in mainstreaming climate change into sectors or sectoral policies, plans, and programmes. All three of the country's regions promote nature-based solutions and ecosystem-based adaptation. Two of the regions have made progress on engaging with stakeholders vulnerable to climate change impacts.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Belgium has been working on creating new high-resolution climate projections in recent years, based on the most recent IPCC scenarios (2022). Studies have been conducted on the impact of climate change on agriculture, urban heat stress, storm surges and wave heights, as well as biogenic emissions.

For Flanders, projections on the impacts of drought, heat, flooding and extreme precipitation between now and 2100, visualised at municipal level, were updated on the Climate Portal in 2021. The site also introduced a new PLANtool and PROJECTtool in 2022, which allow users to explore adaptation options and provide local insight into risk reduction and the costs of adaptation measures.

Belgium is developing new climate scenarios that align with the renewal of national climate risk assessments and the policy revision cycle.

2-4. Changes to the reported vulnerabilities and risks since 2021

In 2023, Belgium reported that it experiences more frequent and longer periods of extreme weather events like drought, extreme heat and heatwaves, and heavy rainfall causing floods as well as slow-onset changes like a general temperature rise and sea level rise. Belgium identifies heatwaves as one of the many future climate hazards that will increase significantly. Since 2021, Belgium has published new national climate risk and vulnerability assessments on health, transport, biodiversity (including ecosystem-based approaches), energy, agriculture and food, forestry, finance and insurance. Belgium is in the process of revising and updating its climate risk and vulnerability assessment, which is due in 2023. Belgium considers agriculture as a key affected sector with a high likelihood of facing hazards and vulnerability. Belgium does not identify water management as a key affected sector, although for all sectors the water-related hazards fluvial and pluvial floods and droughts are explicitly mentioned.

Conclusions. Belgium has continued to develop its climate projections and has conducted studies on climate impacts. Flanders has updated its Climate Portal with tools to explore adaptation options and to provide local insights into risk reduction. Belgium reported that it experiences more frequent and longer periods of various types of extreme weather events as well as slow-onset changes. It is working on revising and updating its climate risk and vulnerability assessments.

Section 2 – Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

Belgium has appropriate national governance structures in place to support adaptation actions. The main national governance structures have not changed significantly since 2021. There is no legal framework at federal level. Climate adaptation policy in Belgium is implemented at different levels: at national level, the national adaptation strategy and national adaptation plan set out actions that complement those set out in the regional (Flanders, Wallonia, Brussels) and federal plans. Most of the responsibilities for climate change adaptation are under the authority of the regional governments. No information is available on the involvement of the Prime Minister's office in the inter-ministerial coordination mechanism on adaptation, or of another body with strong political authority across all sectoral policies concerned.

A new federal adaptation plan (2023-2026) was launched in March 2023. The government has examined the socio-economic impacts of climate change, and is creating a coordination centre for complex risk assessments of climate change (CCCRA-CC). The centre will be an independent organisation within the federal department for health, food chain safety and environment, based in Brussels. A new Flemish adaptation plan was published in the third quarter of 2022. For planning, implementation and monitoring, the country has appropriate national governance structures in place.

Belgium is developing a new Paragon programme as an early warning system. It is among the countries that have further integrated climate change impacts into their national disaster risk management (DRM) frameworks and sectoral planning.

Conclusions. Climate adaptation is implemented at various levels, with complementary strategies and plans at federal and regional level. No major changes in governance structures have taken place since 2021. A new federal adaptation plan (2023-2026) was launched in March 2023 and a new Flemish adaptation plan in 2022. For planning, implementation and monitoring, the country has appropriate national governance structures in place. Belgium has further integrated climate change impacts into their national disaster risk management frameworks and sectoral planning. There is no legal requirement for action on adaptation.

Section 3 – Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

A new federal adaptation plan (2023-2026) was adopted in spring 2023. At federal level, 28 adaptation measures have been identified in eight areas. Each measure will be funded by the ministry or service responsible. Measures include multidisciplinary risk assessments, analysis of climate change impacts on essential services for society, assessing the impact of climate change on energy security and infrastructure, and developing natural disasters risk zones criteria. The plan also includes measures to strengthen sectoral coordination, including by organising sectoral information sessions on climate change adaptation and increasing the availability of information on adaptation to climate change, for example through a national online platform.

Belgium's three regions have identified adaptation priorities, strategies, policies, plans and actions related to health, transport, biodiversity, energy, agriculture and food, forestry, finance and insurance.

In Flanders, the Flemish climate adaptation plan was adopted in October 2022. It focuses on 2030 and sets out a vision for a climate-resilient Flanders by 2050 through nature-based solutions and technological innovation. The plan sets out six strategies, including building and connecting green-blue infrastructure, space for water in function of water safety and drought prevention, and collaboration and coordination. Each strategy identifies tangible measures to achieve the plan's objectives. The plan is based on a cost-benefit analysis of climate adaptation measures by the Flanders region and has an overall budget of EUR 150 million for 2023-2024.

In the Brussels region, the water management plan for 2022-2027 has a chapter on climate adaptation with a specific ambition to increase efforts in the fight against drought. The new Air Climate Energy Plan with a chapter on adaptation is also expected to be adopted in spring 2023. The plan includes measures such as developing nature-based solutions, increasing the climate change resilience of natural resources and infrastructure, and developing indicators for monitoring adaptation policy.

Wallonia has made available a budget of EUR 7 billion to finance more than 300 projects, to enable the region to respond to current social, economic and environmental challenges, as well as to the impacts of the various crises suffered, such as the historic floods of July 2021.

The challenges identified in 2021 and 2023 are broadly the same. They include knowledge gaps in all sectors, a lack of sense of urgency in some sectors and municipalities, a lack of indicators for an efficient monitoring system, and a lack of legislation for an efficient and effective implementation of climate adaptation measures. 'Opportunities for a social just adaptation' appears to be a new area of focus for 2023.

10. Nature-based solutions in national adaptation policies

The country and its regions promote nature-based solutions and ecosystem-based adaptation in national strategies, policies and plans.

11. Integration of adaptation into sectoral policies

Belgium is making progress on mainstreaming climate change adaptation into sectoral policies, plans, and programmes. The federal and regional governments have taken measures to assess and analyse climate change impacts on essential services for society, to increase emergency planning and to improve cooperation among Member States on crisis management in natural disasters. Further progress was made in incorporating climate adaptation in environmental impact assessment (EIA) procedures in terms of the use of online tools, methodologies, checklists and guidance. Belgium focused on sector-specific adaptation goals and highlighted priority sectors from the perspective of the Energy Union agenda, including buildings, energy, transport and infrastructure. The finance and insurance sector was not addressed explicitly.

Brussels, Wallonia and Flanders have integrated climate change impacts into their river basin and flood risk management plans for 2022-2027. Flanders also launched the Blue Deal to increase efforts in the fight against drought and water scarcity. Brussels has measures in place to further integrate climate change adaptation into land use plans, urban planning regulations and the construction sector.

12. Engaging with stakeholders who are vulnerable to climate change impacts

Progress was made between 2021 and 2023 on engaging with stakeholders vulnerable to climate change impacts. Brussels plans to map vulnerable institutions and populations at municipal level and to strengthen the monitoring of areas and populations that lack publicly accessible green spaces. In Flanders, the integration of social aspects in all adaptation measures receives special attention, and the engagement of stakeholders particularly vulnerable to climate change impacts is a key element throughout the Flemish Climate Adaptation Plan.

13. Engaging with private-sector stakeholders

Belgium has reported progress since 2021 on engaging private sector stakeholders. In Flanders, the government is working on a Green Deal climate resilient spatial planning initiative in cooperation with various sectoral organisations, including the building sector, nature

organisations, architects and study agencies. Brussels is also providing the construction sector with support to design buildings and environments that are adapted to climate change.

Conclusions. A new federal adaptation plan (2023-2026) was launched in 2023 and a new Flemish adaptation plan in 2022. Belgium reports progress on mainstreaming climate change into sectors or sectoral policies, plans and programmes. Belgium and its three regions all promote nature-based solutions and ecosystem-based adaptation. Between 2021 and 2023 progress has been made on engaging with stakeholders vulnerable to climate change impacts in Brussels and Flanders.

Section 4 – Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

No progress has been reported since 2021 on setting up and implementing monitoring mechanisms. Therefore, there is currently no monitoring system at national or federal level. According to the new federal adaptation plan, the federal adaptation measures will be evaluated twice by a third party between 2024 and 2026. On monitoring, Flanders has developed a Climate Portal and various other tools. In 2023, the Flemish government plans a new study to identify a more efficient monitoring system based on indicators. This suggests that efforts are being made to improve the implementation and monitoring of adaptation measures in the region.

15. Implementation of adaptation measures and financing

Several actions have been taken, including awareness-raising, incorporating climate change adaptation into various sectors such as education and transportation, and initiating a study on high-resolution climate scenarios.

The Recovery and Resilience Facility (RRF) provides financial support to projects under the Blue Deal of Flanders as well as for remeandering projects in the Wallonia, via the national recovery and resilience plan. There is scope to put climate resilience considerations more to the forefront in Flanders and Wallonia's use of EU support from the common agricultural policy and cohesion policy funding[11].

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

The measures taken contribute to reducing climate impacts, vulnerabilities, and risks.

The 2023 reporting indicates that there is already a lot of knowledge available, and that progress has been made by developing tools to share this knowledge with policymakers and others active in climate adaptation. However, much remains to be done on raising awareness and supporting

[11] Belgium intends to invest ca 13 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

municipalities with their adaptation actions. In both the 2021 and 2023 reporting it is recognised that more needs to be done to increase adaptive capacity

It is difficult to assess whether progress was made between 2021 and 2023 on tackling barriers to adaptation. While Flanders launched a study to provide a cost-benefit analysis of climate change adaptation in 2020, and Brussels carried out a mapping of urban heat islands in 2018 and a study on the impact of nature-based solutions on city residents in 2020, there is no clear indication of the progress made on the adaptation measures concerned.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

It is not clear whether progress was made specifically on reviewing and updating vulnerability and risk assessments between 2021 and 2023 at federal and regional level. However, the reporting does mention that the Flemish Environmental Agency provides regular updates of data on vulnerability and risk on the Climate Portal.

The National Adaptation Plan was evaluated in 2020. In 2021, a cost-benefit analysis was conducted to prioritise adaptation action.

Flanders is developing indicators to measure the impact of climate change adaptation measures at regional (Flemish) and local level. There is little information on monitoring and climate risk assessment from the Wallonia.

Conclusions. No progress has been reported since 2021 on setting up and implementing a monitoring mechanism. Belgium reports having implemented measures at federal and regional level that contribute to the reduction of climate impacts, vulnerabilities and risks. However, there seems to be no accessible monitoring and reporting scheme to support this. It is recognised that more needs to be done to increase adaptive capacity. Although more knowledge is now available, work remains to be done on awareness raising and supporting municipalities with their adaptation actions. No progress has seemingly been made over 2021-2023 in reviewing and updating the vulnerability and risk assessments.

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation.

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Belgium did not provide updates on good practices and lessons learnt in its 2023 reporting. To stimulate internal cooperation, the Belgian authorities set up a coordination centre and a Climate Knowledge Centre between 2021 and 2023. In 2021, the Brussels government urged local authorities to develop projects to implement climate transition policies. The Walloon government supports municipalities by sharing information and experiences. In addition, regions have provided tools, financial support and training on adaptation to communities that have signed the Covenant of Mayors. Belgium reported no new synergies with international frameworks or new initiatives

on transnational cooperation. However, it underlined that Belgium is part of the Benelux network whose primary focus is information/best practice sharing on adaptation. Belgium has an active working group on adaptation consisting of one or more representatives for each region. It has frequent contacts with organisations such as OECD, EEA and EIB, suggesting that Belgium actively seeks out best practices and ideas from other international organisations and incorporates them into their own climate adaptation efforts. Eastern and Western Flanders are part of Horizon Project NBRACER (Nature-Based Solutions for Atlantic Regional Climate Resilience)[12].

Conclusions. No new information on good practices, lesson learnt or synergies with international frameworks was submitted in 2023. Cooperation with municipalities is supported by Wallonia.

Section 6 – Subnational level information

25. Subnational governance structures for adaptation action

Appropriate subnational governance structures are in place to support adaptation actions in Belgium. This includes support to the preparation of legal requirements and strategic documents at various levels of governance, adaptation plans for provinces and municipalities, and collaboration across national and regional authorities. Examples of good practice include knowledge platforms and tools to support adaptation policies.

26-27-28-29. Subnational policies and cooperation

No significant new initiatives were identified in subnational strategies, policies, plans or measures on climate change adaptation in Belgium between 2021 and 2023, except for the newly adopted Flemish climate adaptation plan (2022).

Progress was reported on public consultations and active consultations with private actors, and good practices by local authorities were identified. This suggests that Belgium has made continued efforts to engage with stakeholders and involve them in the development of policies and measures on climate change adaptation[13]. Belgium reported the involvement of regional and local governments in the EU Mission on Adaptation to Climate Change. The regions Flanders and Wallonia, and the cities of Leuven, Hasselt, Ottignies-Louvain-La-Neuve and Blankenberge are signatories to the Mission Charter.

Conclusions. Relevant subnational governance structures and online tools are in place to support adaptation action in Belgium, also at province and municipality level. Progress has been made on the consultation of public and private actors.

[12] https://cordis.europa.eu/project/id/101112836

[13] For Flanders: https://www.vvsg.be/klimaatproject and Wallonia: http://leswallonssadaptent.be/

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 – National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	P
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 – Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 – Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	↑
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↗

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	Y
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↑
Section 4 – Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↑
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	?
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	?
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 – Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 – Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↗
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Bulgaria according to the European Climate Law

Summary

The assessment of Bulgaria's progress towards adaptation shows a mixed picture.

The climate monitoring and modelling framework was not updated, nor was the analysis of vulnerabilities and risks. Data collection and monitoring remain a challenge with significant data gaps and difficulty in coping with uncertainties.

Governance structures have not been developed further. Key challenges remain in this area. In particular, the lack of coordination at national level and the lack of a system to monitor adaptation at subnational level limit the government's capacity to soundly and consistently implement adaptation policies. A lack of financial and human resources is the main barrier to further progress.

Bulgaria's reporting lacks key information needed to assess progress in some areas. This is in itself a pertinent finding as it suggests that there may be insufficient political prioritisation or resources dedicated to adaptation at governmental level.

Nevertheless, progress has been made on adaptation measures that are expected to reduce vulnerability and risk, achieve adaptation priorities and improve adaptive capacity. However, an assessment of the impact of such initiatives is not yet available. New plans for disaster protection are under approval, while new policies and measures were introduced in various sectors. Insurance coverage against climate-related disasters is limited.

No progress has been recorded on cooperation and synergies with international frameworks, and information about adaptation at subnational level is mostly missing.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Between 2021 and 2023, Bulgaria reported no significant changes in its climate monitoring and modelling framework.

Monitoring and reporting under the 2019-2030 national climate change adaptation strategy is carried out in line with the Regulation on the Governance of the Energy Union which incorporates the provisions of the Climate Monitoring Mechanism Regulation and harmonises them with those of the Paris Climate Agreement.

Data collection and monitoring is identified as a challenge. Knowledge and data gaps concern climate projections and associated risks, the costs and benefits of adaptation, and vulnerabilities at local level.

On climate risk assessments, Bulgaria finds coping with uncertainties to be a challenge. Limited financial and human resources is considered the main barrier to progress.

2-4. Changes to the reported vulnerabilities and risks since 2021

There were only slight changes in the ranking of vulnerabilities reported by Bulgaria, where the vulnerability under disaster risk management changed from low to medium.

The vulnerability of both agriculture and urban environment is identified as high, while the vulnerability of water management is reported as medium.

Bulgaria is also vulnerable to risks related to floods and droughts. The latter is also highlighted as a key hazard in the INFORM tool[14]. Storms are also mentioned as an increasing hazard.

Other vulnerabilities and risks reported by Bulgaria are loss of genetic diversity, disruption of species lifecycles and phenological phases, and deterioration of habitats. However, specific attention should be paid to risks to coastal ecosystems, fisheries and aquaculture.

An increase in the frequency and intensity of weather events and increasing pressure on water resources pose a threat to many sectors. The energy sector is among those that will be the most affected, and ensuring a reliable energy supply is seen as a growing challenge. While Bulgaria expressed uncertainty about the projected impact of heatwaves, floods, and droughts, the risk analysis under the PESETA project forecasts an increase in their potential economic impact (significant for heatwaves and floods and slight for droughts).

Conclusions. Bulgaria has not recorded any further development of its monitoring and modelling tools. The climate vulnerability and risk analysis essentially confirmed the risks already identified in 2021. Independent analyses predict an increase in potential economic impacts of floods, heatwaves, droughts and storms, which demand closer monitoring. Specific attention should be paid to coastal ecosystems, fisheries and aquaculture.

[14] The INFORM Tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool

5-6. National governance structures supporting adaptation action

Between 2021 and 2023 no changes were made to the national governance structure supporting adaptation to climate change.

Bulgaria's approach to climate adaptation emphasises the importance of sectoral adaptation plans. These are crucial for integrating adaptation measures into national policies, strategies and processes.

In line with the Climate Change Mitigation Act, the Ministry of Environment and Water (MoEW) is responsible for coordinating the policymaking process for climate change adaptation. A National Coordination Council on Climate Change led by the MoEW and involving representatives of all ministries and state agencies participates in strategy development. The MoEW is also assisted by the National Expert Council on Climate Change, which includes representatives of the ministries, the executive agencies, the Bulgarian Academy of Science, the National Association of Municipalities and non-profit organisations with an interest in climate change.

Despite these structures, coordination among relevant authorities remains a challenge. There is no information available on the involvement of the prime minister's office in the interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned. There is also a gap in the monitoring of local municipalities by the MoEW.

The Unified Rescue System ensures population protection in case of emergencies or disasters, in line with disaster protection plans. The System ensures coordination among different stakeholders, such as ministries and agencies, municipalities, commercial companies, medical and healthcare facilities, and non-profit and voluntary organisations.

As a focal point for environmental data collection and reporting within the National Environmental Monitoring System, the Environment Executive Agency provides data on climate change adaptation and biodiversity and plays a key role in ecosystem-based monitoring.

Regarding the legal and policy framework, several key strategies and programmes underpin the legislation on climate change and institutional set-up, which was further strengthened with the adoption of legal acts (ordinances) in 2022. However, the reported progress mostly concerns energy efficiency and climate change mitigation measures. It is therefore not possible to consider this as progress towards climate adaptation.

Conclusions. No changes to governance structures have taken place since 2021. National adaptation plans and sectoral adaptation plans are key for integrating adaptation measures into national policies. However, the lack of coordination among national authorities and a gap in the monitoring of measures implemented by local municipalities by the Ministry of Environment and Water remain important challenges.

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Bulgaria provided details on its adaptation priorities, strategies, policies, plans and efforts. The country's key risks and vulnerabilities concern agriculture, the urban environment, water management, biodiversity and ecosystems. However, no details were provided on tourism, and civil protection and emergency management, despite the identified vulnerabilities.

Vulnerabilities in the energy sector are being addressed with specific measures. In addition, several activities and initiatives mainly dealing with mitigation efforts involve synergies with adaptation initiatives[15].

A few new developments since 2021 were reported in urban environment, the energy sector and transport.

The 2023 report identifies the same challenges, gaps and barriers to adaptation as in 2021. These include insufficient institutional capacity - both administrative and expert capacity - in organisations responsible for adaptation policies and actions. Specific challenges include the scope and quality of coordination between institutions, insufficient professional training, a low level of awareness among some decision makers, and insufficient capacity of staff to integrate climate adaptation knowledge into policy planning and implementation. A more general challenge is limited financial and human resources, both in terms of number and training.

The analysis of the climate protection gap included in Bulgaria's 2023 European Semester country report shows that the insurance coverage for floods remain low as compared to the projected risk, and this could result in losses to be covered by the public sector.

10. Nature-based solutions in national adaptation policies

Biodiversity and ecosystems are a key focus of Bulgaria's adaptation policy documents. Measures include the adoption of a new biodiversity strategy and action plan and a new green infrastructure strategy on ecosystem-based management, conservation, restoration and climate change adaptation. Nature-based solutions and ecosystem restoration are also included in other national strategies, such as the 2030 national development programme of Bulgaria, the national recovery and resilience plan and the 2021-2027 environment programme.

11. Integration of adaptation into sectoral policies

The 2023 report does not present any update since 2021. Planned measures are listed per sector, including agriculture, biodiversity and ecosystems, energy, forestry, human health, tourism, urban

[15] These include: the national energy and climate plan for 2021-2030; the long-term climate change mitigation strategy for 2050; the national recovery and resilience plan; the strategic vision for sustainable development of the electricity sector.

environment and water management. However, as the state-of-play of implementation is unclear, it is not possible to assess progress.

12. Engaging with stakeholders who are vulnerable to climate change impacts

Concerning the engagement of vulnerable stakeholders, Bulgaria reported several measures to improve energy efficiency in residential buildings included in both the regional programme for 2021-2027 and the national programme for energy efficiency of multi-family residential buildings. These measures complement Bulgaria's policy on climate change mitigation and adaptation in the housing sector. However, as no further information was provided on the engagement of vulnerable stakeholders, progress in this area seems rather limited.

13. Engaging with private-sector stakeholders

The 2023 report shows good progress since 2021. Multiple strategies and programmes are in place to support the business sector, with various measures and financial support allocated to climate priorities. Businesses are involved in the development of clean technologies, and the promotion of a circular and low-carbon economy. Energy and resource efficiency are key objectives of these measures, while proper climate adaptation priorities are underrepresented.

Conclusions. Bulgaria's adaptation priorities address its main vulnerabilities and risks, and specific measures have been developed for the most vulnerable sectors. However, the 2023 report presents little change compared to 2021, which makes it difficult to assess progress. Remaining challenges include a lack of coordination among authorities, institutional capacity, and financial and human resources. A climate protection gap exists, especially for floods. Nature-based solutions are included in multiple strategies and programmes. Developments on the engagement of vulnerable stakeholders and private sector stakeholders are unclear.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

No progress was reported in 2023 compared to 2021. Monitoring and reporting under the national climate change adaptation strategy for 2019-2030 is in line with the Regulation on the Governance of the Energy Union, which incorporates the respective provisions of the existing Climate Monitoring Mechanism Regulation and harmonises them with those of the Paris Climate Agreement. Reports on national adaptation actions are to be prepared every 2 years as of 2021. Progress on measures set out in the strategy's action plan will be assessed in one mid-term and one final official report due in 2025 and 2031 respectively. The situation is currently satisfactory.

15. Implementation of adaptation measures and financing

Several projects and actions were funded during the reporting period. Projects included support to municipalities for their adaptation measures, awareness raising and education, preparing the population for natural disasters, resilience of the health sector, transport and protection of cultural

heritage. However, no information is available on the progress of these actions, and it is unclear if and how their outcomes will feed into the wider national adaptation strategy.

New adaptation measures are included in the strategic plan for the common agricultural policy launched on 1 January 2023 which concern, in particular, the introduction of new crop varieties. Nevertheless, there is scope to put climate resilience considerations more to the forefront in Bulgaria's use of EU support from the common agricultural policy and cohesion policy funding.[16]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

The various 'soft' measures reported should help municipal officials to plan, develop and implement measures to mitigate and adapt to climate change in the field of transport and urban planning. In addition, information campaigns are under way to increase public knowledge and enhance preparedness to prevent risk and reduce vulnerability. These activities are expected to be completed by the end of 2023, so their effectiveness cannot yet be measured.

Various measures to increase adaptive capacity were reported in 2023 in the field of energy, transport and water. However, many of them were related to energy efficiency and the transition to lower and more sustainable energy consumption, which cannot be classified as climate adaptation measures.

Regarding water, the expansion and upgrading of networks for monitoring precipitation, water resources and water use is expected to improve the capacity to adapt to water changes.

On meeting adaptation priorities, the 2023 report shows progress on energy, water, transport and agriculture.

Improvements in the efficiency of water use were linked to the introduction of new technologies, audits and checks. Initiatives to improve the transport sector's resilience to climate change were also reported.

On progress in tackling barriers to adaption, efforts are focusing on building missing energy infrastructure. This is to support reforms in regions with a carbon-intensive energy sector and to ensure a secure energy supply by diversifying energy sources and routes.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Significant progress has been made on updating vulnerability and risk assessments. Five central and 20 regional plans for disaster protection plans have been submitted to the Ministry of Internal Affairs.

[16] Bulgaria intends to invest ca EUR 940 million in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution) out of which EUR 186 million has been programmed for 2021-2027 under the European Regional Development Fund (ERDF) for the specific objective 'climate change adaptation'" (around 3.3% of the total ERDF financial allocation).

Regarding adaptation policies, developments include a few new ordinances and a draft strategy for biological diversity. Following the adoption of the strategy, the national plan for the protection and sustainable use of biodiversity and genetic resources, which sets out tangible measures to achieve the goals defined in the strategy, will undergo an approval procedure.

In the healthcare sector, the rules and conditions for making use of medical assistance for the prevention, diagnosis, treatment and rehabilitation of diseases, including those potentially caused by climate, are set out in the relevant regulations and updated regularly.

New regulations and ordinances concern energy requirements for buildings, energy efficiency and the water supply system.

Conclusions. The information on monitoring mechanisms has not been updated since 2021. Several ongoing projects are expected to reduce vulnerability and risk, meet adaptation priorities and improve adaptive capacity. However, the impact of such projects is not yet measurable. In general, there is scope to put climate resilience considerations more to the forefront in Bulgaria's use of EU support from the common agricultural policy and cohesion policy funding. Updated vulnerability and risk assessments are set out in new disaster protection plans, and new policies and measures have been introduced in various sectors.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

No good practices, lessons learnt or synergies with international frameworks were reported in 2023 or in 2021. Neither was new cooperation with EU Member States, non-EU countries, or regional and international organisations. It is however noted that the province of Gabrovo is part of the Horizon project MountResilience (Accelerating transformative climate adaptation for higher resilience in European mountain regions)[17].

Conclusions. No progress has been made on synergies with international networks, and good practices were not reported.

[17] https://mountresilience.eu/ and https://cordis.europa.eu/project/id/101112876

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

Bulgaria does not have a network or other form of collaboration on adaptation for national authorities. On subnational adaptation measures, the Ministry of Environment and Water does not require a full report from the municipalities and regions on their adaptation efforts.

26-29. Subnational policies and cooperation

Only two adaptation efforts have been identified at subnational level: the strategy for adaptation to climate change for Sofia Municipality; and the Vision for Development of the Municipality of Burgas for 2021-2027, both of which were already reported in 2021. No new efforts are recorded.

No new examples were reported on engagement with stakeholders. The fact that the Ministry of Environment and Water does not require a full report from municipalities on their adaptation efforts is the reason for this lack of information.

The 2023 reporting does not provide any new information on the update of subnational adaptation plans, policies, strategies and measures.

Some progress was made on cooperation at subnational level. Between 2021 and 2023, a few projects have involved Bulgarian municipalities and partners form Norway, Germany and other European countries. The projects regarded innovative measures for mitigation and adaptation to climate change and new tools for financing energy efficiency projects at municipal level.

13 Bulgarian municipalities participate in the EU Mission on Adaptation to Climate Change.

Conclusions. The lack of a system for Bulgarian municipalities to report on their adaptation efforts does not allow the assessment of progress at subnational level. Only the participation of municipalities in international projects shows some positive elements.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	•
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	P
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑
	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	Y

	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	?
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↗
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↑
Section 4 – Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↗
	17. Has progress been made towards increasing adaptive capacity?	↗
	18. Has progress been made in meeting adaptation priorities?	↗
	19. Has progress been made in addressing barriers to adaptation?	↗
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 – Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	●
Section 6 – Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	N

	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	•
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	?
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	↗

Assessment of progress on climate adaptation in Croatia according to the European Climate Law

Summary

Croatia has stepped up its efforts to address the imminent risks and challenges posed by climate change since 2021. The country conducted an extensive climate risk assessment. Croatia has also integrated adaptation provisions into its national climate laws, including statutory requirements for subnational adaptation planning.

National governance structures are in place to support adaptation actions. This organisational foundation supports the delivery of obligations under international policy frameworks such as the Paris Agreement, the UN Sendai Framework for Disaster Risk Reduction for 2015-2030, and the UN 2030 Agenda for Sustainable Development.

Croatia uses its Fund for Environmental Protection and Energy Efficiency to support the development and implementation of subnational adaptation strategies and action plans. Local level implementation and evaluation of these strategies are assigned to municipalities and regions. Transnational adaptation efforts are also notable, bolstered by EU funding schemes such as the EU Interreg programmes.

Croatia has improved its integration of climate change considerations into its environmental impact assessment procedures.

In terms of areas of improvement, adaptation objectives need to be clarified, stakeholder engagement improved, and the monitoring, reporting and evaluation system needs to be set up.

Some progress has been made at sub-national level on both the establishment and the implementation of adaptation strategies.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Since 2021, there have been no changes to the climate monitoring and modelling framework.

The Croatian Meteorological and Hydrological Service continues to carry out meteorological and hydrological activities, including those relevant to climate monitoring and modelling.

2-4. Changes to the reported vulnerabilities and risks since 2021

Croatia has prepared a comprehensive new national multi-/cross-sectoral climate risk assessment. The assessment identifies a significantly increased risk of floods, both in terms of expected annual damage and population exposed.

The list of vulnerabilities and key affected sectors identified by the national risk assessment under the Union Civil Protection Mechanism aligns with the conclusions of the INFORM tool[18] and the PESETA project[19].

Agriculture and food and water management were identified by Croatia as the key sectors affected by climate change.

There have been changes in the following sectors since the last report:

- Water management: the risk to the marine environment from changes in the thermohaline properties of the Adriatic Sea is no longer mentioned.
- Agriculture: soil degradation was added.
- Biodiversity: the list of key hazards has been revised. Croatia highlights that further analyses would be necessary to determine the degree of vulnerability and risk of climate change to biodiversity.
- Energy: water scarcity is affecting power hydro and thermal power production, there is more energy required for cooling and less for heating due to higher temperatures, as well as damage from extreme weather and floods.
- Tourism: the sector is less attractive due to high temperatures, more solar irradiance, more extreme events, biodiversity loss, water scarcity, and damage to tourism infrastructure.
- Disaster prevention and emergency management sector: Croatia additionally emphasised disaster risk management, identifying that disaster prevention was insufficient, due to insufficient investments, among other factors.

The INFORM climate change tool identifies floods, drought and coastal floods as the country's most significant hazards. Croatia reported drought and floods as the key climate hazards but did not specifically mention coastal flooding. Croatia further identified sea level rise as an observed

[18] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool

[19] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en

and future climate hazard. Heatwaves have been identified as a climate hazard that will increase significantly in the future.

Conclusions. Croatia has continued to develop its climate monitoring and modelling tools. The climate vulnerability and risk analysis identified changes in several sectors, such as water management, agriculture, energy, tourism, biodiversity and disaster risk reduction. Floods, drought, sea level rise and heatwaves have been identified as the most significant hazards.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The Climate Change and Ozone Layer Protection Act (OG 127/19) is the basic legal act, which is complemented by implementing documents (the national adaptation strategy, the national adaptation plan, and the programmes for climate change mitigation and adaptation and the protection of the ozone layer at local and regional level).

Under national legislation and the Law on Climate Change and Protection of the Ozone Layer, there is a general obligation for inter-ministerial coordination. Therefore, the Ministry responsible for climate change adaptation policy is regularly invited to comment on relevant draft legislative and policy proposals.

Furthermore, the Law on Climate Change stipulates that the authorities responsible for meteorology, nature and environmental protection, agriculture, fisheries, forestry, water management, energy, construction, spatial planning, transport, the sea, tourism and health protection must report to the Ministry every 2 years on climate change adaptation activities.

A comprehensive assessment of climate impacts was carried out to inform climate projections until 2040 and 2070. A disaster risk assessment is periodically updated by the Ministry of the Interior together with the Croatian Disaster Risk Reduction Platform. There is good cooperation between the ministry responsible for climate change adaptation policy and the ministry responsible for disaster risk management policy.

Croatian legislation lays down requirements for subnational adaptation planning.

Croatia has taken steps to meet its obligations under international policy frameworks addressing climate adaptation, such as the Paris Agreement, the UN Sendai Framework for Disaster Risk Reduction 2015-2030 and the UN 2030 Agenda for Sustainable Development.

Croatia has institutionalised adaptation working groups for technical and operational coordination, as part of their policy structures and processes.

Conclusions. National governance structures are in place to support adaptation actions. The principles, objectives, priorities and measures set out in the climate change adaptation strategy are taken into account in the legislative process, as well as in national development documents and sectoral strategic documents. Furthermore, Croatia has integrated climate change and biodiversity

protection requirements into environmental impact assessment and strategic environmental assessment processes.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges.

The objectives of the national adaptation strategy are expressed only in general terms. It is therefore not entirely clear if and how the identified vulnerabilities and risks are taken into account in the main affected sectors, namely agriculture, food and water management.

However, the national adaptation strategy sets out a series of measures for agriculture, forestry, water management, fishing and aquaculture, biodiversity, energy, tourism, health, spatial planning and risk management. Based on the list of climate change adaptation measures (85 measures, of which 83 are sector-specific and two are cross-cutting), sectoral measures are divided into five groups, and five national priorities have been identified under which climate change adaptation measures need to be implemented. These are: ensuring sustainable regional and urban development; ensuring the preconditions for the economic development of rural areas, coastal areas and islands; ensuring sustainable energy development; strengthening management capacity through a networked monitoring and early warning system; ensuring the continuity of research activities. Based on the above, it seems that the identified vulnerabilities and risks have been broadly taken into account.

The challenges, gaps and barriers to adaptation seem to be the same in 2023 as in 2021.

In 2021, Croatia referred to its national adaptation strategy and reported measures by sector. In 2023, it describes its key targets, content and underlying modelling in more detail.

10. Nature-based solutions in national adaptation policies

Croatia has not mentioned any new nature-based solutions and ecosystem-based adaptation in its reporting.

11. Integration of adaptation into sectoral policies

The ministry responsible for climate change adaptation policy regularly receives regulations and other documents for opinion and strives to ensure that national development documents and development documents of individual areas and activities are aligned with the principles, basic goals, priorities and measures set out in the climate change adaptation strategy.

Croatia submitted the same text as in 2021, with only minor changes. Therefore, no major progress can be noted.

12. Engaging with stakeholders who are vulnerable to climate change impacts.

A participatory process of defining priority adaptation measures and tasks was used to prepare the national adaptation plan. Several projects aimed at reaching/engaging with different stakeholder groups are under way. According to the 2021 report, the national adaptation strategy provides for stakeholder engagement on various activities and projects. However, it is not clear whether these activities target stakeholders vulnerable to climate change.

Croatia set up a website as a central platform for information and awareness raising on climate change adaptation. Communication is aimed at all sectors and stakeholders. Particularly vulnerable groups are not specifically mentioned.

13. Engaging with private-sector stakeholders

Croatia reported on the International Institute for Climate Action (IICA), an association of experts in the field of climate change policy. Its purpose is to assist the business community in the fight against climate change by reducing CO_2 emissions, introducing the low carbon strategy, the adaptation strategy and the European Green Deal objectives in general into their business plans and processes. Croatia already reported about the IICA in 2021.

Conclusions. Implementation of the national adaptation strategy and plan is under way. Measures aimed at individual sectors are described in detail, but progress on their implementation is rather unclear. Croatia has not mentioned any new nature-based solutions and ecosystem-based adaptation in its reporting.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

The national adaptation strategy proposes impact indicators for different sectors. Some of these indicators are already being monitored or partially monitored, but most of them are not being monitored systematically and the methodology still needs to be developed. The methodology should be developed under the national adaptation plan measure on ‘development of impact indicators of the implementation of the adaptation strategy for vulnerable sectors and society'.

15. Implementation of adaptation measures and financing

It is difficult to assess progress on adaptation measures since no comprehensive monitoring reporting and evaluation (MRE) system has been set up.

There is scope to put climate resilience considerations more to the forefront in Croatia’s use of EU support from the common agricultural policy and cohesion policy funding.[20]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

[20] Croatia intends to invest ca 340 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

It is difficult to assess progress on the implementation of adaptation measures as no comprehensive MRE system has been set up.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

The vulnerability and risk assessments were slightly updated in February 2023 to prepare the eight national communications to the UNFCCC.

The national adaptation strategy, adopted in 2020, should be evaluated and updated every 5 years if needed, i.e. after the completion of the first national adaptation plan at the earliest.

Conclusions. It is difficult to assess progress on the implementation of adaptation measures since no comprehensive monitoring reporting and evaluation (MRE) system has been set up. The vulnerability and risk assessments were slightly updated.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned.

Croatia further integrated climate change considerations into its environmental impact assessment (EIA) procedures.

No information is available on the involvement of the prime minister's office in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Croatia did not report on any good practices or lessons learnt.

Croatian scientific institutes are participating in multiple EU projects, mainly funded by Horizon 2020, the LIFE programmes, INTERREG, etc. Croatia benefits from the EU Interreg programmes, which also support other transnational adaptation efforts. A total of 18 projects have been funded in Croatia under the Interreg programme 'Italy – Croatia', involving all counties, many municipalities, and islands and stakeholders from the Adriatic area.

Since the 2021 report, Croatia has begun cooperating with competent authorities to implement the Sendai Framework for disaster risk reduction in the country. Under the Sendai framework, a joint approach to education and awareness raising is planned to build capacity for better risk management and adaptation to climate change.

Conclusions. Croatia further integrated climate change considerations into other policies. Croatia participates in multiple EU-funded projects. The Sendai Framework for disaster risk reduction has contributed to capacity building in Croatia.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

In Croatia, responsibility for implementing and evaluating local strategies and measures lies with the municipalities and regions.

Subnational governance structures are in place to support adaptation actions.

Under the Interreg programme between Croatia and Italy, a good regional cooperation has been established between local institutions and stakeholders.

26-29. Subnational policies and cooperation

The Environmental Protection Act and the Climate Change and Ozone Layer Protection Act require local and regional authorities to integrate adaptation measures into their strategic documents and to periodically report on their implementation. The Civil Protection System Act obliges local and regional authorities to conduct hazard assessments for all threats, including those caused by climate change, and to develop appropriate action plans.

Counties and large cities are required by law to prepare planning documents setting out priority measures on climate change mitigation, adaptation and ozone layer protection relevant to their jurisdiction. Out of 21 counties, only 4 have such programmes, and out of 16 major cities, only 3 have programmes that address climate change adaptation.

To encourage local governments to adapt to climate change, the Environmental Protection and Energy Efficiency Fund, in cooperation with the Ministry responsible for climate policy, has launched two public calls granting co-financing for the preparation of subnational adaptation plans and reports on their implementation, and granting co-financing for the implementation of climate change adaptation measures (2021-2022).Many Croatian municipalities and cities have adhered to the Covenant of Mayors for Climate and Energy Europe Initiative. So far, 24 municipalities have adopted local action plans for climate change adaptation, mitigation and action against energy poverty.

EU Mission on Adaptation to Climate Change charter signatories in Croatia include Karlovac City, Karlovac County, Koprivnica Križevci County, Krapina-zagorje County, Ludbreg, Šibenik-Knin County, Split City and Zagreb City.

Conclusions. The government provides support for developing and implementing subnational adaptation strategies and action plans. Municipalities and regions are responsible for implementing and evaluating local strategies and measures. Several Croatian cities and counties have signed the EU Mission on Adaptation to Climate Change charter.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	↗
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	?
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↗
	17. Has progress been made towards increasing adaptive capacity?	?
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	?
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	●

Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↗
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Cyprus according to the European Climate Law

Summary

Cyprus reports little progress between 2021 and 2023 on reducing vulnerabilities to climate change, strengthening resilience or enhancing adaptive capacity. Structures, goals and activities put in place before 2021 remain broadly in place. Cyprus has included little detail in many sections of its reporting, which has not allowed a thorough analysis. This in itself is a pertinent finding, as it may suggest insufficient political prioritisation and resources dedicated to adaptation at governmental level.

A climate change risk assessment was conducted in 2016. Cyprus's combined national adaptation strategy and adaptation plan was subsequently adopted in 2017. Cyprus will begin receiving Commission assistance in the coming months to update the latter through the Technical Support Instrument. No information is available on the involvement of the Prime Minister's office in the interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned. Adaptation is largely voluntary: implementing the actions set out in the national adaptation plan is not a legal requirement even though Cyprus is among the Member States who are most exposed to the intensifying climate crisis.

Cyprus reports similar vulnerabilities and risks as in 2021. Heatwaves and drought are recognised among the most acute and significant challenges. The relevance of sea level rise and coastal erosion is reported to be uncertain, which does not appear to be fully in line with the country's geography and modelling projections.

Some adaptation actions appear to be making notable, if partial strides in addressing the acute challenges. One such action is the increased provision of desalinated water. In other areas, the available information raises doubts on whether progress is significant. For example, the costing estimates for addressing health-related challenges appear disproportionately low. Adaptation solutions that benefit both people and the rest of nature should be applied at scale.

Cyprus plays an important role in regional diplomacy and knowledge exchange and could therefore positively contribute to the building of resilience in the wider neighbourhood.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant toclimate- adaptation actions,the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate monitoring and modelling framework

Cyprus has not reported any developments in its main methodologies, tools and activities on climate monitoring, modelling, projections and scenarios relative to 2021.

Cyprus tracks the long-term annual and seasonal averages of surface climate variables such as temperature extreme indices, forest fire risk indices and vector population dynamics. It also estimates forest fire risk and vector-borne disease risk and publishes monitoring data as well as predictions for these hazards.

The Environmental Predictions Department of the Atmosphere and Climate Research Centre at the Cyprus Institute utilises global and regional atmospheric and climate models for the study and prediction of key near surface meteorological variables related to the varying mean and extreme conditions brought about by global heating. Projects already under way in 2021 were reported to dynamically downscale global climate model predictions, using the IPCC RCP2.6, RCP4.5 and RCP8.5 scenarios to 2100.

2-4. Changes to the reported vulnerabilities and risks since 2021

Cyprus faces mounting climate-related challenges, in particular with intensifying and lengthening heatwaves and drought, and the risk of flood. The reported vulnerabilities and risks are in line with those reported in 2021.

Water shortage and drought are already a challenge on this semi-arid island and are expected to intensify as a result of global heating, putting further pressure on human systems and ecosystems. The combination of comparatively low precipitation and high temperatures under the current water management system contributes to the highest water stress levels in the EU. Cyprus expects flood risks to increase significantly, which does not fully align with other sources such as the INFORM tool[21] and the PESETA project[22] that rather anticipate a decrease in flood risk or impact. The discrepancy could be partly explained if Cyprus considered coastal flooding under this heading rather than inland flooding.

In urban areas, notably Nicosia, escalating heatwaves coupled with high pollution are anticipated to amplify heat stress. Annual excess heat mortality is projected by Cyprus to potentially grow by 94% by the 2050s under a moderate climate change scenario and by up to 126% under a more pessimistic climate change scenario. By the 2080s these numbers would grow by 104% and by up

[21] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool

[22] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en

to 268%, respectively. Annual excess heat morbidity, expressed in terms of patient-days in hospital per year, will also increase proportionally.

An OECD report[23] drawing also on official and expert opinions expressed at a workshop in Nicosia noted that over-abstraction of groundwater resulting in the depletion of aquifers and saline intrusion is a major problem in Cyprus, and a principal reason for the nation's failure to comply with the Water Framework Directive. However, Cyprus reports that saline intrusion from seawater into aquifers has not been observed to date, and that the evolution of this hazard in the future is uncertain or unknown. The main driver of the phenomenon has historically been water management choices rather than global heating, but this example may illustrate the importance of considering climate-related hazards in interaction with other risks.

Surprisingly, considering Cyprus's geography, the evolution of sea level rise and coastal erosion are also reported to be uncertain. However, according to projections[24] by the University of the Aegean, up to 72% of the island's beaches could disappear by 2100. To address this hazard, Cyprus has launched a project on coastal adaptation (COASTANCE).

Whereas the national adaptation plan covers 11 vulnerable sectors and the 2016 climate risk assessment covered 12 sectors, under the Governance Regulation Cyprus reports only on two key affected sectors in 2023: water and health.

Water, of course, touches on many sectors in turn. While Cyprus considers that the risks to water availability in coastal areas and in urban centres on the plains are being effectively mitigated in the near and mid-term, it is a more serious challenge in mountainous areas, for agriculture and for forests and other natural ecosystems. In its 2022 application to the Technical Support Instrument's project on adaptation, Cyprus also stated that the tourism sector might not be able to absorb additional pressures such as cuts in water supply to tourist units, potentially dealing a devastating blow to the sector. Agriculture is the most water-consuming economic sector in Cyprus, where water-related risks under current agricultural models combine with increasing soil degradation and desertification. On the other side of the water-linked phenomena, Cyprus has assessed its urban infrastructure as insufficiently prepared for increased flooding.

Conclusions. Cyprus is among the Member States most exposed to physical impacts from global heating. Projects to translate global climate model predictions locally were reported to be under way already in 2021, but no updates on its climate modelling and monitoring framework have been submitted in recent years. There is appropriate emphasis on heat- and drought-related risks. Whereas sea level rise, coastal erosion and saltwater intrusion are not reported among the risks to which Cyprus is exposed, independent sources suggest otherwise. Putting adaptation measures in place for these hazards may be socially contentious and/or require long lead times.

[23] Republic of Cyprus (oecd.org)
[24] Frontiers | Climate change - induced hazards on touristic island beaches: Cyprus, Eastern Mediterranean (frontiersin.org)

5-6. National governance structures supporting adaptation action

Cyprus has not provided any update on the national governance structures in place since 2021. The country published a climate change risk assessment in 2016 which looked at risks, opportunities and gaps across 12 sectors. Sector reports were also produced, following the methodology applied in the first UK climate change risk assessment. No information has been provided on when this risk assessment is expected to be updated.

Following the 2016 risk assessment, Cyprus's combined national adaptation strategy and adaptation plan was updated and formally adopted in May 2017. The categorisation of adaptation policy areas is based on a 2009 Commission white paper[25] on adapting to climate change. Again, information is not provided on when the national adaptation strategy/plan is expected to be updated.

The responsibility for monitoring the implementation of the national adaptation strategy/plan sits with the Ministry of Agriculture, Rural Development and the Environment. Its Department of Environment organised consultations with the implementing bodies involved to plan the implementation of adaptation measures in 2019 and in the run-up to the preparation of the national budget of 2020. Monitoring reports are prepared yearly and published on the website of the Department of Environment. The latest report, completed in 2022, covered progress made on the implementation of the national adaptation strategy/plan up to 2021.

Furthermore, some autonomous adaptation actions are reported to be taken at sectoral level. For example, the Institute of Agricultural Research and the Department of Forests in the Ministry of Agriculture, Rural Development and the Environment are carrying out projects to facilitate adaptation. As these are labelled as autonomous actions, their relationship with the national adaptation strategy/plan is unclear. No information is available on the involvement of the prime minister's office in the interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

The EU-funded EMME-CARE project, scheduled to run from 2019-2026, aims to develop the climate division of the Cyprus Institute into a regional knowledge hub and centre of excellence in climate and atmospheric studies as well as adaptation solutions, in particular for the public health, agricultural and energy sectors.

Conclusions. Cyprus has a climate risk assessment and a combined national adaptation strategy/plan in place, supplemented by sector reports. These documents were adopted in 2016 and 2017, respectively. No information is available about their updating.

[25] EUR-Lex - 52009DC0147 - EN - EUR-Lex (europa.eu)

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Responding to the water-related challenges appears to have mainly taken the form of boosting the provision of desalinated water. While costly, Cyprus reports that this have been effective in responding to the projected water demand of the population living in low-lying and urban areas in the short and medium term, except for the water demand for agriculture. Mountainous areas face continuing challenges as they rely on reservoirs that are prone to running increasingly low. Reforestation is reported to have relied more on drought resistant species than before 2021.

Cyprus reported already in 2021 that it has bolstered its healthcare infrastructure and taken steps to introduce green and blue infrastructure. As part of its broader energy strategy, photovoltaic systems were also installed in homes of vulnerable citizens, reducing energy consumption during peak demand. The scale and impact of these actions is difficult to judge, and information on more recent action was not provided.

Barriers to action include the voluntary and non-legally binding nature of many policies and measures in the national adaptation plan, and the fact that they were adopted before the EU Climate Law came into effect.

Performance indicators to support monitoring and evaluation are also lacking, and there is no quantifiable target in the adaptation strategy that could help track how close Cyprus is to achieving its adaptation objectives. Costing per sector is reported in most cases (see below), but the cost of implementation cannot be estimated for some of the actions.

Between 1980 and 2020, only around 2% of disaster losses were insured in Cyprus. Cyprus appears to be particularly vulnerable to wildfires. The current protection gap for wildfires suggests that the insurance coverage remains low compared to projected risk, which potentially poses a risk to public finances.

10. Nature-based solutions in national adaptation policies

No developments on nature-based solutions in national adaptation policies have been reported since 2021. Cyprus refers to promoting green and blue infrastructure, as well as using more drought-resistant trees in reforestation and plantation. Further detail is not provided.

11. Integration of adaptation into sectoral policies

Cyprus has made efforts to integrate climate adaptation into sectoral policies, plans and programmes. These include its sustainable development strategy, biodiversity strategy, water policy framework, common fisheries policy, national agricultural policy, river basin management plan, drought action plan, strategy for forests and disaster risk management strategy.

However, more detailed information on the procedures for and extent of the integration of climate adaptation into these policies and plans is not available.

12. Engaging with stakeholders who are vulnerable to climate change impacts

Cyprus held a public consultation on its draft adaptation strategy/plan before it was finalised and adopted. No information on engaging with vulnerable stakeholders was available at that time or since.

Measures in the national adaptation plan that specifically target vulnerable groups include installing photovoltaic systems in the homes of vulnerable electricity consumers, and a grant scheme for replacing energy-intensive electrical appliances in homes of vulnerable consumers. These measures contribute to mitigating risks related to energy supply. In 2021, Cyprus also introduced a household support scheme for roof insulation to increase the resilience of the beneficiaries. However, no information is available on the level of support and whether it is targeted specifically to vulnerable households.

13. Engaging with private-sector stakeholders

As in 2021, Cyprus reports close cooperation with academic institutions and research organisations that carry out relevant research activity. It also refers to private sector involvement in the Interreg-supported project on 'Computing Power Goes Green' to promote the green digital transition. However, it is unclear how this involves engaging with private stakeholders on adaptation policy.

Conclusions. The voluntary nature of many policies and measures in the national adaptation plan is a barrier to action. Water scarcity is a principal climate-related challenge and Cyprus has made strides in increasing the provision of desalinated water for the population living in low-lying areas. Engagement with the risks from rising sea levels and saline intrusion appears low. Investing in nature-based solutions to address rising sea levels and to restore the sponge function of soils could be prioritised further. Little evidence is provided on the involvement of vulnerable groups in preparing adaptation policies or the involvement of the private sector in financing and implementing good adaptation solutions.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

No developments have been reported on monitoring mechanisms since 2021. The monitoring mechanism set out in the national adaptation strategy was developed through the CYPADAPT project co-financed through LIFE, which concluded in 2014. Cyprus reports that new research work has been carried out since then, but no details were provided.

In its application to the Technical Support Instrument's adaptation project, Cyprus stated that the lack of effective mechanisms to monitor and report on the implementation of national and local strategies hinders progress.

15. Implementation of adaptation measures and financing

Cyprus provided more detail than in 2021 on the cost of adaptation measures for some sectors for which actions have been outlined in the national adaptation plan. Costs include EUR 312 million for energy, EUR 7.2 million for water resources, EUR 0.9 million for agriculture and

EUR 0.2 million for health. Considering the adaptation priorities identified by Cyprus, some of these figures appear very low.

No information was provided on how these costs compare with actual budgeting and implementation. Information is also lacking on the implementation of adaptation measures and their financing by the private sector.

Of the EUR 1.2 billion budgeted for Cyprus's national recovery and resilience plan, EUR 130 million is linked to investments and reforms on adaptation to climate change. Specifically, this amount goes towards preventing and extinguishing forest wildfires, water-related measures, collecting climate-related information from cities, flooding prevention infrastructure, a public warning system and research.

There is scope to put climate resilience considerations more to the forefront in Cyprus's use of EU support from the common agricultural policy and cohesion policy funding. [26]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Cyprus reports that scientific work carried out under the Cyprus Initiative on Climate Change is aimed at assessing progress on reducing climate impacts, vulnerabilities and risks. The initiative also aims to increase adaptive capacity, meet adaptation priorities, and update vulnerability and risk assessments.

No information was provided on the measures expected to achieve these objectives or on the impact of these measures.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Cyprus has applied for technical support under the Technical Support Instrument's 2023 project on adaptation. This will also provide an assessment report on climate risks and vulnerabilities and support the update of the Cypriot national adaptation strategy.

Conclusions. The information provided on monitoring and evaluation has been scant. Cyprus has successfully applied to the Commission's Technical Support Instrument for assistance in updating the national adaptation strategy, which should also address monitoring and evaluation. Some of the costs for adaptation measures in priority sectors appear surprisingly low, and no information has been provided on actual budgeting on adaptation.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

[26] Cyprus intends to invest ca 80 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Cyprus has not reported any new synergies with other international frameworks and/or conventions since 2021.

The Ministry for Agriculture, Rural Development and the Environment is responsible for the implementation of the Paris Agreement. Its departments for environment, for forests, and for water development participate in the National Platform for Disaster Risk Reduction, which is coordinated by the department for civil protection, and aims to ensure coherence with the UN Sendai Framework and the Hyogo Framework for Action. The Directorate-General for European Programmes, Coordination and Development monitors and coordinates the implementation of the Sustainable Development Goals in Cyprus.

LIFE-funded projects have further facilitated cooperation on adaptation with Greece and other, mostly neighbouring, Member States, in the areas of agriculture (Adapt2Clima), urban adaptation (UrbanProof) and health (Medea). Through the MAREMED project on adaptation in coastal areas, the Larnaca District Development Agency is partnering with 14 regions in five countries. Cyprus is also involved in demonstrations of two Horizon Europe-projects – Regions4Climate and Cardimed (Nicosia city).

Cyprus initiated the Eastern Mediterranean and Middle East Climate Change Initiative (EMME-CCI) in 2019, which aims to pool resources to tackle common climate challenges. A dynamic regional action plan for the EMME countries is being drafted based on the recommendations of 13 thematic taskforces. The aim is for the regional action plan to be easily adaptable by national governments and regional stakeholders (such as NGOs, companies and local governments).

Cooperation on adaptation-related topics is a priority in the 2017 trilateral cooperation agreements between Greece-Cyprus-Israel and Greece-Cyprus-Egypt. These mainly focus on the exchange of knowledge and know-how on adaptation policy monitoring and evaluation, and on good practices at regional and local levels.

Conclusions. The initiatives already under way in 2021 are still ongoing. The regional role played by Cyprus through the Eastern Mediterranean and Middle East Climate Change Initiative and other cooperation agreements may have major potential. The country has not reported any new good practices, new synergies with international frameworks or new initiatives on transnational cooperation.

Section 6 – Subnational level information

25. Subnational governance structures for adaptation action

There are no legal requirements for strategic documents on adaptation at subnational level.

The Cyprus Energy Agency promotes the ‘Covenant of Mayors’ and the ‘Covenant of Islands’, under which it is reported to have prepared 40 local climate and energy action plans (rather than

under the national adaptation plan), and to monitor them. The Ministry of Agriculture, Rural Development and the Environment is also collecting information from the Union of Municipalities and the Union of Communities on the implementation of the national adaptation plan. However, progress on the plan is unknown. The Ministry also organises training days to inform local authorities about adaptation actions relevant to their regions.

26-29. Subnational policies and cooperation

Some municipalities have taken the initiative to prepare and implement local adaptation plans. This includes the CAMP-Cyprus project, which conducts activities in the southern peri-urban coastal area of Larnaca town with the cooperation of Larnaca municipality and the communities of Pervolia, Meneou and Kiti. The LIFE UrbanProof project has helped the Strovolos and Lakatamia municipalities to prepare local adaptation strategies.

The Athienou, Nicosia and Pafos municipalities have signed the charter of the EU Mission on Adaptation to Climate Change. This allows them access to technical advice and guidance from the Mission Implementation Platform, support through the community of practice, the opportunity to act as a testbed for innovative adaptation solutions, and research and innovation funding opportunities to join large innovation actions, pilot projects and demonstrations.

Conclusions. There are no legal requirements in Cyprus for strategic documents on adaptation at subnational level. Nevertheless, 40 climate and energy action plans have been prepared by local authorities under the Covenant of Mayors and the Covenant of Islands. Training is organised for local authorities on adaptation. Some municipalities have actively accessed EU-funded technical support to develop adaptation strategies and activities, and three municipalities have signed up to the EU Mission on Adaptation to Climate Change.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	•
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	P
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	N
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•
	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P

	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	?
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	?
	15. Has progress been made in the implementation of adaptation measures?	?
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↗
	17. Has progress been made towards increasing adaptive capacity?	↗
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	●
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	?
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	?
Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	P
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	●
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	●

	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	●
	29. Has progress been made with regards to cooperation at a subnational level?	?

Assessment of progress on climate adaptation in Czechia according to the European Climate Law

Summary

Since 2021, Czechia has stepped up its efforts to address the imminent risks and challenges posed by climate change.

Recognising the importance of a comprehensive approach to tackle these challenges, Czechia updated its national adaptation strategy and national adaptation plan in 2021. It is in the process of conducting a national climate risk assessment, which has a significant focus on drought risk.

Czechia has seen a decline in agriculture and forestry outputs, reduced carbon sequestration capacity (partly due to a bark-beetle infestation induced by unprecedented droughts and the dieback of forests), and the negative impacts of climate change on biomass energy production. Extreme weather events have impacted both hydropower and photovoltaic power production and changed energy demand patterns, reducing the need for heating while increasing the need for cooling. Extreme events have also increased energy security concerns.

Floods, droughts, and heatwaves are the key climate-related hazards. The risk of floods caused by a combined effect of heavy precipitation and low water retention of soils, has significantly increased (both in terms of the population exposed and the expected annual damage). To effectively address these hazards, Czechia has strengthened its governance structures. The Ministry of Environment coordinates the national adaptation policy efforts.

However, the key causes of the situation have not yet been addressed. Conventional agriculture and forestry activities deteriorate the quality of soil, decrease water retention in soil, prevent forests from becoming resilient, etc. This leads to droughts, wind erosion on arable land, floods and water erosion following torrential rains, further deterioration of arable land, and massive damage and economic loss.

There is scope to put climate resilience considerations more to the forefront in Czechia's use of EU support from the common agricultural policy and cohesion policy funding.

At subnational level, an increasing number of cities and municipalities are developing local adaptation strategies and subnational climate adaptation efforts remain mostly voluntary.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the

assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate monitoring and modelling framework

Czechia's modelling and monitoring framework has not significantly changed since 2021.

Czechia reports that they have started to prepare new regional scenarios using the ALADIN-CLIMATE/CZ model with a resolution of 2.5x2.5 km in 2020. This is as a part of a project on "Prediction, evaluation, and research for understanding national sensitivity and impacts of drought and climate change for Czechia" (PERUN), a research initiative focusing on climate extremes, particularly the increasing risk of droughts. The adjusted model is going to be used as a tool for conducting controlled experiments with changing input characteristics and lateral boundary conditions.

2-4. Changes to the reported vulnerabilities and risks since 2021

Czechia reports decreased agriculture and forestry production, decreased carbon sequestration and negative climate impacts on biomass availability for energy production. It also reports the vulnerability of forest biomass production to climate change impacts, the decreasing availability of biomass and forest management challenges.

Recent droughts have caused a decline in hydropower production. On energy security, Czechia reports more frequent extreme events that can reduce power plant outputs and interrupt transmission lines and energy supply. Changes in energy demand are also expected due to climate change and climate vulnerability, such as a decrease in energy consumption for heating and an increase for cooling.

Agriculture and food and water management are among the key affected sectors. For agriculture and food, the likelihood of key hazards and vulnerabilities was assessed to be 'high'.

The INFORM tool of the EU Joint Research Centre[27] has highlighted the importance of preparedness for floods, droughts and heatwaves.

No major change was reported on vulnerabilities and risks since 2021. The available literature suggests that vulnerabilities and risks are increasing.

Conclusions. Capacity for conducting systemic risk assessments is limited, and Czechia faces challenges in translating climate risk information into actionable adaptation solutions. The climate

[27] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

vulnerability and risk analysis has not identified further risks compared to 2021. The reported risks and sectors are consistent with the results of independent analysis by the Joint Research Centre.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The national coordinator of adaptation is the Ministry of the Environment. For the planning and revision of the adaptation policy set out in the national adaptation strategy and plan, the Ministry cooperates with six working groups consisting of about 170 experts from public, scientific and non-profit institutions. Four of these working groups focus on key climate change impacts and the other two deal with finance and monitoring.

The Ministry of the Environment also monitors and evaluates the national adaptation strategy and plan in cooperation with other ministries that are responsible for specific tasks.

Inter-ministerial coordination remains a challenge, especially in the agricultural and forestry sectors. Even if coordination structures are in place, in reality, the Ministry of the Environment has a very limited impact on the integration of climate change adaptation considerations. No information was provided on the involvement of the Prime Minister's office in inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Czechia has two essential strategic documents on disaster risk management: a concept of population protection until 2025 with an outlook to 2030; and a strategy for environmental security for 2021-2030 with an outlook to 2050.

In addition, the Crisis Management Act[28] lays down institutional arrangements and governance. It specifies the thematic area and jurisdiction of each State authority and territorial self-governing unit, as well as and rights and obligations of legal and natural entities, during crisis situations. It is complemented by the Act on the Integrated Rescue System[29] which lays down the components of the rescue system, the powers and competences of all involved (State authorities, self-governing territorial units, self-governing authorities) and their rights and obligations before, during and after emergency events.

The government has approved a proposal for an Act on Hydrometeorological Service, which specifies how these services, including the Forecast service, will be organised. Conclusions. No major changes to governance structures have been introduced since 2021. While institutional arrangements for inter-ministerial coordination are in place, adaptation concerns are not being sufficiently integrated into sectors managed by ministries other than the Ministry of the

[28] N. 240/2000 Coll.
[29] Act 239/2000 Coll.

Environment, especially the agriculture and forestry sectors managed by the Ministry of Agriculture.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Czechia has outlined its strategic and overarching adaptation goals in its national energy and climate plans, as well as in other relevant documents.

The national adaptation strategy and the national adaptation plan are still the key documents, with no new ones reported since 2021.

The plan translates the strategy into specific tasks and responsibilities, along with deadlines, for each climate change impact and source of financing, and seems to be well aimed.

More than 170 experts from public, scientific and non-profit institutions were involved in the update of the national adaptation strategy and the national adaptation plan. Written material underpinning the updates mainly include expert documents prepared by the Ministry of the Environment (including the Czech Hydrometeorological Institute and Czech Environmental Information Agency) with the support of the Czech Academy of Sciences (especially CZECH GLOBE - Institute of Global Change Research of the Czech Academy of Sciences), and several other research organisations.

The implementation of the national adaptation strategy and plan is overseen by several thematic working groups. Challenges in coordination, cooperation and policy consistency remain, stemming from ambiguous responsibilities, a general lack of awareness and very low political prominence of climate change issues.

The adaptation priorities broadly correlate with identified vulnerabilities and risks. The gaps, barriers and challenges remain the same as in 2021. Czechia has not reported any new significant risks or related efforts.

While adaptation priorities correlate with identified vulnerabilities and risks, the actual adaptation efforts do not. For example, the country still follows a conventional approach to land management despite the risk of droughts and floods.

10. Nature-based solutions in national adaptation policies

The updated national adaptation strategy sets out three specific objectives focused on ecological stability and ecosystem services in agricultural, forest and water ecosystems. Nevertheless, the deployment of nature-based solutions remains rather low compared to grey (steel-concrete) solutions. There are positive examples of climate-smart agriculture, close-to-nature forestry and water stream revitalisation that may be replicated.

11. Integration of adaptation into sectoral policies

Czechia has not reported any progress on integrating climate change adaptation into sectoral policies, plans and programmes.

Adaptation has not been sufficiently integrated into key policies such as agriculture, forestry, water management, construction and urban planning, into funding instruments (common agricultural policy or cohesion policy funding) or in national support schemes.

12. Engaging with stakeholders who are vulnerable to climate change impacts

Efforts have been made to engage with vulnerable groups, primarily at subnational level (see Section 6 below).

13. Engaging with private-sector stakeholders

Czechia reported that engagement with the private sector has taken the form of public-private risk-sharing, as in 2021.

Conclusions. Some progress has been made in reviewing and updating adaption policies, strategies plans and measures. Nature-based solutions are mentioned in the policies but not sufficiently promoted and funded, as compared with conventional solutions. Ministries other than the Ministry of the Environment have not been sufficiently involved in climate change adaptation.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Since 2023, progress on the national adaptation plan is being monitored. The Ministry of the Environment reports once a year on the implementation of the plan's 350 measures. The government will use the results of this monitoring in its midterm assessment of the national adaptation strategy.

15. Implementation of adaptation measures and financing

Czechia reported an improved implementation of its adaption measures. For example, as part of its national adaptation plan, water retention measures in forests have been introduced and the restoration of the water management function of small water reservoirs has been promoted.

Some measures introduced by various ministries and departments in the agriculture, forestry, biodiversity, human health and water management sectors could also be considered relevant to climate adaptation.

However, there is considerable potential for enhancing adaptation efforts, especially in the agricultural and forestry sectors. The limited progress overall is due to the responsible ministries not taking ownership of adaptation measures. There is also scope to put climate resilience

considerations more to the forefront in Czechia's use of EU support from the common agricultural policy and cohesion policy funding.[30]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

According to the latest vulnerability assessments Czechia remains very vulnerable to climate change.

The adaptation options set out in the national adaptation strategy are based on expert opinions. The prioritisation of sectoral adaptation measures proposed in the national adaptation plan is based on a robust multi-criteria analysis, in consultation with the relevant ministries and thematic working groups. No information was provided on the impact of these measures on reducing climate impacts, vulnerabilities, and risks.

The barriers to adaptation are both legal and organisational, as already mentioned in 2021. While some of the missing legal norms have been adopted, cooperation between ministries is still lacking, as are human resources.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Czechia has made progress on reviewing and updating its vulnerability and risk assessments. A research project for understanding vulnerability to and impacts of drought and climate change in the country was launched in 2020 and is set to last for 6.5 years in total. The project outcomes will also serve as a knowledge base for the future update of strategic documents on adaptation.

Conclusions. Some progress has been made on vulnerability and risk assessments and on monitoring the implementation of the national adaptation plan. However, overall progress on reducing vulnerabilities, risks and climate change impacts, remains low.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

No new synergies with other international frameworks and/or conventions have been reported since 2021. There are, however, synergies between the adaptation actions set out in the national adaptation strategy and plan, and between mitigation efforts and activities. A recent example is the new 'green savings' programme, mainly focused on energy savings and mitigation, which supports the construction of green roofs among other activities. Synergies between adaptation and mitigation have been sought under the Covenant of Mayors for Climate & Energy.

[30] Czechia intends to invest ca 602 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

Action on adaptation is also part of Czechia's strategic framework for 2030 (based on global Sustainable Development Goals) and the Sendai Framework for Disaster Risk Reduction.

One example of good practice is the ´Intersucho´ programme, managed by the CZECHGLOBE institute. This programme brings together experts to analyse past droughts, monitor the current situation, and try to forecast future periods of drought. Many people from across Czechia get involved in reporting data and, by extension, verifying the monitoring and forecast information prepared by the experts.

The ´Living landscape´ methodology is an advanced participatory approach to improving water retention on whole surface of the landscape. It has been used successfully in Czechia, and may serve as a good practice example for other EU Member States.

The Adapterra awards scheme is another good practice as it motivates land managers to contribute to climate change adaptation.

In September 2022, the Czech Presidency organised a climate change adaptation conference on 'Designing Climate Resilient Landscapes'. Participants from across Europe presented their inspirational adaptation projects that comprehensively address water retention, soil protection and forest restoration as part of landscape planning. The main conference output was a 'Prague Appeal' encouraging designers and implementers to use the common elements of successful adaptation projects, and urging politicians to remove obstacles to their implementation.

Conclusions. Examples of a good practice include creating synergies between mitigation and adaptation efforts, the ´Instersucho´ project, The ´Living landscape´ methodology, and the Adapterra award scheme. The conference 'Designing Climate Resilient Landscapes' helped gather best practices in adaptation and outlined an innovative approach to extending good practices in the 'Prague Appeal'.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

There are no legal requirements for adaptation actions and strategies at subnational level. Nevertheless, regions and municipalities are encouraged to develop adaptation strategies and plans, and to implement specific adaptation measures. Collaboration on adaptation between the Ministry of the Environment and other stakeholders (including subnational stakeholders) takes place primarily through the Adaptation platform. Collaborators on this platform include members of the ministries involved in implementing the national adaptation strategy and plan, and members of the Union of Towns and Municipalities, the Healthy Cities Network, and the National Network of Local Action Groups (LAGs).

By March 2023, more than 200 Czech municipalities joined the EU Covenant of Mayors for Climate & Energy. A total of 179 LAGS play a key role in implementing local strategies and actions, as well as climate adaptation projects. For this, they often work with international partners.

No Czech cities or administrative regions signed the EU Mission on Adaptation to Climate Change Charter during its first implementation stage.

26-29. Subnational policies and cooperation

Currently, of Czechia's 14 regions, three have developed adaptation strategies. The other regions are in the process of developing them but are at different stages.

Since 2021, several projects on engaging with particularly vulnerable regions or other stakeholders have been launched.

The COALA project focuses on adaptation and a just transition in the Moravian-Silesian region, which is particularly affected by the climate transition.

Czech municipalities actively cooperate with their partner cities in other countries. One of the biggest Czech cities (Liberec) is also involved in the Mission Horizon (Climate neutral cities). Some LAGs are also participating in the EU Mission on Adaptation to Climate Change.

Conclusions. An increasing number of cities and municipalities in Czechia are developing their adaptation strategies as signatories of the Covenant of Mayors initiative (even if there is no legal requirement to do so). The city of Prague has developed an exemplary adaptation strategy with a solid evaluation and monitoring system.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	•
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	?
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	●
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↗
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↗
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	P
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	●
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↗
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Denmark according to the European Climate Law

Summary

Since 2021, Denmark has enhanced its efforts to address the imminent risks and challenges posed by climate change.

In 2023, Denmark reported the Climate Risk and Vulnerability Assessments (CRAs) from 2012, which assessed specific sectors at the national level. The CRA has however not been updated.

Denmark is updating its National Adaptation Strategy (NAS) and National Adaptation Plan (NAP) and is also showing its commitment to institutionalising climate adaptation through legislation. Following amendment of the Danish Planning Act, guidelines were finalised in 2022 for risk-mitigation measures in urban planning. Denmark has also established requirements for subnational adaptation planning and even created a task force for specific sector-related coordination between various national bodies. However, there are still reported sectoral gaps in climate-adaptation legislation.

At the subnational level, the majority of municipalities in Denmark have reviewed and updated their local adaptation plans. This local commitment has been supplemented by Denmark's push for public-private partnerships, particularly in areas like floods management. The country also focuses on knowledge-sharing by supporting the private sector with information through online platforms, seminars and conferences.

The formation of a new government in 2022 brought a renewed commitment to climate adaptation. Denmark's work plan now includes initiatives for a new NAS and heightened protection against floods and extreme weather events.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Between 2021 and 2023, the main elements of the climate monitoring and modelling framework have remained the same in Denmark, with the Danish Meteorological Institute (the DMI) carrying out observations of climate parameters and regional simulations being published in the Danish Climate Atlas. In 2021, the University of Aarhus produced a report for the Danish Environmental Protection Agency (EPA) that collected and presented Danish National Monitoring Programme (NOVANA) data that could potentially be applied when further documenting the effects of climate change on the natural environment (NOVANA also includes climate-related indicators).

New methodologies related to the CRA were developed, including new methodologies for coastal flood risk assessment. New projects have started to better map watercourse flooding, assess the costs of climate change and distinguish between climate-related and climate-change-related effects and risks.

Denmark reported for the first time a CRA from 2012, which includes thematic and sector-specific assessments at the national scale.

2-4. Changes to the reported vulnerabilities and risks since 2021

Denmark reported that the agriculture and food sector and the water management sector areas the key sectors affected by climate change.

Denmark has partially updated the description of risks and vulnerabilities since 2021. Updated information on vulnerabilities and risks in the agriculture and food sector and in the biodiversity, sector has been provided, but the vulnerabilities and risks for coastal areas, fisheries and aquaculture have not changed.

The INFORM climate-change tool[31] identifies coastal flood, droughts and pluvial/fluvial floods as the most significant hazards. This is in line with those identified by Denmark in its reporting.

Denmark expects that heatwaves are likely to significantly increase in the future.

Conclusions. Denmark issued a CRA in 2012, this should however be updated on the basis of the latest available science. Updated information was provided on vulnerabilities and risks in the agriculture and food sector and for ecosystems.

[31] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

Section 2 – Legal and policy frameworks, and institutional arrangements

5-6. National governance structures supporting adaptation action

Following an amendment of the Danish Planning Act, Denmark adopted its final guidelines for hazard-prevention and risk-mitigation measures in urban planning in 2022.

Denmark established a task force for specific sector-related coordination tasks, involving both the Danish coastal authority and the Danish EPA.

The coastal authority plays a role at the national level in relation to the management of flood risk and coastal erosion and completed a new nationwide risk assessment for the entire Danish coastline. A task force responsible for coordinating tasks between the coastal authority and the EPA operated between 2017-2020. In 2020, the coastal authority completed a new nationwide risk assessment (Kystplanlægger) for the entire Danish coastline.

In 2020, cross-ministerial working groups started investigating possible national climate-adaptation initiatives. The Ministry of Environment is the main entity responsible for adaptation at the national level. No information is available on the involvement of the prime minister's office in the interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Planning and implementing measures for adaptation is largely a municipal responsibility, which is outlined in a number of laws and executive orders the Planning Act, the Floods Act, the Act on Watercourses, the Water Supply act, and the Waste Water executive order under the Environment Act. There is no national obligation to update the local adaptation plans but most of the municipalities have reviewed and updated the plans, either in connection with the municipal plans every fourth year, or as part of the voluntary DK2020-network.

Conclusions. Denmark has established a task force for specific sector-related coordination tasks, comprising both the Danish coastal authority and the Danish EPA. Denmark has adopted its final guidelines for hazard-prevention and risk-mitigation measures in urban planning. No permanent governance structure is in place at the national level to support adaptation actions across all sectors and the legislative framework does not include legally binding adaptation goals.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The identified risks and vulnerabilities are mostly covered by adaptation priorities. However, the significant climate hazards of heatwaves, water scarcity and droughts need to be better addressed.

At the end of 2022, the new Danish government included an update of the NAS and NAP in its work plan. The updated national adaptation plan was published in Q4 2023. An update of the national CRA on coastal risks has been planned within the next few years.

10. Nature-based solutions in national adaptation policies

Denmark has not mentioned any progress on ecosystem-based adaptation and nature-based solutions in adaptation policies in its reporting.

11. Integration of adaptation into sectoral policies

The 2021 data did not mention any integration of climate-change adaptation into sectoral policies, plans and programmes, but the 2023 data provides a list with specific examples of integration in the sectors of agriculture, tourism and insurance:

- agriculture: the 2021 Green Transition of the agricultural sector includes multiple climate-mitigating measures with positive climate-adaptation effects;
- tourism: the Sustainable Growth in Danish tourism, which was adopted in 2022, includes goals and initiatives on climate-change adaptation;
- insurance: the Danish Natural Hazards Council determines whether there has been a storm surge, flooding from streams and lakes or a drought that merits compensation by the Council.

The 3rd River Basin Management Plan submitted during the summer of 2023 does not include adaptation measures in the water management sector.

12. Engaging with stakeholders who are vulnerable to climate change impacts

It is not clear from the reporting if and how stakeholders particularly vulnerable to climate-change impacts were involved.

13. Engaging with private-sector stakeholders

Denmark supports public-private partnerships, particularly in the area of flood management. Denmark also supports knowledge-sharing with the private sector through online platforms, seminars and conferences.

Denmark reported on a catalogue of technologies and methods that was developed in collaboration with the Danish Environmental Technology Association and published.

Conclusions. Denmark has recently updated its NAP. Heatwaves and droughts are not yet sufficiently reflected in adaptation priorities. Nature-based adaptation solutions are not reflected in Denmark's reporting.

Section 4 – Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Denmark reported that it does not have a national monitoring and evaluation system related to reducing climate impacts, vulnerabilities and risks, and to increasing adaptive capacity.

The coastal authority continues to report on planned measures by municipalities in response to significant flood risk and on progress made in their implementation.

15. Implementation of adaptation measures and financing

As a result of the 2020-2024 Joint Agreement on Coastal Protection of the Danish West Coast, progress has been made on adaptation measures and their financing in coastal areas. Four municipalities and the Danish state are parties to the Joint Agreement. A total of around DKK 204 million per year is to be invested in coastal protection in these four municipalities. In addition, Denmark reported on 10 new projects along the entire Danish coast which have been granted a total of DKK 150 million in 2023 to reduce the risks of flooding and erosion.

There is scope to put climate resilience considerations more to the forefront in Denmark's use of EU support from the common agricultural policy and cohesion policy funding.[32]

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Climate action plans, which almost all Danish municipalities have developed, also help improve these municipalities' flood risk management (see below for details). No information has been provided on progress made towards reducing climate impacts, vulnerabilities and risks in areas other than flood risk management.

Denmark has initiated a joint plan on how to secure the capital region against coastal flooding in 2022 with first step exploratory investigations. The ongoing project spans several municipalities, the owners of infrastructure and national ministries.

Denmark has a new regulation on wastewater utilities' investments, which should also help address climate-change adaptation.

Denmark has identified barriers in the areas of legislation, financing and data availability, which will be addressed by the new NAS/NAP.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

The Danish Coastal Authority has reviewed and updated the national flood risk assessment for coastal and fluvial flooding, including developing a vulnerability assessment (as part of the implementation of the Floods Directive).

Conclusions. No significant progress has been made in enhancing Denmark´s monitoring and evaluation system.

[32] Denmark intends to invest ca 6 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Insurance companies pay a mandatory annual fee to cover the costs of damage caused by climate-induced events.

Denmark has not provided any other information on 'good practices and lessons learned'learnt'.

Several international projects have been implemented, which should contribute to climate-change adaptation. In the Horizon project RESIST (2018-2022),) a new practical framework for climate-adaptation pathways has been tested in four regions. NEPTUN (2020-2023) is an Interreg-funded project that connects small and medium-sized enterprises and municipalities across the Danish-German border. The aim of the project is to unleash the innovation and growth potential within the water and wastewater sectors.

Several local projects have been instrumental in stakeholders' engagement (e.g. 'New Lakes Retain Rainwater in the Town of Tommerup Stationsby on Funen'Funen and 'Storm-surge protection and new harbour environment in Svendborg').

The Danish Ministry of Foreign Affairs is currently implementing Denmark's 2021-2025 strategy on development aid ('Fælles om verden'), which includes efforts in the fields of climate-change adaptation and nature management and thus increases resilience of poor and vulnerable countries and people.

The Ministry of Environment is responsible for the inter-ministerial coordination on adaptation. There is no information available on the involvement of the prime minister's office in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Conclusions. Innovative adaptation projects are being implemented in Denmark, within Denmark's cross-border cooperation and as part of Denmark's international aid. Insurance companies pay a mandatory annual fee to cover the costs of damage caused by climate-induced events.

Section 6 – Subnational level information

Subnational and private-sector adaptation

25. Subnational governance structures for adaptation action

Denmark supports private-sector climate adaptation efforts, including online platforms, seminars and conferences.

Almost all Danish municipalities (96 out of 98) are part of the DK2020 network, which aims at developing climate action plans that are compatible with the Paris agreement. Copenhagen Municipality is a member of C40 Cities (a global network of nearly 100 mayors of the world's leading cities that are united in action to confront the climate crisis).

The coastal authority has produced guidance material for municipalities on developing risk management plans under the Floods Directive.

26-29. Subnational policies and cooperation

Most Danish municipalities have reviewed and updated their CRAs and their local adaptation plans (even if this is not a legal obligation). However, there is no systematic monitoring in place to take stock of progress in local adaptation.

There is no national procedure for reviewing and updating the subnational adaptation plans and policies. However, Frederiksberg and Copenhagen, for instance, provide an overview of the state of play of their climate-adaptation measures.

Four of the five Danish regions and three municipalities are signatories of the Charter of the EU Mission on Adaptation to Climate Change (the Capital Region of Denmark, the Central Denmark Region, the North Denmark Region, the South Denmark Region, and the Zealand Region; Aarhus City, Kalundborg Municipality and Vordingborg Municipality).

Conclusions. Almost all Danish municipalities have reviewed and updated their CRAs and their local climate adaptation plans. This will help the monitoring and evaluation of adaptation progress. Some cities regularly report on their progress. Danish regions and municipalities actively participate in the EU Mission on Adaptation to Climate Change.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 – National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 – Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 – Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	↗
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	N
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	?
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↗
Section 4 – Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↗
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	?
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●

Section 5 – Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	↑
Section 6 – Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	•
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	•
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Estonia according to the European Climate Law

Summary

Estonia made some progress on adaptation between 2021 and 2023. The policy framework remains as before but is being updated as part of a wider project to develop an overarching environmental action plan that also includes a national adaptation plan (NAP). Estonia has started drafting a Climate Law also to improve climate change adaptation, set to enter into force in January 2025. A large proportion of local authorities in Estonia have developed or are developing local energy and climate plans, including with central government support.

Estonia needs to comprehensively assess its vulnerability to climate change but lacks a monitoring framework for climate risks and adaptation action. This complicates the assessment of the evolving vulnerabilities and their management. Estonia has started updating the frameworks.

Estonia reported three priority sectors at risk from climate change (health, civil protection and emergency management, and forestry). These are consistent with scientific evidence, but do not include other sectors that may also be exposed to the full range of observed and future climate hazards, such as agriculture and water management. Although Estonia did not include this in its reporting under the Governance Regulation, it has shared with the Commission that the current Estonian Climate Change Adaptation Development Plan until 2030[33] identifies a broader range of priority sectors (see below).

The ongoing update of the NAP and its integration into an overarching environmental action plan due in 2023 should strengthen Estonian adaptation actions.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 6 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

[33] Climate Change Adaptation Development Plan until 2030

1. Climate-monitoring and modelling framework

Estonia has not made any changes to the climate monitoring and modelling framework since 2021. Estonia uses the 2015 modelling framework used for establishing the national climate scenarios until 2100. Estonia faces limited capacity for systemic risk assessment has been identified as a barrier to progress in adaptation, but the Estonian Environment Agency is reported to be working to revise and update its climate risk assessments (CRAs) and to be working on new high-resolution climate projections (expected to be completed in the beginning of 2027), which are triggered by the latest IPCC AR6. Updating the monitoring and modelling framework has started, including with support by a LIFE project.

2-4. Changes to reported vulnerabilities and risks since 2021

Estonia has identified 15 climate hazards (including droughts, heatwaves, forest fires and flooding) and expects that these (with the exception of sea-ice) will significantly sees significant increase in the future. It has also identified 8 additional future climate hazards. As in previous reports, Estonia reports that health, civil protection and emergency management and forestry areas the key affected sectors. Estonia identifies drought as a key and increasing hazard and mentions this in the context of risks to forests, but does not identify the agriculture and food sector and the water management sector as key risk areas.

Although Estonia did not include this in its reporting under the Governance Regulation, it has shared with the Commission that the current Estonian Climate Change Adaptation Development Plan until 2030 identifies eight priority sectors (health and rescue capacity, land use and planning, natural environment, bioeconomy (including agriculture, forestry, fishing industry, hunting, tourism, peat production), economy, society, awareness and cooperation, infrastructure and buildings, energy and security of supply) with specific measures and metrics.

Compared the vulnerability and risk analysis under the INFORM tool [34], the PESETA project [35] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. Estonia has not updated its climate monitoring and modelling tools since 2021, but has started the process of updating these. With regard to climate modelling tools, the 2015 methodological framework remains the basis, until the new climate projections are completed. The CRA has not identified further risks over and above those identified into 2021, but the reported risks and sectors appear consistent with the results of independent analysis by the Joint Research Centre and the country's own national risk assessment.

[34] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

[35] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

Section 2 – Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The main national governance structures have been strengthened since 2021. The National Adaptation Strategy (NAS) and the NAP on climate-change adaptation were adopted at government level in April 2017. In 2023, several Ministries were reorganised, including the Ministry of Environment was reorganised as the Ministry of Climate with broader responsibilities including for transport infrastructure and special planning aspects. This should bring focus on the importance of climate change mitigation and adaptation issues. The Ministry of Climate is responsible for the development of the NAS (together with several other ministries) and the implementation of the Development Plan for Climate Change Adaptation until 2030, which presents a framework for action that serves as a basis for reducing Estonia's vulnerability to climate change.

The NAP for 2021-2025 was completed in 2021. It will be updated and included in the newly prepared Environmental Development Plan until 2030 (KEVAD), which is planned for 2023. Climate change adaptation is a part of Green Reform action plan for 2023-2025 drafted by the Republic of Estonia Government Office and coordinated by a commission chaired by the prime minister.

Although Estonia did not include this in its reporting under the Governance Regulation, it has started drafting a Climate Law to set climate targets and timeframe by decade and sectors, to define responsible parties and management structure and also to improve climate change adaptation, including integrating climate resilience principles into planning, establishing reporting systems and regular climate risk and vulnerability assessment. Estonia´s Climate Law will enter into force in January 2025.

Conclusions. Estonia has strengthened its governance structures since 2021, notably with a strengthened Climate Ministry. Estonia continues to mainstream climate adaptation in cross-ministerial coordination under the recast Climate Ministry, including in the context of establishing a new environmental development plan.

Section 3 – Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The NAS and NAP are consistent with the vulnerabilities and risk identified in Estonia but do not cover all sectors potentially exposed to observed and future risks. The adaptation activities are focused on the fields of natural environment and bioeconomy, with emphasis also being placed on more efficient use of primary energy and increasing renewable energy's share of total energy final consumption in the field of energy and security of supply. Health, emergency preparedness and

forestry are the three focus sectors. The reporting recognises drought and changes to the changed hydrological system as a risk, but their subsequent impacts on agriculture and food production seem to receive less emphasis. Estonia has revised neither the overall level of challenges, gaps and barriers to adaptation, nor the 2021 adaptation objectives.

10. Nature-based solutions in national adaptation policies

Favourable state of ecosystems and sustainability in bioeconomic sector are two of the adaptation objectives stated in the NAS. In particular, the NAS seeks to ensure diversity of species, habitats and landscapes; favourable conditions and completeness of terrestrial and aquatic ecosystems; and provision of socio-economically significant ecosystem services.Nature-based solutions are not specifically mentioned in other policy documents.

11. Integration of adaptation into sectoral policies

Estonia has integrated adaptation into several sectoral policies and plans. At legislative level, the Emergency Act and Water Act address adaptation needs. Adaptation is also integrated in the long-term Estonia 2035 strategy, the climate policy vision document General Principles of Climate Policy until 2050 (GPCP), the 2020-2030 Development Plan for Internal Security, the 2020-2030 Population Health Development Plan, the 2030 Agriculture and Fisheries Strategy, the 2030 Transport and Mobility Development Plan and the 2021-2035 Youth Sector Development Plan.

12. Engaging with stakeholders vulnerable to climate-change impacts

Estonia does not report on targeted engagement of vulnerable stakeholders, but it does acknowledge the need to use various communications channels at the appropriate governance level, while also noting the importance of knowledge and capacities. There is an emphasis on civil protection and emergency preparedness, including a dedicated application for alerting the general public of crisis situations. Although Estonia did not include this in its reporting under the Governance Regulation, it has shared with the Commission that in the context of preparing the new Climate Act, it has in 2023 established a Climate Council and organises a range of consultative actions.

13. Engaging with private-sector stakeholders

Estonia specifically highlights the need to engage with agricultural and fishing communities, and also notes the need to inform economic actors more broadly of risks and opportunities, but it does not identify any new activities by comparison 2021. Although Estonia did not include this in its reporting under the Governance Regulation, it has shared with the Commission that in the context of preparing the new Climate Act, it has in 2023 established a Climate Council and organises a range of consultative actions.

Conclusions. Estonia has mainstreamed adaptation into further sectors. It appears that certain policy areas (notably agriculture) may have considered climate risks and addressed adaptation needs, even if they have not been identified as priorities in the NAS. This indicates a possible need to update the key sectors in the NAS and to give greater priority to climate-resilience considerations when using EU support from the common agricultural policy and the cohesion

policy. [36] Nature-based solutions are not specifically identified in the policies. Further stakeholder engagement has been started in the context of preparing the new Climate Law.

Section 4 – Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Estonia does not have a comprehensive monitoring, reporting and evaluation (MRE) methodology in place to systematically and periodically assess climate impacts, vulnerabilities, risks and adaptive capacity. This impedes the assessment of progress in adaptation measures and was identified as an issue in both 2021 and 2023. Although Estonia did not include this in its reporting under the Governance Regulation, it has shared with the Commission that the "activity-based budgeting" and reporting could be a source of relevant information for monitoring adaptation-relevant progress across the government.

15. Implementation of adaptation measures and financing

In light of the lack of a comprehensive monitoring mechanism, and reflecting that adaptation measures and actions are divided between different ministries and their action plans, Estonia reports (as in the 2021 report) on the adaptation of measures on the basis of the outcomes of the 2017-2020 NAP, but provides no new information on progress made since 2021. Estonia could give greater priority to climate-resilience considerations when using EU support from the common agricultural policy. Although Estonia did not include this in its reporting under the Governance Regulation, it has shared with the Commission that EU and other financial support systems are mainly aimed at supporting raising awareness, strengthening local level adaptation and greening planning, preventing and mitigating flood risks, developing meteorological, hydrological and environmental monitoring systems and climate scenarios, restoring wetlands, lakes and rivers and increasing the resilience of different ecosystems in a changing climate.

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Estonia has implemented actions to improve resilience to multiple risks. However, the lack of a comprehensive monitoring mechanism means that it is not possible to determine how much progress has been made since 2021 in reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; or meeting adaptation priorities. While it is not possible to identify progress on addressing barriers to adaptation, Estonia has identified that systemic risk assessment, better indicators and MRE systems are necessary in order to sustain the current adaptation actions detailed in the NAS and updated NAP, and that the lack of these is one of the barriers to adaptation.

[36] Estonia intends to invest ca 92 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Estonia finalised the new NAS in 2021, which included addressing knowledge gaps in national vulnerabilities and risks. The list of priority vulnerable sectors remains the same as in the previous NAS and there is not enough information regarding a possible evolution of the assessment of individual risks and vulnerabilities at a more granular level. Estonia does not appear to have reviewed the CRAs since 2021.

In 2022, Estonia reported on the implementation in 2017-2020 of the Climate Change Adaptation Development Plan until 2030, thus providing an overview of the achievement of the goals and effectiveness of the Development Plandevelopment plan in its first 3 years. Since the adaptation of the new NAS, the focus has been on implementing the NAS with several strategic documents. Estonia is in the process of recasting the NAP into a comprehensive environmental strategy document, the Environmental Development Plan until 2030 (KEVAD).

Conclusions. The lack of a comprehensive MRE methodology makes it difficult to assess the evolution of climate impacts, vulnerabilities, risks and adaptive capacity in Estonia. Estonia has itself identified this as a barrier.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Since 2021, Estonia has identified additional synergies between its NAS and the UN 2030 agenda (2020) and the Landscape Convention (since 2019). It has also engaged in several cooperation projects to share information and to strengthen science, institutions and adaptation knowledge. This includes study-visit for representatives of local governments in 2022 to Oslo to learn about storm-water management and how to make the local environment greener; and a study to develop a remote sensing system for flood occurrence and warnings of the general public. In addition, a civil protection system and the 'Ole valmis' (be prepared) app was developed to improve citizen-level awareness. As regards cooperation to enhance adaptation action at national, macroregional and international level, the LIFE SIP AdaptEst project will continue running until 2032, the LIFE-IP BuildEst project will continue running until 2028, and the LIFE UrbanStorm project was finished in February 2023. Finally, Estonia is also engaging in the Horizon Europe project Regions4Change.

Conclusions. Estonia is engaged in several international projects both at national and local level. It is expected that these will inform the review of its NAP.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation actions

The link between national and subnational adaptation action is mainly managed through a working group used for updating the NAS, which includes representatives of cities and municipalities. There are four regional crisis committees in Estonia to coordinate crisis management at regional level, as required by legislation. The Ministry of Climate cooperates with the Association of Estonian Cities and Municipalities to promote climate issues. Guidelines have been created for the preparation of local energy and climate plans for local governments.

26-29. Subnational policies and cooperation

Estonian local governments have stepped up the preparation of local strategic climate and energy plans based on national plans. In December 2022, local energy and climate plans existed in nearly 50 of the 79 local governments. In June 2022, risk-mitigation plans related to the flooding threat for the Eastern Estonia, Western Estonia and Koiva watersheds were approved. Cooperation at subnational level has also moved forward with the support of the LIFE-IP BuildEst project and the LIFE UrbanStorm project completed in 2023.

Stakeholder engagement in adaptation policy has been focused on a multidisciplinary cooperation platform (Green Tiger) that initiates and contributes to innovation inside companies and in society more broadly by involving entrepreneurs, individuals, the public sector and the civic sector. Actions include two youth assemblies in 2021 and 2022. The government has held specific discussions with tourism-sector NGOs to improve adaptation to the effects of climate change. In addition, the Ministry of Climate holds an annual competition ('Environmentally Friendly Company of the Year') to promote the conversion of environmental problems into economic opportunities. Several different climate-related information days, seminars and conferences have also been held.

Five local authorities in Estonia have signed the EU Mission on Adaptation to Climate Change: Pärnu City, Saue Rural Municipality, Tallinn City, Tartu City and Viimsi Municipality.

Conclusions. National policies have helped Estonian local authorities to develop subnational strategies and action. It is not possible to see how the consistency of national and subnational action is ensured and whether there are tools in place to facilitate structured mutual learning in Estonia.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	•
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	P
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	↑
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	N
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↗
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	↗
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	?
	18. Has progress been made in meeting adaptation priorities?	?
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	?
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Finland according to the European Climate Law

Summary

With its new 2022 Climate Act and National Adaptation Plan 2030 (NAP 2030), Finland has strengthened its approach to climate adaptation at both national and regional level. The new assessment of risks and vulnerabilities is comprehensive and covers, covering all major climate-risk vectors, including floods, drought, heatwaves and forest fires. It therefore provides a solid basis for adaptation across key sectors. Further efforts are under way to improve both the risk assessments and the monitoring frameworks. Adaptation is mainstreamed across policies and there are additional resources to support regional adaptation actions. Finland is pursuing a multitiered approach to climate adaptation, involving widespread policymaker and stakeholder engagement across various groups, and leveraging scientific and technological advancements. The national strategy for climate adaptation spans sectors such as flood and drought risk management, healthcare, social welfare and transportation. A range of ministries (including the Ministry of Transport and Communications, the Ministry of Economic Affairs and Employment and the Ministry of the Environment) are contributing to this cross-sectoral approach.

Regional adaptation action is also well developed and further supported by the reinforced resourcing for NAP 2020. Finland participates in a range of international cooperation initiatives. The Finnish Meteorological Institute (FMI) and the Natural Resources Institute Finland actively participate in scientific research and consultancy on climate adaptation.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

In parallel with preparing the new 2022 Climate Act, Finland also updated the climate scenarios in 2021-2022, using the Shared Socio-economic Pathways (SSPs). Finland has also developed national SSPs for agriculture, food, social welfare and health sectors, and the work on regional and

system-level scenarios is in the early stages. The comprehensive monitoring activities continue, in particular by the FMI.

2-4. Changes to the reported vulnerabilities and risks since 2021

The assessment of risk and vulnerability is more detailed than in 2021, with clear indications of expected levels for the 13 key affected sectors. Agriculture, forestry, food and water management are also considered as key affected sectors, with the probability, vulnerability and impacts of climate change assessed as medium or low. Finland reports that it has observed 20 different climate hazards and notes uncertainties about how several of these will evolve in the future. The hazard coverage is consistent with the INFORM [37] climate-change tool, which identifies flooding, coastal flooding and drought as the most significant hazards. Finland also identifies heatwaves as the biggest health climate-change hazard. When compared with the vulnerability and risk analysis under the INFORM tool, the PESETA project [38] and the country's own National Risk Assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. Finland has updated its national climate modelling framework in line with global scientific developments and is making progress with more granular scenario development at the regional and systems levels. This level should continue. The risk assessment is comprehensive and allows appropriate preparedness for climate change.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The main governance structures for adaptation remain the same as in 2021. National adaptation planning is required by Finland's Climate Act (adopted in 2022), which includes Finland's National Climate Change Adaptation Plan. Finland aims to integrate adaptation into the normal planning and activities of administrative branches and sectors, and is implementing this through several administrative-branch-specific plans and sector-specific regulation. For example, climate-change impacts, preparedness and adaptation are integrated into agriculture, disaster risk reduction, flood risk and river basin management, transport and construction. That includes legislation and strategies, such as the Emergency Powers Act, the Rescue Act, the Act on Security of Supply, the Security Strategy for Society 2017 (updated in 2023) and the Government Report on Internal Security. In 2023, climate-change impacts were included in the National Risk Assessment. There is no information available on the involvement of the prime minister's office

[37] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

[38] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

in interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Conclusions. No major changes in governance structures have taken place since 2021 and Finland continues to mainstream adaptation across policy areas (with renewed impetus due to the 2022 Climate Act).

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, changechange in the reported challenges

The vision of the Finnish national adaptation activities is formulated in NAP 2030, which underlines well-being, prosperity, safety and security in a changing climate. This covers actions across 10 main themes (including food and nutrition security, use and management of renewable natural resources, biodiversity, nature-based solutions and drought risk management, health protection and promotion, infrastructure and the built environment). There are also administration-specific plans, such as the Ministry of Agriculture and Forestry adaptation plan, the Ministry of Social Affairs and Health 2021, the Ministry of Defence 2023 and more generally the Environmental Administration's 2022 Action Plan for Adaptation to Climate Change. Finland has also noted that adaptation has been integrated into broader climate /environmental policy programmes in other sectors, including transport and communications.

The reported risks are consistent with the overarching policy documents. Finland has developed its reporting of the challenges, gaps and barriers to adaptation compared with 2021, including not only administrative capacity, sectoral capacities and complex responsibilities, but also lack of local, sector-specific and decision-useful information, which hampers systematic assessment of adaptation measures.

10. Nature-based solutions in national adaptation policies

Nature-based solutions are an explicit part of NAP 2030, which includes a specific target that nature-based solutions will have become established and will have increased society's preparedness for climate risks and improved water protection while also increasing biodiversity by 2030. Biodiversity and natural resource management are also part of other elements of the plan. Adaptation to climate change is included in the objectives of the new Nature Conservation Act (2023). In addition, a new national biodiversity strategy is currently being developed, in which reducing climate-change impacts and vulnerabilities to climate change are emphasised.

11. Integration of adaptation into sectoral policies

Finland has further mainstreamed adaptation into a wide range of sectoral policies, including water management, forestry (the National Forest Strategy and Forest Damage Act), transport, buildings (the Construction Act), national land-use guidelines and the Flood Risk Management Act (for

urban flood management). The 2023 National Risk Assessment for disaster risks also included adaptation.

12. Engaging with stakeholders vulnerable to climate-change impacts

During the preparation of NAP2030, Finland consulted a broad range of stakeholder representatives, including vulnerable groups such as young people, older people, people with disabilities , disabled and the indigenous Sámi people. The Finnish Environment Institute is involved in a project ('Solidarity in climate-change adaptation policies: towards more socio-spatial justice in the face of multiple risks' (SOLARIS)), which has organised events to involve the local population, which is facing significant flood risks. Furthermore, the Natural Resources Institute Finland is coordinating a project ('Youth and indigenous peoples' involvement in climate-change adaptation in the Arctic and Barents region'region (ACAF)) which involves engaging with indigenous people and youth in the design and implementation of climate-change adaptation schemes.

13. Engaging with private-sector stakeholders

The private sector was consulted in the preparation of NAP 2030. It was also consulted in various sectoral strategies and projects which address climate resilience and adaptation (including the preparation of the 2035 National Forest Strategy).

Conclusions. The 2022 Climate Act and NAP 2030 strengthen Finnish adaptation policy, with thorough risk assessment covering all key sectors and risks, including flooding, risks to food security and the role of nature-based solutions in adaptation. The documents were prepared in consultation with stakeholders, including vulnerable groups, and are followed up by further sectoral action.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Finland has continued to strengthen its monitoring and evaluation action. In 2022, Finland published a comprehensive evaluation of its adaptation policy. In 2023, the Finnish Environment Institute (Syke) will conduct a project that will evaluate the current use of indicators and identify development needs of indicator use in Finland to strengthen monitoring of climate impacts, vulnerabilities and risks. Other specific examples in 2023 are projects funded by the Ministry of Agriculture and Forestry on forest damage management, prevention and preparedness, and the development of wildfire and forest firefighting capacity by scaling up static fire maps to a national level. National adaptation reporting is done through the Annual Climate Report, which is one of the requirements of the Climate Act.

15. Implementation of adaptation measures and financing

Building on NAP 2030 and the comprehensive evaluation of Finnish adaptation policy, Finland has set out several legislative reforms and plans. For example, adaptation has been considered in

the proposal for the new Nature Conservation Act, the ongoing legislative reform of the Rescue Act, and the government's decision on supply-security objectives. In terms of adaptation-spending, no substantial increases were reported between 2021 and 2023. Adaptation-spending is not routinely identifiable, but some specific projects were noted (including a EUR 145 000 project to improve adaptation in water services; projects to strengthen adaptation in agriculture worth around EUR 300 000; and a project to support mapping for the emergency services that indicates the risks of wildfires and supports firefighting, worth around EUR 330 000). Finland has noted that adaptation aspects were reviewed when preparing its CAP strategic plan. There is scope to put climate resilience considerations more to the forefront in Finland's use EU support from the common agricultural policy and cohesion policy funding. [39]

16-19. Reducing climate impacts, vulnerabilities, and risks, increasing adaptive capacity;capacity meeting adaptation priorities; and, addressing barriers.

Finland has actively expanded the inclusion of adaptation action across many policy areas that have been identified as key. Finland notes that progress in these areas contributes to a general reduction of vulnerabilities and risks, but that it is not possible to quantify the extent of the reductions. Weather extremes can have economic impacts in the current climate in several sectors (agriculture, forestry and electricity distribution), although an exact quantification has not yet been possible.

Finland considers that its adaptive capacity has generally increased due to increased awareness of possible climate-change impacts, with positive action reported for the built environment, in water resources and flood management, in energy distribution and in the agricultural sector. The 2022 evaluation of Finland's adaptation policy concluded that the general awareness of the impacts and risks of climate change and the need to adapt has strengthened and is at a comparatively good level in Finland. Furthermore, regional analyses of adaptation across sectors have become more common.

On the basis of the assessment of the adaptation policy, the 2022 Climate Act aims to address the barriers to adaptation. In particular, the financial barriers have been addressed to some extent by allocating new human resources at both the national level (to the coordinating ministry, the Ministry of Agriculture and Forestry) and the regional level. In addition, in order, to address the issue of insufficient awareness of the potential impacts of climate change, Finland has strengthened national sector-specific planning.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Finland updated its vulnerability and risk assessment during the preparation of NAP 2030 and there were also updates to sectoral and cross-sectoral risk and vulnerability assessments. In addition, an assessment of regional climate-related risk and vulnerabilities in Finland has started.

[39] Finland intends to invest ca 1 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

Work is currently under way to develop a model for risk and vulnerability assessments that will allow continuous development and updates of the assessment.

The revised Climate Change Act (423/2022) and NAP 2030 have strengthened the general adaptation framework by introducing obligations to promote climate resilience and sustainable development, and to regularly update the plan. Moreover, a new content requirement for the development of national adaptation plans is that a regional risk assessment is to be carried out when necessary.

Conclusions. Finland has updated its monitoring and evaluation framework in the context of its new Climate Act and NAP 2030. It is currently working to facilitate continuous updating of risk and vulnerability assessment, as well as more sector-specific planning. It is also addressing identified barriers to adaptation, notably the financial barriers linked to staffing levels. Adaptation-spending is mainstreamed as a part of official duties at both national and subnational level and adaptation-spending is not routinely identifiable.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Finland does not identify specific good practices and lessons learned, but the thorough preparation of the new Climate Act could be of interest to others. Finland has sought to strengthen synergies with the adaptation target of the Kunming-Montreal Global Biodiversity Framework, which will be implemented through a national biodiversity strategy and action plan that was , to be developed in 2023. Finland has reactivated a cross-stakeholder cooperation network for the implementation of the Sendai Framework. Finnish institutions also actively cooperate at the international, EU and Nordic levels, and specifically in the key mechanisms of cooperation in the Arctic, Barents and Baltic Sea regions. Finnish regions are involved as demonstrating sites in several Horizon-Europe demonstration projects[40].

Conclusions. Finland does not identify specific good practices, but the recent update to national adaptation plan is of broader interest. It continues to strengthen synergies with international frameworks, including at regional level.

[40] - Uusimaa - in regions4climate https://regions4climate.eu/resilient-region/uusimaa/
- Lapland in MountResilience : https://cordis.europa.eu/project/id/101112876
- SouthWest Finalin in RESIST: https://resist-project.eu/regions/

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

Finland has various subnational governance structures in place to support adaptation actions, notably the ELY Centres' climate-expert network and work through Finland's regional councils. A number of measures have been set out in the Tampere City Region's 2030 climate strategy. The business network for climate security in the Pohjois-Savo region is coordinated by Savonia University of Applied Sciences. The Helsinki Metropolitan Area's monitoring group coordinates action.

There are also several sectoral coordination networks for climate-adaptation work at subnational level. These include, including the Ministry of Transport and Communications, the Ministry of Economic Affairs and Employment, the Ministry of the Environment and the Finnish Environment Institute.

The institutional framework for subnational climate-change adaptation action is established in several legislative acts, notably the Local Government Act / Municipal Act, the Emergency Powers Act, the Flood Risk Management Act, the new Construction Act, the upcoming reform of the Land-use and Building Act, the Water Services Act, the Environmental Protection Act and the Health Protection Act.

26-29. Subnational policies and cooperation

Finland has explicitly recognised the importance of preparedness regarding various climate risks in the National Security Strategy for Society and the triennially updated national risk assessment (most recent update was in 2023). The Ministry of Agriculture and Forestry set up a working group in 2021 to prepare a model for community-specific reindeer-pasture management.

The Helsinki Region Environmental Services Authority hosts a biennially updated dataset on land cover in the Helsinki Metropolitan Area. The newly published version of the dataset was produced in collaboration with a company that providesproviding solutions powered by artificial intelligence was used to enhance the classification of sand and asphalt, which had been recognised as an essential target when developing the dataset. Some progress has also been made in reviewing and updating subnational adaptation action. The Helsinki-Uusimaa Region and the City of Tampere participate in several international cooperation initiatives.

10 Finnish municipalities and regions participate in the EU Mission on Adaptation to Climate Change: Espoo City, Häme Region, Helsinki-Uusimaa, Kymenlaakso Regional Council, Lapland, Ostrobothnia, Southwest Finland and the City of Turku Region, Tampere City, Turku City and Vaasa City.

Conclusions. Finland has strengthened its national support structures for regional adaptation (e.g. setting up thematic frameworks and working groups to support the implementation of national legislation). There are also a wide range of local and regional adaptation policies and actions, and Finnish municipalities and regions are active in the EU Mission on Adaptation to Climate Change.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑
	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	Y

	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↑
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↑
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	•
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	↑
Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y

	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↗
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in France according to the European Climate Law

Summary

In the context of escalating global heating, France is taking active steps to alleviate climate change-related vulnerabilities. France is coming to the end of the implementation period of the second National Adaptation Plan for Climate Change for 2018-2023.

The second national adaptation plan adopts a more targeted approach than its predecessor, closely aligning thematic interfaces to priorities, with an increased focus on sectors and regions susceptible to climatic shifts. Regionalised climate projections for France's overseas territories are an integral part of the plan. A third national adaptation plan due to be adopted by end 2023, will cover health, the economy, agriculture, infrastructure and resilience of essential services, as well as natural habitat protection.

A specific strategy is in place to optimise land use, land-use change and forestry resources for climate adaptation.

France has established 14 laboratories of excellence to deliver innovative solutions for climate adaptation. A "Future of Climate" portal provides access to regional climate data and products regarding impacts and the adaptation of society and environment. Initiatives such as the National Observatory on the Effects of Global Warming (ONERC)and a geoportal streamline the exchange of critical information on climate risks.

Effective since the beginning of 2023, the 'Fonds verts' are an unprecedented mechanism for accelerating ecological transition in the regions. These make EUR 2 billion available to the regional prefects to finance projects by local authorities and their partners in three areas: environmental performance, adapting the territory to climate change and improving the living environment.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

France has achieved notable advances in climate-research and monitoring systems. One significant development is the introduction of a new dataset of regionalised climate projections within the DRIAS Future of Climate portal. This dataset was created under the climate services convention, supported by the Ministry for an Ecological Transition and assisted by several French laboratories involved in climate modelling (IPSL, CERFACS and CNRM).

In addition, France has strengthened its capabilities in climate and environmental research through the establishment of 14 laboratories of excellence (labEx).. These efforts, in conjunction with the 2022-2026 Contract of Objectives and Performance (COP) with Météo-France, highlight France's commitment to monitoring climate change. They provide national climate data and services, encourage innovation and collaboration, and comply with a corporate social responsibility (CSR) policy.

France has generated new thematic and sector-specific assessments on a national scale and has carried out subnational climate projections. These projections explicitly incorporate subnational climate risk assessments (CRAs) or regional climate projections, which typically feature multisectoral assessment frameworks.

The Climate Change Adaptation Resource Centre provides stakeholders with a comprehensive platform, offering information, tools and resources related to various sectors and regions. A new report by the National Observatory on the Effects of Global Warming (ONERC) on 'Foresight for climate change adaptation' in 2022 provided valuable new information.

2-4. Changes to reported vulnerabilities and risks since 2021

There have been significant changes in the reported vulnerabilities and risks affecting France, which has significant vulnerabilities (particularly to drought and flooding).

Global warming is having detrimental effects on agriculture, including yield stagnation, reduced nutritional quality, changes in seed and crop phenology, and impacts on plant and animal health. The physical impacts of climate change on agriculture (and more specifically crop production) relate to temperature sensitivity, water requirements, soil quality and the emergence of crop-related diseases and pests. Regions within France (e.g. Languedoc, Lozère and Drôme) have already suffered substantial declines in agricultural production due to climate change and consequent losses in dry matter, forage and crop yields.

French agriculture's systemic response to climate change is organised around agroecology and agroforestry methods. Incremental adaptation focuses on changing sowing dates, encouraging the use of adapted crops and varieties, and optimising irrigation systems.

Climate-change impacts on energy production and distribution include high temperatures during heatwaves and reduced river flows. There is also an increased risk of extreme precipitation in Mediterranean areas. France considers that the electricity system needs to be prepared for

maximum temperatures that could be 5-10°C higher than historical extremes. More severe and frequent drought conditions are also expected in France due to a precipitation deficit and increased soil evapotranspiration.

Climate change is also having significant impacts on public health. Heatwaves in particular increase mortality rates and various health issues, including fatigue, cardiovascular symptoms, pregnancy complications and increased strain on healthcare systems. Rising temperatures also contribute to indirect effects, such as ozone pollution, allergies, algal blooms and vector-borne diseases. Other extreme events, like flash floods, can also have health implications.

Unlike vulnerability and risk analyses conducted under tools like INFORM [41], the PESETA project[42] and France's own national risk assessment within the framework of the Union Civil Protection Mechanism, the list of reported vulnerabilities and the key affected sectors is non-exhaustive. While the identified and reported hazards largely correspond to the hazards identified by additional and independent sources, additional hazards such as coastal hazards, storms, erosion and severe floods should be included.

Conclusion: France has made significant progress in improving its climate-research and monitoring systems. Climate vulnerability and risk analysis has to some extent identified risks which did not feature in the 2021 assessment, but it does not recognise some significant hazards, such as coastal floods and tsunamis. The reported vulnerabilities are not entirely consistent with INFORM and PESETA.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

France retains its pre-existing legal or political requirements for CRAs, such as annual thematic national reports by the National Observatory on the Effects of Global Warming (ONERC) and vulnerability analysis as part of statutory regional territorial development plans and intermunicipal climate-air-energy plans. The Ministry of Ecological Transition plays a role in the monitoring and evaluation of the second National Adaptation Plan for Climate Change (PNACC-2). However, there is no reported information that suggests that there is a structure for interministerial coordination on adaptation. There is also no information available on the involvement of the prime minister's office in interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

[41] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Toolhttps://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

42 The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

ONERC issues an annual report on planning for adaptation to climate change.

The Climate Change Adaptation Resource Centre is a key action of PNACC-2 and is designed to provide comprehensive support to all stakeholders engaged in climate-change adaptation. This resource centre provides access to personalised information on the realities of climate change, its associated challenges and existing solutions. Furthermore, the Géorisque geoportal facilitates easy access to data on natural hazards, covering risks associated with climate change and drawing on a compilation of 14 databases (including 6 specifically dedicated to climate change).

A national heatwave management plan was introduced in June 2023 in response to previous heatwave experiences. This initiative is intended to better address the impact of heatwaves on the daily lives of the French population and reflects France's commitment to proactive adaptation.

The management of water resources operates within the framework of river basins and is guided by river-basin committees that ensure that climate-change considerations are integrated into water planning and management strategies. Water agencies play a pivotal role in safeguarding water bodies and promoting adaptive measures. They are supported by an annual budget of EUR 500 million for climate-change adaptation initiatives.

Challenges nevertheless persist at the national level regarding horizontal policy integration. They are often linked to unclear delineation of responsibilities, limited awareness and low political prominence.

Conclusion: strong legislation and governance structures support the fight against climate change and adaptation and resilience efforts in France, but horizontal policy integration is still impeded by unclear responsibilities in the institutions in charge of adaptation.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The adaptation priorities, strategies, policies, plans and efforts are defined in broad and general terms.

France's national strategy for adapting to climate change was crafted through an extensive consultation process led by ONERC and subsequently endorsed by the Interministerial Committee for Sustainable Development. PNACC-2 focuses on effective adaptation to regional climate shifts corresponding to a 2°C temperature increase. It places particular emphasis on territorial engagement, nature-based solutions, overseas territories, economic sectors, knowledge enhancement and international cooperation.

France has reported examples of mainstreaming climate change into various plans such as the Territorial Coherence Scheme and the Local Urban Plan, natural risk-prevention plans, urban transport plans, regional health and environment plans, strategic seafront document plans or action

plans for marine environments on the coast, park charters in certain areas, and water development and management (master) plans.

10. Nature-based solutions in national adaptation policies

PNACC-2 prioritises nature-based solutions, which are considered as an integral part of the approach for addressing climate-change impacts and building resilience. France's reporting did not include information on the scale of their implementation and their impact.

11. Integration of adaptation into sectoral policies

At the intermunicipal level, territorial plans for climate, air, and energy (PCAETs) coordinate concerted efforts aimed at climate-change mitigation and adaptation. In addition, various schemes (including territorial coherence schemes, natural risk-prevention plans, and regional health and environment plans) are subject to continuous review and improvement in order to bolster support for climate-change adaptation initiatives.

12. Engaging with stakeholders vulnerable to climate-change impacts

PNACC-2 places emphasis on strengthening integration with sectoral policies while forging meaningful connections between adaptation and mitigation efforts. It seeks to raise awareness, mobilise stakeholders and seamlessly integrate climate change into economic and financial risk assessments. However, the report2ing does not provide any information on engagement with vulnerable stakeholders.

13. Engaging with private-sector stakeholders

PNACC-2 highlights the significance of engaging stakeholders and citizens (including vulnerable populations) in discussions on the impacts of climate change and the prioritisation of adaptation measures. The establishment of multiactor and local networks at the regional level indicates that various actors (including private-sector entities) may participate in these networks. However, the text does not explicitly mention the involvement of the private sector.

Conclusion. PNACC-2 is based on the assumption of a 2°C temperature rise. However, the information reported in 2023 is a replication of the information from 2021, with no new updates. The number of measures (58) remains the same as in PNACC-1. The allocated budget (EUR 8.7 billion) is also unchanged but now covers a period of 5 years (2018-2023) instead of 4 years (2011-2015). The potential climate-change impacts considered do not include the risks of storms, sea-level rise, flooding and coastal erosion – even though research highlights their relevance. . Little information is provided on stakeholder engagement, although there is a reference to the importance of involving vulnerable populations in the formulation of the national adaptation plan.

14. Monitoring mechanisms

PNACC-1 was assessed by France's General Council for the Environment and Sustainable Development (CGEDD), which highlighted significant progress in its implementation. Approximately 80% of the actions and 75% of the measures outlined in the plan were completed by the end of 2016. However, the evaluation highlighted a need for more comprehensive monitoring of the financial commitments associated with the plan.

The monitoring of the implementation of the national adaptation plans to climate change has been entrusted to a dedicated committee of the National Council for an Ecological Transition (CNTE), which provides guidance to ONERC. It ensures the annual monitoring of the plan, chooses relevant adaptation indicators and proposes, if necessary, changes to the national adaptation policy. The monitoring, reporting and evaluation (MRE) efforts at subnational level are conducted in conjunction with the national adaptation plan.

For monitoring purposes, a dedicated tool has been developed by the digital service of the Ministry of Ecological Transition. The CNTE's specialised commission has further endorsed a set of indicators that can be analysed ed into three categories: risks and impacts, implementation and results. These indicators provide a comprehensive overview of climate-change impacts, the actions taken and the outcomes achieved.

No update on monitoring mechanisms has been provided since 2021.

15. Implementation of adaptation measures and financing

No update on the implementation of adaptation measures and financing has been provided since 2021.

PNACC-2 2018-2023 has made significant progress in flood risk management through the implementation of the Flood Risk Assessment and Management Directive. France developed a national flood risk management strategy, which significantly improved its understanding of flood related issues through rigorous assessments and mapping. Coastal risk-prevention plans were improved and a wave-submersion alert system was set up. Mountainous regions also benefited from advances in flash-flood forecasting and addressing clay-related risks.

PNACC-2 contains 58 measures and has a budget of EUR 8.7 billion for a 5-year period (2018-2023). This budget is being spent on governance, prevention and resilience measures, natural and environmental initiatives, economic sectors, knowledge dissemination, information dissemination, and international efforts to address climate change.

The management of water resources operates within the framework of river basins, guided by river-basin committees that ensure that climate-change considerations are integrated into water planning and management strategies. Water agencies play a key role in safeguarding water bodies and promoting adaptive measures. They are backed by an annual budget of EUR 500 million for climate-change adaptation initiatives.

There is scope to put climate resilience considerations more in the forefront in France's use of EU support from the common agricultural policy and cohesion policy funding.[43]

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

New insights from the results of PNACC –2 and the creation of the Climate Change Adaptation Resource Centre provide stakeholders with a comprehensive platform that provides information, tools and resources for various sectors and regions. This can enhance adaptive capacity, but concrete impact is not recorded.

The PNACC-2 has supported research initiatives to address climate-change impacts (including decadal climate forecasting, extreme events, mountain areas, building adaptation and clay-related risks).

PNACC-1 did not adequately address thematic interfaces and prioritisation. The development of PNACC-2 was based on recommendations in the evaluation of PNACC-1. Information on meeting the priorities outlined in PNACC-2 has not been provided.

France has not reported on barriers to adaptation and efforts to address them in 2023.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Vulnerability and risk assessments are reviewed and updated in several stages. The DRIAS, Future of Climate offers regionalised climate scenarios and projections, with a recent update and the addition of new features. Regionalised climate projections for overseas territories have also been included. These projections are crucial for vulnerability studies and local adaptation efforts. Initiatives like Explore 2070 are dedicated to assessing climate change's impact on water resources.

Local vulnerability studies are updated through the revision of the territorial plans for climate, air and energy (PCAETs). Clear progress was made before 2021 in the review and enhancement of national adaptation policies, strategies, plans, and measures. The recommendations derived from the evaluation of PNACC-1 have significantly influenced the development of PNACC-2.

Conclusion. Overall, France is now better prepared to respond to climate-related risks at national and local levels thanks to the mobilisation of scientific and technical networks, and to the setting-up of monitoring institutions. However, no progress has been reported for 2021-2023 on barriers to adaptation, implementation and funding because the reporting on implementation relates to the outcomes of PNACC-1. The evaluation of PNACC-2 appears to be under way with an update expected by the end of 2023. This update will cover health, the economy, agriculture, infrastructure, essential services resilience, and natural habitat protection.

[43] France intends to invest ca 381 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

PNACC-2 continues to promote the goal of supporting stakeholders in climate-change adaptation and providing personalised information through the resource centre. However, there were no new recorded insights or updates in 2021-2023.

There are examples of good practices in France, even though it has not reported any. For example, the Fonds Verts ('Green Funds') initiative is a new mechanism designed to help local authorities boost their environmental performance, adapt their territory to climate change and improve their living environment. The Fonds Verts will support territorial players, who are essential to accelerating and intensifying the ecological transition already under way in the territories. Additionally French regions are involved as demonstrating sites in several Horizon-Europe demonstration projects[44].

Regarding France's engagement with the United Nations Framework Convention on Climate Change (UNFCCC), there is a partial mention of France's active involvement in the EU's efforts to harmonise its stance on scientific agenda items. Within the Council of the European Union's Working Party for International Environmental Issues (the WPIEI), a dedicated issue group known as IG-Science meets regularly to address scientific matters. In particular, IG-Science specifically deliberated during 2022 and 2023 on how to incorporate recent IPCC reports into the relevant agenda items of the UNFCCC.

Conclusion: France has not reported any new good practices, new synergies with international frameworks or new initiatives in transnational cooperation.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

Legal requirements for subnational adaptation-planning in France include the Law on the New Territorial Organisation of the Republic since 2015, which calls for the regional plan for development, sustainable development and territorial equality (SRADDET) to include a section on adaptation to climate change. This is mandatory for all intermunicipal bodies with more than 20 000 inhabitants.

Regional strategies include climate-change adaptation and are aligned with regional plans. At the intermunicipal level, the PCAETs coordinate climate-change actions. Water resources are

[44] - South Aquitaine - in regions4climate https://regions4climate.eu/resilient-region/uusimaa/
- Nouvelle-Aquitaine in NBRACER : Nature Based Solutions for Atlantic Regional Climate Resilience | NBRACER | Project | Fact sheet | HORIZON | CORDIS | European Commission (europa.eu)
- Normandy in RESIST: https://resist-project.eu/regions/

managed in river basins with river-basin committees and water agencies supporting climate-change adaptation.

26-29. Subnational policies and cooperation

The development of adaptation strategies and plans in France continues at regional and local levels.

Some progress has been made in France in recent years with regard to regional climate-change adaptation. One notable initiative is the Adapto project (2017-2022), led by the Conservatoire du littoral. This project is dedicated to exploring solutions for erosion and marine submersion in coastal regions grappling with the impacts of climate change (including rising sea levels and more frequent extreme-weather events).

Moreover, regional observation and research networks (often referred to as 'local IPCCs' or 'regional COPs') have been established in most of France's regions. These networks play an important role in advancing knowledge and facilitating decision-making by fostering connections between laboratories, researchers and policymakers. They focus on bridging the gap between scientific knowledge and society's needs.

The DRIAS Future of Climate portal provides access to French regional climate data and products for the impact on and adaptation of society and the environment. DRIAS's main objectives are to facilitate access to French regional climate-change scenarios, so that users can retrieve data online in various formats, as well as a set of products (such as charts and maps) that provide a general outlook on the future climate and provide assistance (including a probability approach).

France's commitment to climate-change adaptation includes the Covenant of Mayors for Climate & Energy. This ensures that a substantial portion of the population benefits from adaptation measures. France also actively engages in subnational cooperation initiatives like the Alpine Convention and the EU Strategy for the Alpine Region (EUSALP).

In addition, the Fonds Vert have been set up to respond to the diversity of regional realities and to finance targeted local projects, including in rural areas. The Fonds Verts fund three types of action at regional level: strengthening environmental performance; adapting to climate change and improving the quality of life. These actions combine climate-change mitigation and adaptation, but also address safety, health and well-being. The Fonds Vert may be used as the national contribution in ERDF-supported projects.

23 French regions, cities and municipalities (covering approximately 90% of France's territory) are participating in the EU Mission on Adaptation to Climate Change. A large majority of French regions have signed the Mission's charter and thus declared their willingness to cooperate, mobilise resources and develop activities to achieve their adaptation goals.

Conclusion: French regions are mandated to develop regional strategies for sustainable development and territorial equality (including climate-change adaptation) in line with their regional plans. Regional initiatives address the specific climate hazards faced by the regions.

France provides good practices for national support for subnational levels, specifically through the newly established Climate Change Adaptation Resource Centre. The new Fonds Vert initiative reinforces the decentralisation of adaptation measures in order to better respond to the particular circumstances of France's regions and localities, in synergy with its cohesion policy programmes. The extensive involvement of French regions in the EU Mission on Adaptation to Climate Change shows their strong commitment to adaptation at subnational level.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	P
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↑
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↑
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	●
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	●
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	N
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↗
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Germany according to the European Climate Law

Summary

Overall, Germany has made good progress in climate adaptation and has been proactively addressing climate-related threats. The federal government has been improving its risk and impact assessments, upgrading the supporting governance structures and initiatives, revising its national adaptation strategy (NAS) and plan (NAP), and engaging widely in related cooperation and coordination work.

In an important development, the adoption of the new German Federal Climate Adaptation Act in November 2023. This takes adaptation policy and action to a new level as it requires the federal, state and local levels of government to develop and implement climate-adaptation strategies and concepts, and the public sector overall to consider the goal of adaptation in an interdisciplinary and integrated manner in its plans and decisions.

Within the context of this new law, Germany is also currently developing its second NAS, which it expects to adopt in 2024. Its development is informed by a new and comprehensive climate-impact and risk analysis, which identified a very urgent need for action on around 30 climate-change effects (including fatal heat stress, droughts, and flash flooding).

In addition, the government has given considerable support to subnational adaptation efforts by facilitating expert dialogues on climate-risk assessment initiatives at the regional level, and through funding programmes and other targeted support for local climate adaptation.

Germany's already well-developed adaptation-monitoring system does nevertheless indicate that many of these comprehensive and ambitious frameworks and programmes still need to be fully translated into concrete action on the ground.

It would also be desirable to make more use of private-sector capacities and funding in support of climate-adaptation policy and action.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Germany is currently improving its regional climate modelling framework by incorporating the most recent Representative Concentration Pathway (RCP) provided by the Sixth Assessment Report of the IPCC. These efforts appear to be consistent with the renewal of national climate-risk assessment. The current modelling framework otherwise remains in place.

2-4. Changes to reported vulnerabilities and risks since 2021

In June 2021, the German government published a new comprehensive climate-impact and risk analysis (Klimawirkungs- und Risikoanalyse), which considers both the medium- and long-term risks of various climate scenarios. It examines over 100 effects of climate change and their interactions and identifies a very urgent need for action for around 30 of them. These include fatal heat stress (especially in cities), lack of water in the soil and more frequent low water-levels, with serious consequences for all ecosystems, agriculture, forestry and freight transport.

The new climate-risk assessment also assessed, for the first time, how risks in individual sectors interact, using a conceptual framework of impact chains for systemic climate-risk considerations and comparing changes in risk and preparedness. It also considered the degree to which various adaptation options could reduce the biggest climate risks.

Germany applies the ISO 14091 standard for its national climate risk assessments.

Conclusions. Germany has made good progress by updating and upgrading its climate-risk assessment, modelling methods and monitoring frameworks. The latest national climate-risk assessment (a centrally coordinated, systemic and cross-sectoral exercise) has provided detailed and comprehensive descriptions of vulnerabilities and risks for nearly all sectors.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

Germany has established high-level inter-ministerial or inter-sectoral coordination bodies for national adaptation policies. Notably, the inter-ministerial working group on adaptation to climate change is the central decision making body in the national adaptation governance structure. The Federal Chancellery has recently been added to its information and exchange distribution list.The German federal governance structures for climate adaptation also include the Federal Authority Climate Adaptation Network and a reporting system that feeds into the adaptation-planning process (including a monitoring report, the climate-impact and vulnerability analysis, adaptation action plans and the evaluation of the German adaptation strategy).

In November 2023, the German Parliament passed the Federal Climate Adaptation Act-. This new law sets out a framework for preventive climate adaptation at all administrative levels in Germany and requires

- the federal government to implement a 'precautionary climate-adaptation strategy' with measurable targets;
- the federal states to adopt and implement systematic and comprehensive climate-adaptation strategies;
- the federal states to ensure that municipalities and districts have climate-adaptation concepts and plans and to report to the federal government how many municipalities and districts have such concepts.

The -Federal Climate Adaptation Act also imposes a duty on public sector bodies to consider the goal of adaptation in an interdisciplinary and integrated manner in their plans and decisions. It also includes provisions on the restoration of sealed soils, where possible, on occupational health and safety as an element of adaptation, and on the precautions that should taken specifically for vulnerable groups.

In parallel to the adoption of this new law, the government is currently updating its NAS, which it expects to publish by the end of 2024. The new strategy will follow the format prescribed in the proposed federal climate-adaptation law.

In July 2021, the Federal Environment Ministry launched the new climate-adaptation centre (Zentrum KlimaAnpassung), which supports municipalities and social institutions nationwide and in line with their needs in initiating and implementing climate-adaptation measures.

Conclusions. There is currently no domestic federal legal requirement as regards climate adaptation, but Germany has been working to improve and strengthen the already existing federal governance structures in support of adaptation. The adoption of the new National Climate Adaptation Act and the connected ongoing revision of the NAS are highly significant initiatives in this context. Both can be expected to further enhance horizontal and vertical policy coordination, institutional capacity and climate-adaptation action.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Germany's reporting mentions all the key identified affected sectors and lists many programmes to improve climate adaptation in all areas as part of the country's overall adaptation strategy.

Germany has reported a list of 10 new measures since 2021. Most of these concern the creation of new institutions, legislative frameworks and governance structures in order to mainstream adaptation and make it more systemic. The effectiveness of these actions is to be appraised in the

future, wherever possible, considering urgent climate impacts and requirements for action arising from the climate impact and vulnerability analysis, and from criteria-based individual assessments.

The reported challenges, gaps and barriers are identical to the ones reported in 2021.

Germany has also reported the planned launch of a nationwide process to identify concrete and measurable targets for climate-change adaptation, as set out in the Federal Climate Adaptation Act.

10. Nature-based solutions in national adaptation policies

Germany adopted a new action plan on nature-based solutions for climate and biodiversity (Aktionsprogramm Natürlicher Klimaschutz*)* in March 2023. In addition to many climate-mitigation measures, this also includes many actions with high relevance to adaptation (e.g. the introduction of satellite-based monitoring of water-retention potential at landscape level and the associated cooling effect; the introduction of digital forest-monitoring; the creation of a soil-monitoring centre; and the building of a comprehensive, spatially-explicit and predictive water accounting system to support medium- to long-term regional water-planning and management). The programme has a budget of EUR 4 billion until 2026.

11. Integration of adaptation into sectoral policies

Germany has not reported on any progress made in integrating climate-change adaptation into sectoral policies, plans and programmes.

Germany did refer, however, to the implementation of the UN Sendai Framework for Disaster Risk Reduction 2015-2030 as a key action; and to the embedding of civil protection as a cross-cutting issue in the NAS. Most of the planned measures reported by Germany concern the better integration of adaptation into national institutions and legislation.

Adapting forests to climate change through Waldumbau (the restructuring of forests for more biodiversity and climate resilience) and other measures is a central goal of Germany's Forest Strategy for 2050, which was adopted in September 2021.

Under the Sofortprogramm Klimaanpassung programme (a package of measures presented in March 2022), the German government announced the continuation of the 'climate-funding programme "Climate adaptation in social institutions' beyond 2023, thus turning it into a permanent programme.

Regional chambers of industry and commerce, craft chambers and agricultural chambers provide training to their members and raise awareness on how to deal with climate-change impacts. Other associations focus on responding to extreme weather events.

12. Engaging with stakeholders vulnerable to climate-change impacts

The development of the new German adaptation strategy builds on a broad and comprehensive citizen and stakeholder participation and dialogue process.

There are already many structures in place to facilitate dialogue and cooperation between government, federal states and municipalities.

The new Federal Climate Adaptation Act includes provisions on occupational health and safety and on the precautions that should be taken specifically for vulnerable groups.

13. Engaging with private-sector stakeholders

Germany reports no progress regarding engagement with the private sector on climate adaptation.

One measure that is already in place is the organisation of awards by the Federal Environment Agency for highly innovative adaptation projects carried out by businesses, research institutes and associations– the joint national adaptation award organised Ministry and Federal Environment .

Conclusions. The reported information indicates that Germany is continuing to put into place comprehensive structures and processes to support adaptation. However, the lack of reported detail on concrete measures and actions (for example, on how actions address identified risks, the use of nature-based solutions, and the involvement of vulnerable stakeholders and the private sector in adaptation policy and practice) sometimes makes it difficult to assess the overall progress made with adaptation strategies, policies, plans and goals during this reporting period. That said, the ongoing definition of nationwide and measurable adaptation goals, the action plan on nature-based solutions for climate and biodiversity, and continuation of the 'climate adaptation in social institutions' programme demonstrate that progress is being made in many areas.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

According to the information submitted, the German 'adaptation scoreboard' monitoring mechanism has been operational since 2015. The government's next monitoring report will be published in November 2023.

A joint July 2022 study, commissioned by the Federal Ministries for the Environment and for Economic Affairs and Climate Action on the costs caused by climate impacts in Germany, concluded that extreme weather events had caused financial losses of at least EUR 80 billion since 2018 and EUR 6.6 billion per year on average during the last 22 years.

One of the surprising findings was the size of the financial losses (just under EUR 18 billion) due to the significant forest damage caused by the 2018/19 droughts (including losses of forestry companies of EUR 8.5 billion, the indirect costs of EUR 2.8 billion from CO_2 emissions and indirect damage causing losses of EUR 6.5 billion in various value chains). This figure was significantly higher than the initial financial loss estimates provided by forest-owner associations.

15. Implementation of adaptation measures and financing

Germany has dedicated national adaptation funds, including the 'Climate Adaptation in Social Institutions' programme. This helps social institutions to prepare for climate hazards like heatwaves or floods and to support adaptation in the health, care and social sectors.

The programme aims to promote exemplary model projects with a view to inspiring wider transformations in these sectors. Projects are to be implemented primarily in 'climate-hotspot' regions that are or will be particularly affected by the climate crisis. Running initially from 2020 to 2023 with a budget of EUR 150 million, the programme has now been extended. The first funding-round in 2020 received a significant response.

Other than that, the submitted information is the same as that already reported in 2021.

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

According to the reported information, vulnerability has been reduced and adaptation-capacity enhanced 'only sporadically' via the NAS. This is based on an analysis of data and evidence relating to the NAS's emphasis on state-level and municipal adaptation strategies, to information about the impact of measures of the second NAP, and to trends in the six geographical and thematic focuses of the NAS which relate to more than one action area.

This 2021 information was not updated in the 2023 submission. This suggests that the measures currently in place have not significantly reduced climate impacts, vulnerabilities and risks.

The reported information indicates that adaptation priorities have been carefully chosen on the basis of vulnerability assessments and evaluation of the DAS process. The reporting does not include concrete information regarding the progress made in meeting these priorities.

The information reported for this section was identical for 2021 and 2023 and does not cover the barriers to adaptation which have been identified in Section 3.2. This makes it difficult to carry out a proper progress assessment.

Reported adaptation-policy barriers include horizontal and complex coordination mechanisms and gaps in horizontal policy integration and, to a lesser degree, gaps in vertical coordination across different levels of government.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Germany plans to release its second NAS in 2024 as part of the proposed Climate Adaptation Act.

Germany has also highlighted its 'Expert Dialogue on Climate Impacts', which supports climate risk-assessment efforts at subnational levels.

Like other EU Member States, Germany has been developing a comprehensive, multisectoral or cross-sectoral national climate risk assessment.

A reporting system has been established which includes a vulnerability analysis that is updated every 6 years. The latest report was the 2021 climate-impact and risk analysis.

A reporting system also exists, which consists of multiple reports, analyses and plans that are periodically reassessed. These include the forthcoming monitoring report (late 2023, the last one was from 2019), the climate-impact and risk assessment (last published in 2021), the adaptation action plans (last adopted in 2020) and regular evaluation of the NAS.

Conclusions. Germany has a functioning adaptation-monitoring and evaluation system, which enables the authorities to determine the state of play, to identify a number of problem zones and to pinpoint where it should act in vulnerability reduction and adaptive capacity building. The ongoing update of the NAS is a key opportunity to follow up on these findings.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

The synergies with the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals reported in 2023 were the same as reported for 2021. Germany remains involved in multiple projects that facilitate cooperation and support between countries (the NAP Global Network, the NDC Partnership, the InsuResilience Global Partnership for climate and disaster risk finance and insurance solutions, the Global Initiative on Disaster Risk Management and the Global Commission on Adaptation).

Germany also continues to take advantage of EU-funded schemes for transnational cooperation and research, in support of national and cross-border adaptation policymaking and implementation. Additionally, the County of Euskirchen is involved as demonstrating site the Horizon-Europe demonstration project Land4Climate.

On good practices that deserve to be highlighted, the government organised in September 2022 the first ever Climate-Adaptation Week, which attracted a lot of interest and included some 220 events and campaigns organised across Germany. Encouraged by the success of this initiative, a second Climate-Adaptation Week took place in September 2023.

Also, the national 'Blauer Kompass' adaptation award highlights best practice examples from municipalities, private sector, research and educational institutions as well as from associations and foundations. This bi-annual award has attracted 240 submissions during its last application round in 2022.

Conclusions. Germany has not reported new synergies with international frameworks or initiatives in transnational cooperation. The organisation of an annual Climate Adaptation Week and of a national adaptation award, to increase public attention and mobilise action on the ground in support of adaptation, are good practices that may inspire other Member States.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

Adaptation strategies and/or action plans have been adopted or updated by almost all federal states. In addition, 11 of the 16 federal states have expanded and consolidated their relevant legal frameworks.

Interdepartmental and interagency bodies have been set up to facilitate cooperation within the administration.

The Standing Committee on Adaptation to Climate Change Impacts (StA AFK), which was established in 2009 by the Conference of Environment Ministers of the German Federation and the Federal States, is the main coordination mechanism for cooperation. It provides a forum through which strategies and measures adopted by the state administrations feed into work on the NAS.

The Federal Environment Agency, the German Meteorological Service and the state environment agencies/institutes take part in the 'Expert Dialogue on Climate Impacts', an informal forum for discussion of climate impacts and adaptation.

26-29. Subnational policies and cooperation

Germany has not reported any new information compared with 2021.

Germany supports climate-risk assessment efforts at subnational level through initiatives like the 'Expert Dialogue on Climate Impacts', which includes federal and state-level environment agencies.

In the new Federal Climate Adaptation Act requires the federal states to present and implement systematic and comprehensive climate adaptation strategies, and to ensure that municipalities and districts have climate adaptation concepts and plans.

In July 2021, the parliament of the federal state of North Rhine-Westphalia passed the first climate adaptation law at federal-state level in Germany. This obliges all those responsible for public activity to take climate impacts into account in all planning and decisions. Coinciding with the adoption of the law, the Environment Ministry of North Rhine-Westphalia adopted an action plan with 15 measures to help implement the law and support municipalities, citizens and companies.

North Rhine-Westphalia is also the only German federal state to have signed the Charter of the EU Mission on Adaptation to Climate Change (together with 19 German cities and counties).

Also in July 2021, the Federal Environment Ministry launched the new Climate Adaptation Centre (Zentrum KlimaAnpassung), which supports municipalities and social institutions nationwide and in line with their needs as regards initiating and implementing climate-adaptation measures.

Conclusions. The adoption of North Rhine-Westphalia's climate-adaptation law and the launch of the new Climate Adaptation Centre are important initiatives, which demonstrate continued progress in subnational policies, cooperation and support at the local level.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↑
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	?
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↗

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↗
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	?
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	?
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↗
	17. Has progress been made towards increasing adaptive capacity?	↗
	18. Has progress been made in meeting adaptation priorities?	?
	19. Has progress been made in addressing barriers to adaptation?	●
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	?
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↑
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	?

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↗
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Greece according to the European Climate Law

Summary

In recent years, Greece has been working to prepare for the impact of climate change that is hitting the country harder every year. It has made significant progress in several areas in understanding and monitoring the effects of climate change. It has identified sectors that are vulnerable (such as health, tourism, agriculture and infrastructure) and set up the National Adaptation Observatory (NAO) to monitor climate-related risks.

Not much has changed in some areas, such as coastal regions and forests, but Greece is taking steps to make agriculture more resilient to climate change. It is also investing in making tourism more adaptable and using climate data to better manage water resources. In the health sector, Greece is actively preparing for potential disease outbreaks.

Greece has updated its governance structures and created the Ministry of Climate Crisis and Civil Protection to oversee adaptation efforts. It has also set out its adaptation objectives in the National Adaptation Strategy (NAS). The National Climate Law requires government departments to include climate adaptation in their plans.

Challenges remain despite these efforts. Greece has not seen a significant decrease in barriers to adaptation, has not focused enough on nature-based solutions in its strategies and there was no official estimate of the amount of progress made in reducing the impact of climate change. However, the Greek authorities have promised to provide annual reports on their progress and are funding their adaptation efforts through various programmes and funds.

Greece is committed to regularly reviewing its adaptation policies and sharing good practices. It is cooperating internationally to strengthen its adaptation measures.

At the local level, Greece has a well-structured system to support adaptation, with regional authorities playing a vital role. It has also expanded stakeholder engagement in climate-adaptation efforts.

Overall, Greece has made progress in dealing with climate change (especially in health, tourism, agriculture and infrastructure) but faces ever-increasing challenges in particular when it comes to human and financial resources.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the

assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Some small changes have been observed in the climate monitoring and modelling framework since 2021. Greece has identified priority sectors for action based on vulnerability analyses and impact assessments which will include (at a minimum) health, tourism, agriculture, forestry, energy, insurance, infrastructure and transport, the built environment, protection of biodiversity and ecosystems, protection of water resources, protection of coastal zones, and protection of cultural heritage. Furthermore, the Observatory (established by Article 25 of the National Climate Law) aims to provide reliable information and data for future climate research in Greece, and to monitor and project climate-change-related hazards and impacts.

2-3-4. Changes to reported vulnerabilities and risks since 2021

Greece issued new Climate Risk and Vulnerability Assessments in 2023. Agriculture, food and water management have been identified as key affected sectors. Regular updates to Greece's climate-risk knowledge are published on dedicated national web portals. In Greece, climate risk assessments (CRAs) have become a mandatory part of the NAS and regional adaptation action plans (RAAPs), as prescribed by the new Greek Climate Act. Limitations in knowledge and information relating to CRAs have been reported as barriers in Greece. Greece is working on revising and updating its CRAs and has scheduled an update under the LIFE-IP AdaptInGR project for the end of 2024.

No changes have been observed in the reported risks of all sectors. For the agriculture and food sector, the 2023-2027 National CAP Strategic Plan includes measures to promote climate-resilient and climate-adaptive crops; climate-adaptive cultivation and production practices; precision agriculture; organic farming; conservation of genetic resources; and measures to increase the resilience of agricultural holdings to climate-induced extreme events and disaster risks.

In the tourism sector, more investment priorities in the 2021-2027 Operational Programme (OP) support the upgrading of tourism towards less seasonal and more differentiated services, thus increasing the overall adaptive capacity.

For the water management sector, the 2023 reporting states that the revision of river basin management plans (RBMPs) and flood risk management plans (FRMPs) has begun, using climate projections to map areas at high risk of flooding. The revised preliminary flood risk assessment (Ministry of Environment and Energy, 2019) has used climate projections from the SWICCA project of Copernicus to map areas at high risk of flooding.

Additionally, for the health sector it is reported that the Ministry of Health issues regulations and circulars to counter the growing threat of disease outbreaks.

No changes have been reported for coastal areas, biodiversity and forestry. Climate-change adaptation was considered a key parameter for the sustainability of fisheries and aquaculture, and the 2021-2027 programme includes measures to better understand the impacts of climate change and address specific threats.

In the buildings sector, the Energy-Efficiency National Action Plan includes measures supported through various 'housing saving programmes' and the 2021-2027 Energy and Environment operational programme.

Compared with the vulnerability and risk analysis under the INFORM tool [45], the PESETA project [46] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. Greece has carried out new CRAs and provides regular updates on climate risk. The analysis has not identified any risks that have emerged since 2021 and no significant changes have been observed between the two submissions. The hazards identified and reported by Greece correspond to the hazards and risks identified by other, independent, sources. However, Greece could include coastal floods in the relevant vulnerabilities and risks.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The Ministry of Climate Crisis and Civil Protection (MCCCP) is the national competent authority for coordination of all actions for prevention, preparedness, response and recovery concerning natural and man-made disasters, and climate-adaptation issues. In terms of climate vulnerability and risk assessment, Greece has integrated these into the NAS and RAAPs, addressing specific sectors, ecosystems, etc. The National Climate Law sets out the institutional arrangements for climate-adaptation policies. There is no information available on whether the prime minister's office is involved in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

The Environmental Impact Assessment (EIA) will in January 2024 consider the vulnerability of the project to climate change; associated hazards, impacts and risks; and measures for increasing its climate resilience. Climate-projection data are publicly available.

The changes made to the national governance structures since 2021 are considered as improvements. The most important positive change was the establishment of the MCCCP and the

[45] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC) : https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Toolhttps:/drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

[46] The European Commission's Joint Research Centre (JRC)' PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

environment and spatial-planning directorates of the 13 regional authorities. Moreover, the National Climate Law has strengthened the consideration of climate factors in the environmental assessment process and data are also available at the national adaptation hub.

Conclusions. Greece has reported improvements to its national governance structures since 2021. The establishment of the MCCCP, which has taken responsibility for national-level adaptation policy, is a significant change. Greece has amended or improved its climate legislation. The National Climate Law further strengthens and supports climate-adaptation actions by outlining binding requirements for the planning, implementation and governance of climate adaptation.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Greece has identified key adaptation objectives and priorities and has correlated strategies, policies, plans, and efforts with the vulnerabilities and risks. This is as outlined in Section 3.3, where it is indicated that Greece's actions are included in the NAS and correspond to the specific NAS objectives.

No decrease has been observed regarding the 2023 reported challenges, gaps and barriers to adaptation. However, the LIFE-IP AdaptInGR project has been analysing the baseline situation on adaptation-mainstreaming across the sectors considered in the NAS, and this will help Greece identify and resolve more gaps and barriers.

No new efforts have been identified in national strategies, policies or plans. Greece has only outlined that the NAS will last at least 10 years, that it is implemented through RAAPs and sectoral policies, and that it has also identified the main financial sources for its implementation.

Climate change is affecting many sectors in Greece. Adaptation challenges concerning water management are most prominent. Other affected sectors (including energy supply, the built environment, agriculture and tourism) all depend on water, which is becoming increasingly scarce. Heat-related mortality and morbidity rates are projected to rise significantly. Greece's recovery and resilience plan includes measures on reforestation, water management and the protection and restoration of biodiversity and ecosystems. Greece is also taking renovation measures to increase the resilience of cities and their building stocks to climate change. Greece's large insurance-protection gap for wildfires could pose a risk to public finances if insurance coverage remains low.

10. Nature-based solutions in national adaptation policies

Despite a comprehensive list with actions targeting specific NAS objectives, nature-based solutions and ecosystem-based adaptation are not directly promoted in the strategies.

11. Integration of adaptation into sectoral policies

The National Climate Law mandates central government departments to integrate adaptation into their sectoral strategies and plans, while also allowing for the implementation of policies and measures to increase climate resilience and reduce vulnerability across sectors.

Climate-adaptation has been successfully mainstreamed into a wide range of policies such as strengthening horizontal coordination, the effective use of EU and national funds (the Complementary Funds Committee (CFC) has been established), promoting climate-adaptation at regional and local level, and transferring adaptation responsibilities to the MCCCP to strengthen the link between climate-change adaptation and disaster risk management strategies.

Examples of sectoral strategies that embed adaptation-related actions include the Maritime Spatial Planning Law, the National Biodiversity Strategy, the National Strategy for Forests and the national plan for energy and climate. Finally, the MCCCP seeks ways to advance the coordination of actions for responding to emergencies and adapting to climate change through dedicated projects.

12. Engaging with stakeholders vulnerable to climate-change impacts

Positive progress has been observed as the national adaptation hub has been developed under the LIFE-IP AdaptInGR project and became public in October 2022. Pursuant to the National Climate Law, the hub will form part of the National Adaptation Observatory. The National Climate Law has also established an online climate forum to make it possible to consult representatives of municipalities, regions, universities, environmental NGOs, business, professional, trade unions and other bodies on the annual national climate reports, which also include information on adaptation action and progress in each sector.

13. Engaging with private-sector stakeholders

No significant progress has been observed, except that Greece has reported that two national events are planned towards the end of the LIFE-IP AdaptInGR project.

Conclusions. Greece's National Climate Law, which was adopted in 2022, endorses the NAS, imposes the adoption of action plans on regional authorities and sets annual national reporting requirements. Greece is working on a comprehensive national climate-risk assessment and has linked it with established revision cycles for national adaptation policies. Greece launched its national adaptation hub in October 2022, pooling relevant adaptation information for the benefit of stakeholders (particularly those vulnerable to climate-change impacts). Greece should continue to work to decrease challenges, gaps and barriers to adaptation and should continue its efforts to improve its national strategies, policies and plans. Further promotion of nature-based solutions and ecosystem-based adaptation could advance these objectives.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Progress has been made in establishing and operationalising monitoring mechanisms. Since 2021, the National Adaptation Observatory has been established within the MCCCP. The Observatory comprises an open information-exchange network between the MCCCP, the Ministry of Environment and Energy (MEEN), the Ministry of Internal Affairs, the Hellenic National Meteorological Service (HNMS), the National Observatory of Athens and other research, academic and public-sector organisations. The Observatory develops and operates the open-access national database of climate data and information. Currently in the framework of the project, the proposed monitoring and evaluation system is exploring opportunities to use existing sets of indicators that are already monitored by competent authorities at the different levels of public administration. Consultations with sectoral authorities are ongoing and the set of sectoral indicators is being fine-tuned.

15. Implementation of adaptation measures and financing

Progress has been made with the implementation of adaptation measures. During the 2021-2027 programming period, national-level adaptation actions are primarily financed through the sectoral and operational 'Environment and Climate Change' programme, with a focus on flood protection infrastructure, coastal protection works, green infrastructure projects, and fire prevention/management. The 2021-2027 CAP Strategic Plan includes adaptation measures for agriculture, taking into account the NAS and the development of RAAPs. Additionally, the Green Fund has played a significant role in financing projects related to climate adaptation, particularly in supporting knowledge-improvement; awareness campaigns; adaptation actions in cities, municipalities and forest areas; and initiatives by non-governmental organisations and research institutions to address knowledge gaps as regards vulnerability and adaptation.

There is scope to put climate resilience considerations more to the forefront in Greece's use of EU support from the common agricultural policy and cohesion policy funding.[47]

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Greece has replied positively to the question of whether its adaptation options address the identified sectoral risks and geographical specificities and apply best practices in similar contexts. However, no monitoring reports had been published in March 2023. There is therefore no official assessment of the progress made in reducing impacts, vulnerabilities and risks.

For the same reason and even though Greece has reported that the selection of priority adaptation options is based on robust methods consistent with existing decision-making frameworks, there can be no official estimation of whether any progress had been made by March 2023. In addition, there is no official estimation of how much progress has been made in increasing Greece's adaptive

[47] Greece intends to invest ca 1.1 billion EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

capacity. However, information on progress will be provided through the annual national reporting system, which was established by the National Climate Law, and the results of monitoring and evaluation cycles under the LIFE-IP AdaptInGR project. Sectoral reports prepared by MEEN under the project show that there are significant knowledge gaps and fragmented capacity-building efforts in various affected sectors. Regional capacity-building workshops have been organised in 5 of Greece's 13 regions. They have generated positive feedback and are helping to increase knowledge and climate-proofing of projects, which is expected to enhance adaptive capacity by the end of the project.

No progress has been observed in addressing barriers to adaptation.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Progress is positive, as an updated assessment of the impacts and vulnerabilities across Greece is under development and planned to be delivered by the end of 2024 under the LIFE-IP AdaptInGR project. The assessment for the transport sector has been finalised, while the assessments for the tourism, agriculture, biodiversity and ecosystems sectors have significantly advanced.

Positive progress has been made in reviewing and updating national adaptation policies, strategies, plans and measures. The National Climate Law mandates the review of the NAS at least once every 5 years and, when necessary, its revision with input from the National Climate Change Adaptation Committee (NCCAC). The revision process will be carried out as part of the LIFE-IP AdaptInGR project, taking into consideration the results of two monitoring and evaluation cycles to assess progress in reducing climate impacts, vulnerabilities and risks. The aims of the revision include identifying new priorities, suggesting new actions and measures, and exploring the need for specific sectoral adaptation strategies. Extensive public and stakeholder consultations will be conducted before any new priorities are adopted. The MCCCP will supervise and actively participate in the review and revision process. The updated NAS will be presented to the NCCAC for its formal opinion and adoption.

Conclusions. progress has been observed in establishing and operationalising monitoring mechanisms, but no progress has been made in addressing barriers to adaptation. Greece has not yet reviewed and updated its monitoring reports, so potential progress towards reducing impacts, vulnerabilities and risks cannot be officially and accurately estimated.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Greece has identified new 'good practices and lessons learned' compared with 2021. The LIFE-IP AdaptInGR project has produced new climate-projection data and maps to support the mainstreaming of climate adaptation across policies and projects in Greece. The interactive climate-projection web-tool will increase understanding of climate-change impacts. No new

synergies have been identified with other international frameworks and/or conventions compared with 2021. The only new element reported in 2023 (compared with 2021) is that climate-adaptation action under the UNFCCC remained within the mandate of MEEN after the establishment of the MCCCP.

No progress has been observed between 2021 and 2023 in terms of: cooperation with other Member States; international cooperation; and cooperation with regional and international organisations to share information and strengthen science, institutions and adaptation knowledge. However, positive progress has been observed on cooperation to enhance adaptation action at the national and macro-regional levels, as Mediterranean and transnational cooperation activities are planned to replicate the results and share the knowledge and experience acquired through the LIFE-IP AdaptInGR project with regard to monitoring climate-adaptation policy implementation, developing climate projections, mainstreaming adaptation across sectoral policies, implementing concrete adaptation projects, etc. Moreover, Greece is a member of the Union for the Mediterranean and closely follows its adaptation-related developments and work.

Conclusions. Greece has identified new potential opportunities since 2021. There have been no new synergies with other international frameworks and/or conventions, so there is potential for Greece to promote such activities. Some progress has been observed in replicating actions and knowledge-exchange at national and macro-regional level, but there has been insufficient improvement at international and EU level.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

Relevant subnational governance structures are in place to support climate-adaptation actions in Greece. The 13 regional authorities are responsible for developing and implementing RAAPs and, while local-level adaptation is not a legal requirement, many RAAPs encourage local plans through initiatives like the Covenant of Mayors. The NCCAC oversees adaptation efforts and includes representatives from relevant ministries, regional and municipal associations, meteorological services, industries, NGOs and academics. Initiatives like the LIFE-IP AdaptInGR project and the CLIMATTICCA network promote awareness and capacity-building among experts and authorities.

26-29. Subnational policies and cooperation

The development of the 13 RAAPs has been completed. Their strategic environmental assessments (SEAs) and official endorsement by regional councils is expected to be concluded by September 2023. 5 regions (the North Aegean, Crete, Attica, the Peloponnese and Western Greece) had officially endorsed their RAAPs by March 2023. 2 regions (Central Macedonia and Western Macedonia) have concluded or will soon conclude the SEA process and officially endorse their RAAPs. In 3 regions (Eastern Macedonia-Thrace, Central Greece and the South Aegean) the RAAPs of the SEA is still in progress.

Positive progress has been made in stakeholder engagement, as further efforts to engage with stakeholders and the public in the development of adaptation policies, strategies and plans have been observed in 2023. The 2023 submission shows that stakeholder engagement remains a priority and has been extended to higher-level committees – indicating progress in involving diverse stakeholders in shaping climate-adaptation efforts in Greece.

Positive progress has been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures as the 2022 National Climate Law decreased the RAAPs review intervals from 7 to 5 years. Moreover, the revision of the RAAP will be decided by the regional environment and spatial-planning directorates on the basis of their reviews.

Greece has not reported any progress with regard to cooperation at a subnational level. It is only mentioned in the 2023 submission that Greece participates in bilateral and multilateral projects, which are funded mainly through EU competitive programmes.

20 regions and municipalities are participating in the EU Mission on Adaptation to Climate Change. Greek regions and local authorities have signed the Mission Charter declaring their willingness to cooperate, mobilise resources and develop activities to reach their adaptation goals.

Greece could develop a more detailed and concrete explanation of actions that have been taken, in terms of cooperation that would enable regions and cities to create a comprehensive cooperation structure and work together with other regional and EU authorities to enhance adaptation actions.

Conclusions. the number of adaptation strategies at subnational level in Greece is increasing. The National Climate Law is also strengthening adaptation-planning obligations for subnational entities. A national adaptation web-hub in Greece supports subnational levels through knowledge-provision. Greek cities and municipalities are developing local adaptation strategies as part of the Covenant of Mayors initiative. Municipalities and regions are largely responsible for implementing and evaluating their respective strategies or measures at the local level. A detailed plan for regional and city cooperation would make it easier to work with other EU authorities.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	P
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↑
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	N
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	?
	18. Has progress been made in meeting adaptation priorities?	?
	19. Has progress been made in addressing barriers to adaptation?	●
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↑
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↗

Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	●

Assessment of progress on climate adaptation in Hungary according to the European Climate Law

Summary

Hungary is well aware of the climate-related hazards it faces and is alert to newly identified risks and vulnerabilities. Hungary is evaluating its 2020 climate change strategy, which includes the national adaptation strategy, to determine whether to revise it in 2024-2025.

Agriculture and water-related challenges are among the most pressing. The national adaptation plan includes well-matched analysis on the methods that would most effectively tackle the risks. However, the policy choices in sectoral strategies and plans – including water management – and the associated funding often go in a different direction.

Hungary has some good examples of effective nature-based solutions that are being implemented, including some that were prepared with the involvement of the Ministry of Interior's Office for Local Authorities and other partners that emerged as bottom-up initiatives from civil society organisations in cooperation with local governments. However, the country has not been scaling these up. The currently dominant direction of policy poses a further threat the country's natural asset that are already highly vulnerable (see section 10).

The private sector has been involved at local level, while no information is reported on involvement of vulnerable stakeholders. The monitoring, reporting and evaluation system also needs developing.

Local authorities are not legally obliged to prepare climate strategies, but all the counties and 132 settlements have elaborated a climate strategy including adaptation. There is scope and a need for capacity building on adaptation at subnational level. Four municipalities from Hungary participate in the EU Mission on Adaptation to Climate Change.

In summary, Hungary is actively trying to cope with the effects of climate change. It is encountering challenges in tracking its progress but implementing the most effective solutions. While some fields are taking action, there's a need to better mainstream the most effective solutions across sectoral strategies and the uptake of good practices to tackle these pressing climate issues.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

The climate-monitoring and modelling framework has not changed since 2021, but Hungary has progressed in developing methodologies to be used in climate-risk assessments. It conducted broad, sector-based climate risk and vulnerability assessments, which included socio-economic aspects of climate change. Subnational climate risk assessments or regional climate projections in Hungary were multi-sectoral in design.

The National Adaptation Geo-Information System (NAGiS) is a central tool for making information on vulnerability and climate impacts available to policy makers and the public. Hungary aims to further expand the NAGiS in terms of both thematic and territorial information modules.

Hungary identified gaps in climate research as a barrier to progress in adaptation and climate-risk assessments. Efforts are ongoing to advance methodologies of future climate risk assessments.

2-4. Changes to the reported vulnerabilities and risks since 2021

Changes in vulnerabilities and risks have been reported for the following: forestry, urban, biodiversity, agriculture and food, health and tourism sectors. Newly identified vulnerabilities and risks include the disappearance of spruce in the forestry sector, the impact of excessive heat on the public transport system, and extreme weather events on the road network, as well as specific vulnerabilities of Hungarian tourism regions. Hungary has also communicated that the impacts of spring and summer droughts on agriculture are considered in this list. In the other sectors additional information on previously reported issues has been provided.

The country considers both 'agriculture and food' and 'water management' as key affected sectors. The impact and likelihood of key hazards as well as the vulnerability are rated as 'high' for both sectors.

Compared with the vulnerability and risk analysis under the INFORM tool[48], the PESETA project[49] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. Hungary's climate- impact and vulnerability monitoring framework has not changed since 2021. Progress with climate risk assessment methods has been made, covering various

48 The INFORM Tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool

49 The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en

sectors. The NAGiS is essential for public climate data access and will expand. Gaps in climate research are a hindrance. Vulnerabilities and risks have changed in the forestry, urban, biodiversity, agriculture, health and tourism sectors. Agriculture and water management are key affected sectors rated as 'high' for vulnerability and hazards. Reported vulnerabilities align with INFORM, PESETA, and the National Risk Assessment.

Section 2 – Legal and policy frameworks, and institutional arrangements

5-6. National governance structures supporting adaptation actions

Hungary has national governance structures in place to support adaptation actions. The Ministry of the Energy leads on climate policy including adaptation. The Deputy Secretariat of State for Climate Policy within that ministry is responsible for the planning, implementation, monitoring, evaluation and revision of adaptation policy. It is supported by the National Adaptation Division of the Energy Strategy Institute.

Hungary was an early adopter of a 'climate law' in 2007, which was later expanded to cover climate adaptation, including an obligation for inter-ministerial coordination on adaptation. An inter-ministerial climate change working group operated during the planning of the second National Climate Change Strategy and its first two National Climate Change Action Plans. No information was reported in 2023 to suggest that the coordination structure is currently in place and operational. There is no information available on whether the prime minister's office is involved in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Hungary has reported only one change in national governance structures since 2021 – the restructuring of the National Adaptation Centre (since then, it has operated as the National Adaptation Division as part of the Energy Strategy Institute).

Hungary already reported in 2021 that it lacks a uniform, continuous system for data collection on sectoral vulnerability and progress in adaptation. The country has informed the Commission that establishing a comprehensive monitoring, reporting and evaluation (MRE) system for climate policy remains a plan.

Hungary is evaluating its current climate change strategy (whose modules include the national adaptation strategy), adopted in 2020, to determine whether to revise it in 2024-2025.

Conclusions. There is a climate law requiring the country to adapt to climate change. Hungary's Deputy Secretariat of State for Climate Policy leads national governance for adaptation. Inter-ministerial coordination was in place during the planning of the current National Climate Change Strategy and its action plans but is not currently active. Minor changes include restructuring the National Adaptation Centre and a learning programme. Challenges include the lack of uniform data collection on sectoral vulnerability and the delay in the establishment of a monitoring system. Hungary is evaluating its climate change strategy for potential revision in 2024-2025.

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

One of the three parts of the national climate change strategy (NCCS-2, covering the period 2018-2030) is the national adaptation strategy (NAS). This NCCS-2 is being implemented through four consecutive national climate change action plans (NCCAPs). The first NCCAP came into force in 2020, identifying the following priority fields of adaptation: human health, water management, disaster management, agriculture and rural development, nature protection, forestry, energy infrastructure and tourism. In the second NCCAP, which is currently awaiting government approval urban/settlement development is also included. These fields of adaptation are well aligned with the key affected sectors identified by Hungary. However, the appropriate measures put forward in the NAS are not well reflected in sectoral plans.

The submitted information on challenges, gaps and barriers to adaptation has hardly changed since 2021. In 2021, it was reported that a new integrated climate policy monitoring system was being prepared, but there was no news about it in the 2023 submission. The ongoing lack of a monitoring system is cited as the biggest challenge along with availability of financial resources. Compared with 2021, there was more information on the existing gaps in the NAGiS that still need to be dealt with. The gaps in climate change research identified in 2021 are still included, but there is no information on whether they are being dealt with.

Compared to 2021, the field ‘urban/settlement development’ was added as a new priority field of adaptation in the latest NCCAP. The urban sector was also identified as a key affected sector with newly identified risks and vulnerabilities in 2023. Apart from that, the information submitted in 2023 is less detailed than that in 2021, as the priority fields of adaptation are enumerated without further detail.

10. Nature-based solutions in national adaptation policies

Nature-based solutions and ecosystem-based adaptation are not directly mentioned in the 2023 reporting. Hungary has informed the Commission outside its reporting that in the current programming period, green and blue infrastructure developments and regional groundwater level rehabilitation programmes are being planned, for example, in the Nyírség area.

Pilot experiments for natural water retention measures are being conducted across the country thanks to specific LIFE projects such as LIFE-MICACC. and LIFE LOGOS 4 WATERS. However, nation-wide replication of this approach is lacking. Hungary’s National Adaptation Plan does promote nature-based solutions. The country has also informed the Commission outside its reporting that numerous sectors have started to include water retention-oriented lines into their strategies and activities (water management, forestry, agriculture, nature protection).

At the same time, large-scale investment plans and funding point in the other direction (infrastructure for alternating drainage and irrigation, ongoing greenfield development in urban agglomerations, continuing soil sealing and reduction of urban green spaces). The direction of travel in the legal environment and practice on the ground includes developments that are likely to

harm the resilience of Hungarian landscapes to climate impacts. For example, recent legislation lifts the ceiling on the maximum proportion of agricultural land that may be built up from single-digit numbers to 30% on plots of 1500-10000 m^2 in size[50].

Given the anticipated effects of climate change, which include lower river flow and more frequent droughts, it becomes crucial to prioritise the following key concerns: (i) increasing water retention, starting with retention in the soil; (ii) restoring the natural water cycle; (iii) discouraging land drainage during wet periods; and (iv) adjusting agricultural methods accordingly. Protection from the urban heat island effect, which is set to become an increasingly grave risk, should be made a higher priority alongside the protection and restoration of natural carbon sinks in relation to the development of residential and industrial built-up areas that replace greenery.

11. Integration of adaptation into sectoral policies

Hungary has reported no progress in integrating climate change adaptation into sectoral policies, plans and programmes. The NCCS-2 and the first NCCAP both include 'sectoral action lines and measures' that need to be considered in sectoral policies. Hungary also mentioned a 'wide sectoral partnership' during the planning process for the NCCAPs.

In addition to agriculture, it would be important to mainstream adaptation into the sectoral policies of the other key affected sectors including energy, health, and transport.

12. Engaging with stakeholders vulnerable to climate-change impacts

No information has been reported on any specific engagement with vulnerable stakeholders.

13. Engaging with private-sector stakeholders

No progress regarding the engagement with the private sector has been made since 2021. Hungary reached out to private sector stakeholders while county and municipal climate strategies were being developed. An example of good practice is the LIFE-CLIMCOOP project (2020-2024), which aims to create public-private partnerships to enable cities and local companies to work together on climate change adaptation. Hungary has not reported any further progress regarding the engagement with the private sector since 2021.

Conclusions. Hungary's climate strategy also covers adaptation and its implementation is based on four consecutive action plans. It is currently being evaluated for possible revision in 2024-2025. The country's adaptation priorities thoroughly cover the identified risks and vulnerabilities. The development of a monitoring system for adaptation efforts appears to have stalled. Nature-based solutions are not exploited sufficiently for adaptation. There are good examples of private sector involvement although it seemingly remains confined to a local level.

[50] Építési jog | A tanyák beépíthetőségének szabályai a 2023. évi OTÉK módosítás alapján (1. rész) (epitesijog.hu)

Section 4 – Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Up until now, there has been no suitable monitoring mechanism for climate change adaptation in place. Hungary was aware of this at the time of the 2018 Adaptation Scoreboard and already reported in 2021 that it had begun the process to plan and establish an MRE system, then estimating the starting date for the system as 'late 2021 to early 2022'. Hungary has informed the Commission outside of its reporting that background and feasibility studies have been prepared for setting up a climate policy monitoring, reporting and evaluation system, whose setting-up is now expected for 2024/25.

15. Implementation of adaptation measures and financing

According to the information Hungary submitted, the implementation of adaptation measures can only be assessed properly once the monitoring, reporting and evaluation system mentioned above is operational. The country estimates that 95% of the measures included in the first NCCAP have been implemented, compared to 90% in 2021. The basis for these estimates in the absence of a monitoring system is unclear.

No information has been provided on budgeting for adaptation measures. There is scope to put climate resilience considerations more to the forefront in Hungary's use of EU support from the common agricultural policy and cohesion policy funding.[51]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers

Hungary highlights the lack of an operational MRE system as a challenge when estimating progress. However, it reported progress on several projects that were part of '2014-2020 Ops', the 'Rural Development Programme' and 'LIFE sources', which it considers as having potential to contribute to climate resilience, without specific information on whether they actively reduced risks, vulnerabilities and impacts of climate change.

Regarding adaptive capacity, Hungary is focused on improving the NAGiS. Currently, the NAGiS is the country's system that helps the government implement decisions on adaptive capacity. Since 2021, studies have been carried out to identify NAGiS modules that need improving, which were highlighted in a governmental report. No steps have been made towards these improvements in practice to date. Little information is provided on ensuring that affected sectors acquire the skills needed to make effective use of the output from the NAGiS and other sources for reducing the likelihood of negative impacts of climate-related hazards. Elsewhere, the Swedish Environmental

[51] Hungary intends to invest ca 683 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution). Under the Environmental Programme, the calls for proposals for flood protection measures are being prepared with the help of contracted experts to enhance (where possible nature-based) water retention measures

Agency provided support for a learning programme for Hungarian evaluators of environmental impacts.

132 local authorities have created climate strategies at their level between 2019 and 2021.

Compared with 2021, less information has been provided in 2023 on the progress towards tackling barriers to adaptation. The country highlights issues mentioned in previous sections, which include the missing monitoring system, also reported as a major challenge in 2021. In 2021, the country anticipated that concrete actions to addressing existing practical barriers would be rolled out in the following years, but no progress or concrete plans were reported in 2023.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

According to the 2018 adaptation scoreboard, the vulnerability assessment for the NCCS-2, based on results of the NAGiS, was carried out using sound methodology. Hungary reported that further improvements have been made to the NAGiS system between 2017 and 2020, already mentioned in the last submission. The system was available as evidence basis for the new county and municipal level climate strategies and sustainable energy and climate action plans elaborated between 2018 and 2022. There is no further information how the system continues to inform policy, e.g. through tying into the vulnerability and risk assessment. In 2021, a planned project called 'CARPAGiS' that was meant to further improve the NAGiS was mentioned, but there no information on the status of this project available was provided in the 2023 submission.

In September 2022, preparation started on the regular five-year evaluation as well as on potential revision of the NCCS-2 in 2024-2025.

Conclusions. Hungary faces delays in establishing a climate adaptation monitoring system. It reports that progress has been made in implementing adaptation measures but gives no details on their effectiveness. Adaptive capacity improvements focus on the NAGiS, with little information on progress since 2021. Hungary has made rapid progress on adaptation priorities, particularly in terms of putting structures in place at municipal level. However, no concrete plans have been mentioned on tackling barriers. Vulnerability and risk assessments rely on the NAGiS but lack detailed content.

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

The 2023 submission does not include any information on good practices or lessons learned[52]

[52] This is despite the fact that there are some good adaptation practices that may be reported. For example, under the cohesion policy Environmental Programme, the calls for proposals for flood protection measures are being prepared with the help of contracted experts to enhance (where possible nature-based) water retention measures.

Hungary's reporting identified no new synergies with other international frameworks or conventions compared with 2021. It cites the EU adaptation strategy, the Paris Agreement and the Carpathian Convention as relevant international frameworks and conventions. The country reports that several projects that facilitate international cooperation continue to be run. More detail than before is provided on the DEEPWATER-CE transnational cooperation project, which is currently in its administrational closing phase and aims to provide practical answers to meet the increasing use of municipal water through the sustainable use of groundwater.

Conclusions. Projects and funding schemes already running in 2021 remain ongoing. Hungary has not reported any new good practices, new synergies with international frameworks or new initiatives in transnational cooperation.

Section 6 – Subnational level information

25. Subnational governance structures for adaptation action

As signatories of the Covenant of Mayors initiative, an increasing number of cities and municipalities in Hungary are developing their local adaptation strategies and plans.

The country reports that 132 municipalities have developed their own local climate change strategies, despite there being no legal requirements for having a climate change strategy at a subnational level. Also, a few examples of county-level and local climate platforms that serve as local coordination fora have been set up across the country.

26-29. Subnational policies and cooperation

The country reports no newly identified key efforts at a subnational level. Subnational strategies are not described in enough detail to provide information about specific efforts. However, the county level is fully covered and the municipal level partly covered by climate strategies with differing adaptation priorities depending on the climatic exposures, adaptive capacities and economic characteristics. The submitted text is largely identical to the 2021 submission. The territorial programme, financed by the cohesion policy funds, supports the development of local climate strategies.

The country reports the continuation of the 'climate platforms' where members from local administration, civil society, NGOs, businesses, etc. come together to discuss local climate actions. Also, progress has been reported on the LIFE-CLIMCOOP project, where a city government and local industry are working together to create a local adaptation strategy and actions. This project is currently piloted in the City of Kazincbarcika and there are plans to expand it to other locations in the future.

Currently, there is a training programme for municipal governments and economic organisations in different climate-related topics. Other educational and training programmes are continuing, as well as the 'county climate platforms' that aim to enable local climate action.

Hungary is in the early stages of developing a system for tracking subnational adaptation activities. As had been expected in 2021, approximately 150 Hungarian settlements adopted climate change strategies by the end of 2022. However, on progress with reviewing and updating these strategies, it was already stated in 2021 that the strategies at county level were due to be revised and updated. In 2023, there was no indication that this process had started.

Hungary has four signatories to the charter of the EU Mission on Adaptation to Climate Change – three local municipalities and one county.

The country reports that no information is available at present on cooperation at a subnational level.

Conclusions. Hungary lacks new subnational measures on climate adaptation. County- and municipal-level climate strategies exist but lack specific details about their implementation. Climate platforms and the LIFE-CLIMCOOP project continue, but no progress on sub-national strategy updates was mentioned. A system for tracking subnational activities is at an early stage of development. Around 150 Hungarian settlements adopted climate change strategies by 2022. No information on subnational cooperation projects is available

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	•
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↗

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	●
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	17. Has progress been made towards increasing adaptive capacity?	●
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	●
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	●
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	●

Assessment of progress on climate adaptation in Ireland according to the European Climate Law

Summary

In its 2023 report, Ireland claimed that it has made continuous progress in increasing its adaptive capacity, both on the legal side and on implementation. Ireland focuses on improving and standardising its weather prediction and climate services. Most actions within sectors in favour of adaptation are at the planning stage.

There have been multiple developments in Ireland's climate-monitoring and modelling framework since 2021. These include both extensions and expansions to the existing framework, and new additions. The Climate Action and Low Carbon Development (Amendment) Act 2021 ('the Climate Amendment Act') sets out the legal framework for Ireland's transition to a climate-resilient, biodiversity-rich, environmentally sustainable, and climate-neutral economy by no later than 2050.

A strong component of the Irish legal make-up is the Climate Change Advisory Council and its Committee on Adaptation, which provides independent advice to the government and prepares an annual review on climate change actions.

The Climate Amendment Act is implemented through climate action plans that are updated annually. One of the 22 chapters of the 2023 climate action plan deals with adaptation.

Objectives of the National Adaptation Framework (have been achieved thanks to the above-mentioned 2021 revisions to the Climate Act. A new framework is currently being developed, set to include updated actions and objectives aligning with changes in national, EU and international policy from 2018. The most recent climate action plan (CAP 23), published in December 2022, includes a chapter on adaptation featuring 20 actions for 2023, partly addressing criticism of the Climate Change Advisory Council about the lack of a framework for monitoring[53].

Locally, the Climate Action and Low Carbon Development (Amendment) Act 2021 now legally requires all local authorities to prepare local authority climate action plans (LACAPs) every 5 years.

Furthermore, the Irish Government published its International Climate Finance Roadmap in July 2022, aiming to double climate finance to at least EUR 225 million by 2025.

[53]https://www.climatecouncil.ie/councilpublications/annualreviewandreport/Annual%20Review%202022%20Web%20Version.pdf

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

The Climate Change Advisory Council identified in its annual review for 2022[1] that currently there is no standardised approach to monitoring adaptation. As a result, it is difficult to determine the status of Ireland's action on adaptation. Ireland may attempt to measure the success of its adaptation actions through tools suggested under the forthcoming National Framework for Climate Services (NFCS, see below).

However, since 2021, there have been several developments related to Ireland's climate-monitoring and modelling framework. These include both extensions and expansions to the existing framework, and new additions.

The most notable developments include the TRANSLATE project that was initiated by the Irish national meteorological service, Met Éireann, to standardise future climate projections for Ireland and develop climate services that meet the adaptation sector's needs.

The Irish National Framework for Climate Services (NFCS) was established to streamline the provision of climate services in Ireland. A range of experts from across Irish sectors will be involved in shaping the NFCS, ensuring accuracy and relevance of data and information.

An online training tool has been provided to local authorities for Ireland's climate information platform 'Climate Ireland', which has been completed by 80% of staff.

The Irish Environmental Protection Agency, with partner agencies, has now started developing Ireland's first 5-Year Assessment Report (5-YAR) on Climate Research.

In 2021 and 2022, the EPA published research results. These might lead to a tailored suite of climate adaptation indicators specifically relevant to Ireland, thereby addressing one of the criticisms of the Climate Change Advisory Council. In addition, it published research results on: i) risks and opportunities for Irish businesses, concerning the built environment, leading to a suite of research-based principles to inform policymaking and design, and ii) participatory frameworks for the National Dialogue on Climate Action.

2-4. Changes to the reported vulnerabilities and risks since 2021

The hazards to water management, and agriculture and food have been identified extensively through many lenses (heat and cold, flooding and drought). However, no change was reported for these between 2021 and 2023.

The most material hazards (coastal flooding, flooding and drought) as per the INFORM tool have been described extensively in the reporting for 2023 and are considered particularly important for Ireland.

Risks associated with increasing temperatures have been identified for both water management and agriculture and food. An increase in Ireland's average temperature might lead to an increased occurrence of vector-borne diseases, while heatwaves have already resulted in restrictions on water supply with farmers.

Conclusions. Ireland has continued developing its climate-monitoring and modelling tools, in particular by developing standardised future climate projections and a national framework for climate services. Currently, Ireland has no standardised approach to monitoring adaptation. The future framework for climate services might provide for such a possibility. The climate vulnerability and risk analysis has not identified additional risks compared to 2021. The reported risks and sectors appear consistent with the results of an independent analysis by the Joint Research Centre and the country's own national risk assessment.

Section 2 – Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

Ireland's climate adaptation policy is given legal effect by the Climate Action and Low Carbon Development Act 2015, as amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 (the Climate Act).

Section 5 of the 2015 Act sets out the requirements for developing and approving a National Adaptation Framework. Ireland's first framework , prepared in line with these requirements, was published in January 2018. Sections 6 and 7 of the 2015 Act set out legal requirements for preparing sectoral adaptation plans in priority sectors (identified in the NAF). Ireland's first set of sectoral adaptation plans prepared under the 2015 Act were approved by the Irish Government in October 2019.

The 2021 Act focuses on introducing binding mitigation targets into Irish sectors but also includes several adaptation provisions. It makes a new provision for two or more government ministers to jointly formulate and submit a sectoral adaptation plan related to a matter for which such ministers share responsibility in order to promote better cross-sectoral cooperation. There is no information available on whether the prime minister's office is involved in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

The Act also introduces a requirement for each local authority to prepare a climate action plan, which will include both mitigation and adaptation measures and be updated every 5 years. Local authority plans are currently being developed.

The National Adaptation Framework and its sectoral plans form part of an iterative process and will be revised at least every 5 years to reflect developments in scientific knowledge and enable adaptation actions to be changed and escalated, if needed. The statutory framework was reviewed in 2022. A new framework is currently being developed in line with the recommendations of that review.

Ireland currently has no stand-alone climate risk and vulnerability assessment. These risk assessments are carried out as part of the sectoral adaptation plans. However, Ireland committed to developing a stand-alone climate risk assessment by 2025.

Conclusions. The most important law concerning climate adaptation – the Climate Action and Low Carbon Development Act – was amended in 2021. With this amendment several new adaptation provisions were introduced. These deal, among other things, with requirements for inter-ministerial (cross-sectoral) adaptation plans and a requirement for local authorities to prepare climate action plans. Ireland has committed to developing a stand-alone climate risk assessment by 2025.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The Climate Change Advisory Council published its sixth Annual Review on climate and adaptation policy in 2022[1] ('sixth review'). It identified progress in several areas, such as on flood-risk preparedness and management and on the extent to which the local government helps plan and implement adaptation measures. Ireland's most recent climate action plan (CAP 23) was published in December 2022. It included a chapter (Chapter 22) on adaptation. This chapter contains 20 actions due to be carried out in 2023. Although these do not explicitly cover certain vulnerabilities (e.g. heatwaves, flooding and coastal flooding), their coverage is implied. The priorities under CAP 23 are: updating national policy and the National Adaptation Framework, in line with its review and legislation; providing options for delivering a national implementation strategy for nature-based solutions; including climate resilience in flood-risk management policies; ensuring climate resilience of coasts; providing climate data and availability and climate services; developing early warning systems; ensuring climate resilience of infrastructure (water, comms, electricity, and gas networks); ensuring climate resilience in health; improving awareness of the need to adapt.

The reporting on challenges, gaps and barriers has increased in reaction to the sixth review, which showed gaps in progress and provided suggestions for closing these gaps.

10. Nature-based solutions in national adaptation policies

Nature-based solutions and ecosystem-based adaptations are not specifically mentioned as a priority in the Climate Act. However, one of the actions (see above) in CAP 23 focuses on nature-based solutions.

11. Integration of adaptation into sectoral policies

Sectoral action plans were developed for priority sectors under the Climate Act in 2019, which are currently being reviewed and will be updated accordingly. They cover the following sectors: seafood, agriculture and forestry; biodiversity; built and archaeological heritage; transport infrastructure; electricity and gas networks; communications networks; flood risk management; water quality and water services infrastructure and health. As required under the amended 2021 Climate Act, some cross-sectoral plans are being developed.

12. Engaging with stakeholders vulnerable to climate change impacts

Under the 2022 National Dialogue on Climate Action several initiatives were carried out on involving vulnerable stakeholders in adaptation policy. The Climate Conversations 2022, involved more than 400 stakeholders and 4 300 members of the public, including young people, populations vulnerable to the transition to carbon neutrality, and local and community organisations. The first National Youth Assembly on Climate involved over 40 young people from across Ireland between the ages of 12 and 24 to capture their views and suggestions on how to deliver on climate actions. The National Social and Behavioural Advisory Group was established, which includes social and behavioural scientists, to provide ongoing insight into research findings and help inform policy.

13. Engaging with private-sector stakeholders

One example of the involvement of the private sector in adaptation is given. As mentioned earlier, the Environmental Protection Agency research project, 'Climate Change Adaptation: Risks and Opportunities for Irish Businesses,' identified the biggest climate risks and opportunities for key sectors of the Irish economy. The project examined in-depth five business sectors that are important to Ireland's economy:

(1) chemicals and pharmaceutical manufacturing;
(2) computer and electronics manufacturing;
(3) food and beverage production;
(4) hospitality and tourism; and retail.

All five sectors assessed were found to be vulnerable to the risks of climate change related to supply chain disruptions, changing policy and changing consumer demands. The food and beverage, and hospitality and tourism sectors were found to be the most vulnerable to extreme weather events.

Conclusions. The 2015 Irish Climate Act required sectoral adaptation plans to be developed. These are currently under review and improved plans can be expected soon. In addition, the 2021 amendment of the Climate Act will lead to some cross-sectoral adaptation plans, requiring inter-ministerial collaboration on adaptation.

Section 4 – Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Vulnerability and risk analyses are required as part of the sectoral adaptation plans. As described above, these will be revised and updated in the next cycle of sectoral adaptation plans. The following progress has been made since 2021 on establishing and operationalising monitoring mechanisms.

- Met Éireann's TRANSLATE project, which will be completed in 2023, will standardise and provide a single set of national climate projections for Ireland and it may support standardised monitoring of adaptation actions (still uncertain).
- The Environmental Protection Agency, University College Cork, and Transport Infrastructure Ireland (TII) are currently working on delivering a draft set of indicators for the roads sector as well as a methodology for developing and selecting indicators that can be applied across sectors as part of the sectoral plan development process. This work is scheduled to be fully completed in 2023 to ensure that indicators form a more substantial part of sectoral monitoring processes in future.
- Ireland has committed to developing a standalone climate change risk assessment. This project is being managed by the Environment Protection Agency and is scheduled to be completed in 2025.

15. Implementation of adaptation measures and financing

There was a lot of progress over the past 2 years with risk identification, prioritisation and building of adaptive capacity. As already mentioned, monitoring has not yet been well developed. Adaptation plans exist for many sectors or are being developed/refined. Some of the sectors (electricity and gas networks, biodiversity) were less involved than others. Resources remain a challenge both for planning and implementation at local level and for sectors, even though human resources have been strengthened in many areas.

In its 2023 Annual Review[54], the Climate Change Advisory Council suggested that the Government 'should set out a budget for developing our resilience to the effects of climate change'. There is scope to put climate resilience considerations more to the forefront in Ireland's use of EU support from the common agricultural policy and cohesion policy funding. Ireland already uses these sources for mitigation measures.

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers

Ireland did not provide evidence to show that impacts, vulnerabilities and risks have reduced. However, in addition to the above-mentioned strengthening of human resources for adaptation, there have been other actions to boost adaptive capacity since 2021. These actions led to improved

[54]https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC-AR-2023-FINAL%20Compressed%20web.pdf

coordination mechanisms, alignment of research with national adaptation priorities, development of more sectoral adaptation plans and an increase of public engagement.

The National Adaptation Framework undergoes a review process every 5 years to ensure it is aligned with national adaptation priorities. It was reviewed in 2022 and during the review process considered feedback from consultations with key sectoral, department and agency stakeholders. A public consultation on the review was held from May to July 2022. It also contains a summary of the actions completed under the framework as well as an update on the progress made in implementing the National Adaptation Framework's supporting objectives. The review considered key developments in the EU and international arena, in particular: i) the publication of the IPCC (Intergovernmental Panel on Climate Change) Working Group I and II reports; ii) the agreement and publication of the new 2021 EU adaptation strategy; and iii) and feedback on current adaptation policy in Ireland. It also focused on thematic areas where additional action is necessary and where this would need to be reflected in a new framework.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

In the development of sectoral adaptation plans, vulnerability and risk analyses are required as part of the process set out in sectoral guidelines for climate change adaptation. These will be revised and updated in the next cycle of sectoral adaptation plans.

Ireland committed to developing a stand-alone climate risk assessment by 2025.

Conclusions. The National Adaptation Framework is reviewed every 5 years so that it is aligned with national priorities. The review is complemented by annual reviews from the independent Climate Change Advisory Council and a process is in place to involve key sectors and the public. Gradually more resources are allocated to adaptation planning and implementation, both human and financial. However, the Climate Change Advisory Council recommends that the government establish a genuine adaptation budget. Also, Ireland does not seem to make use of funding provided under the common agricultural policy or cohesion policy for adaptation.

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Since 2021, progress has been made on cooperation, as can be seen with the following new developments.

Met Éireann is a core partner of the Europe-wide EC-Earth consortium which develops an IPCC-class Earth system model. It also includes two other Irish partners: the Irish Centre for High-End Computing and University College Dublin. The project will produce high-resolution simulations of Ireland's future climate using the EC-Earth4 model combined with a range of regional climate models. Ireland is also working with the Commission and other Member States on the EU

Destination Earth project. Since 1989, Met Éireann has been sharing the development of its weather forecasting system with the international consortium HIRLAM (High Resolution Limited Area Model). Met Éireann has now joined the consortium as a full member and will help in its further development.

Conclusions. International co-operation has been stepped up for climate predictions and weather forecasts.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

As already described earlier and in addition to the establishment of climate action regional offices, already reported in 2021, new key measures include the following: Under the Climate Action and Low Carbon Development (Amendment) Act 2021, there is now a legal requirement for all local authorities to prepare local authority climate action plans ('local plans') every 5 years. LACAPs are currently being developed in line with national guidelines. Local plans will replace the existing local adaptation strategies.

Sectoral coordination of adaptation policy takes place under the National Adaptation Steering Committee chaired by the Department of the Environment, Climate and Communications.

26-29. Subnational policies and cooperation

To date, seven local authorities have signed up to the EU Mission on Adaptation to Climate Change Charter. These are: Offaly County Council, Louth County Council, Sligo County Council, Donegal County Council and Galway County Council, Galway City Council and Mayo County Council. The Atlantic Seaboard North regional office and the town of Ennis. Clare have also signed up to be friends of the Mission.

Progress has been made on engaging with stakeholders on climate adaptation policy. The Climate Conversations 2022 included people in hard-to-reach areas of the country, volunteers, behavioural scientists, agriculture experts, members of disadvantaged communities, and many others. Some 15 Public Participation Network workshops were held at local level and 10 focus groups were held with sections of society that have been particularly impacted.

The Transboundary Adaptation Learning Exchange' (TalX) is a collaborative project across Northern Ireland, Ireland, Scotland, England and Wales, funded under the Environmental Protection Agency's research programme and led by University College Cork. TalX aims to establish an innovative learning network to enable a cohesive approach to measuring and acting on climate change adaptation across boundaries.

Conclusions. Through local action plans, the establishment of the climate action regional offices, a multitude of local participatory actions and participation in the EU Mission on Adaptation to Climate Change, there is high level of involvement at subnational level in planning and implementing adaptation measures.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	N
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↑
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies, and plans?	N
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	?
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience, and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↑
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Italy according to the European Climate Law

Summary

Italy's progress in climate change adaptation, as observed by comparing the data provided for 2021 and 2023, reveals a mix of detailed additions and persisting gaps. Over these 2 years, much of the report's content has remained unchanged, indicating that policies remained consistent and there was no significant progress made in certain sectors. In some specific areas of the reporting, Italy disclosed more in the 2023 data, although not necessarily reporting different information from what was shared in 2021.

A total of 100 meteorological stations and numerous stations that are included in hydro-meteorological networks managed by Civil Protection are part of the observational and monitoring networks in 2023.. Similarly, while Italy highlighted that the public can access climate projections made via EURO-CORDEX models through the Copernicus C3S service until 2100, it is uncertain if this access was already available in 2021. In particular, recent climate projections concerning sea surface temperature and sea surface height appeared in the 2023 data, yet it was not clarified if these were the result of new investigations.

In the 2023 report, more sectors were flagged as being at risk and every sector has been equipped with evaluations on potential consequences, while impact assessments were absent in 2021. Despite this, details about likelihood and vulnerabilities were not adequately addressed.

While Italy's aspirations for its national strategy remain grounded in international and regional guidelines, Italy has clearly indicated the challenges in its adaptation strategy, including a lack of coordination nationally and disparities in sub-national adaptation planning. The Paris Agreement and the EU adaptation strategy provide foundations on which the Ministry of Environment and Energy Security, formerly known as the 'Ministry for the Ecological Transition', steers mitigation and adaptation policies. However, to date, only the national adaptation plan (NAP) remains in draft form, pointing to a stagnation in formalising an effective action map.

Despite the overarching approach remaining consistent, advancements have been made in planning, monitoring, and evaluating adaptation policies, as well as in data collection and sharing. The involvement of stakeholders vulnerable to the impacts of climate change has been apparent in several initiatives like flood-risk reduction, green-space expansion, biodiversity enhancement, and urban area protection. However, there are still specific opportunities to tackle risks in sectors such as tourism, energy, agriculture and food, transport, and industry.

The INFORM climate change tool identifies several hazards, with floods, coastal floods, droughts, and heatwaves being the most significant. Although the national strategies, policies, and plans remained largely unchanged from 2021, the imminent approval of the NAP is expected to foster forthcoming actions. The establishment of a working group focused on adaptation for the national strategy stands out as a first accomplishment.

Italy's commitment to adaptation is also reflected in subnational efforts. By 2023, most Italian regions had either formulated regional adaptation strategies or embarked on their development journeys. The involvement of municipalities in crafting local adaptation plans is growing, reflecting a decentralised approach to tackling climate change. This includes strong local participation in the EU Mission on Adaptation to Climate Change.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

The information provided by Italy for 2023 in relation to the climate-monitoring and modelling framework resembles that provided in 2021. Although the answers provided in 2023 were more detailed, the content did not change and most texts were identical; on specific aspects, it remains unclear whether the additions to the text represent an upgrade from 2021 or simply additional detail that was not shared in 2021.

As part of the comprehensive observational national and regional monitoring networks that cover the Italian territory and already referred to in 2021, the 2023 report mentions the availability of 100 meteorological stations and several hundred stations included in hydro-meteorological networks run by Civil Protection.

Italy reports that the climate projections till 2100 made through the EURO-CORDEX models are available to the public through the Copernicus C3S service, but it is unclear whether this was already publicly available in 2021 and whether it represents actual progress. For 2023, climate projections about the temperature and height of the sea’s surface have been provided, which were not mentioned in 2021, but are also not explicitly referred to as recent additions.

2-4. Changes to the reported vulnerabilities and risks since 2021

Italy provided a much more detailed and precise report of vulnerabilities and risks in 2023 than in 2021, having completed a national multi-sectoral climate risk assessment (CRA) in 2023. Firstly, in 2023, 15 sectors have been identified as at risk. Secondly, while in 2021 no impact assessments were provided, in 2023 every sector was included in proper evaluations on potential impact.

Impacts and likelihood of key hazards as well as vulnerability of both agriculture and food, and water management sectors are identified as 'high'. However, descriptions on likelihood and vulnerabilities are still lacking for all the remaining sectors.

The INFORM climate change tool identifies floods, coastal floods, and droughts to be the most significant hazards (all above '4'). Consistently, all these hazards are also identified in the reporting. Heatwave is identified as significantly increasing climate hazard in the future.

Compared with the vulnerability and risk analysis under the INFORM tool[55], the PESETA project[56] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. Italy has not yet significantly developed its climate-monitoring and modelling tools, while it significantly improved the description of vulnerabilities and risks, covering many more sectors in detail. Sectors with a high likelihood of key hazards and vulnerabilities have been identified. The reported risks and sectors appear consistent with the results of independent analysis by the Joint Research Centre and the country's own national risk assessment.

Section 2 – Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The Ministry of Environment and Energy Security, with a similar structure to the previously called Ministry for the Ecological Transition, is responsible for implementing mitigation and adaptation policies and coordinates activities on adaptation strategies and plans. There is no information available on the involvement of the prime minister's office in the interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned. The international indications of the Paris Agreement and the EU adaptation strategy have so far driven the policies and measures taken by Italy to adapt to climate change.

In 2015, the national adaptation strategy (NAS) to tackle climate change was adopted. It outlined a national framework to deal with the impacts of climate change on the main natural systems and economic sectors. The Ministry is currently working on implementing the strategy by adopting a national adaptation plan (NAP). The strategic environmental assessment of the NAP was recently concluded, leading to the adoption of the recommendations from the assessment on 8 August 2023.

No considerable improvements were made apart from the positive developments in the collection and sharing of relevant data, with a national platform on adaptation to climate change being

[55] The INFORM-tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool

[56] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en

established as an e-platform to support decision-making processes, and some improvement in relation to monitoring.

Conclusions. No major changes in governance structures have taken place since 2021. Italy is advancing towards adopting its NAP, the key implementing instrument of the NAS already adopted in 2015.

Section 3 – Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, and changes in the reported challenges

Unfortunately, data provided by Italy are limited and not sufficiently detailed to assess whether priorities and strategies well correlate with the identified risks and vulnerabilities, especially as priorities and strategies have been framed through a systemic approach and not in accordance with the identified risks and vulnerabilities.

Some specific measures were mentioned in relation to 'measures in adaptation policy at national level to engage with stakeholders particularly vulnerable to climate change impacts'; these can be reconnected to the risks and vulnerabilities identified in Section 1.3, namely those related to: i) reducing the risk of flooding; ii) land maintenance, rehabilitation, tracking and prevention; iii) reducing the residual risk to protect public and private safety in areas affected by disasters; iv) protecting existing green areas and creating new urban forests including by planting over 6.6 million trees; v) biodiversity preservation and enhancement; vi) protection of the ecological processes linked to the full functionality of ecosystems; vii) restoration of the course of the River Po to promote the recovery of original natural habitats; viii) increased protection for marine habitats through the use of new technology; ix) increased digitalisation of national parks and marine reserves to better protect the local area and natural habitats; and x) more resilient water infrastructure throughout Italy, by improving and maintaining the source, stocking and water supply infrastructures in the entire country.

On the other hand, some of the risks and vulnerabilities relevant to tourism, coastal areas, energy, agriculture and food, transport, and industry, are not at all considered.

Italy is still facing the same obstacles as those it faced in 2021. At national level there is still a lack of coordination, while at subnational level there is a great lack of uniformity in adaptation planning and actions. Difficulties identified are linked to: i) the lack of detailed data for developing climate assessment frameworks and for regional and local forecasting scenarios; ii) the lack of decision support systems to guide the decision makers in their choices; iii) the lack of specific skills within the administrations and the need to build new governance models; and iv) the low availability of funds to cover the needs of the different sectors and the difficulty to act in an integrated way.

The measures identified in the national strategy, policies and plans are the same as those that were indicated in the 2021 report. As the NAP is still not approved, it is still a declared intention that the governance structure will identify the procedures, tools and competent actors regarding the

introduction of climate change adaptation principles, measures and actions in the national, regional and local plans and programmes. This is expected to happen within 6 months from the NAP adoption. However, some activities are reported as having already started, such as the establishment of a working group on adaptation to implement the national circular economy strategy.

The current protection gap for floods in Italy suggests that the insurance coverage remains low compared to projected risk, and this could result in losses to be covered by the public sector, thereby potentially posing a risk to public finances[57].

Climate change is affecting many sectors in Italy, with adaptation challenges concerning, in particular, soil and water management. The problem of water scarcity has expanded to cover northern Italy, with decreasing moisture and increased sealing and degradation of soils. This affects hydropower generation, availability of water intended for human consumption and agriculture, the ecological flow or the good status of water bodies. Local communities are exposed to flash floods and extreme heat, with the risk of heat-related death and morbidity projected to rise significantly. Italy's governance of water management is fragmented, and infrastructure suffers from significant leakages. High water use in agriculture is a concern in the south. The following measures would help mitigate some adverse effects of climate change: i) investing in flood control; ii) re-naturalising water bodies; iii) improving land-use planning; iv) reducing the sealing of soils; and v) regenerating soil. The recovery and resilience plan contains some measures to restore biodiversity and regenerate soils.

10. Nature-based solutions in national adaptation policies

Nature-based solutions and ecosystem-based measures are not specifically mentioned in the NAS. However, the NAP assessment characterises some of the proposed measures as nature-based solutions and labels them as green actions.

11. Integration of adaptation into sectoral policies

Progress on integrating adaption into sectorial policies cannot be determined. This is because in 2021, adaptation was referred to only in the policies related to the energy sector. For 2023, it is reported that procedures, tools and competent actors regarding the introduction of climate change adaptation principles, measures, and actions in the national, regional and local plans and programmes still need to be identified.

12. Engaging with stakeholders vulnerable to climate change impacts

In many sectors like reforestation, biodiversity, public safety and water management, progress has been made in involving stakeholders vulnerable to climate change impacts.

[57] IT_SWD_2023_612_en.pdf (europa.eu)

13. Engaging with private-sector stakeholders

No progress is evident in terms of involving private sector stakeholders, as exactly the same comments are provided as in 2021. It is unclear to which extent the projects developed by the public actors might involve the private sector in the planning and implementation of the interventions.

Conclusions. The still pending adoption of the National Adaptation Plan has inevitably held back any advancement in rolling out adaptation measures that are well correlated with the identified vulnerabilities and risks. It also affected the mainstreaming of adaption in the different sectorial policies due to the still missing identification of procedures, tools and key actors. The lack of specific reference to nature-based solutions in the National Adaptation Strategy might be superseded by the Plan NAP that. Stakeholder engagement is ongoing, while there is no information on any engagement with private sector stakeholders in relation to adaptation policy.

Section 4 – Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Progress has been made in establishing and operationalising monitoring mechanisms. A new set of indicators was published in June 2021, providing a first picture on climate change impacts at national and regional level. Those indicators have been used as a basis to monitor 13 sectors: water resources; soil; terrestrial ecosystems; marine ecosystem; Alpine and Apennine environment; coastal areas; health; forestry; agriculture; fishing; energy; urban areas; and cultural heritage. Some 33 potential impacts have been identified.

A subset of 20 national indicators and 30 regional case studies have been produced. These indicators belong to various vulnerable sectors in accordance to the NAS. For each of these indicators, the report specifies climate factors, frequency of data collection, temporal and spatial coverage, and limitations, as well as overall future trends.

These indicators have diverse characteristics in terms of data, consistency, and length of historical series.

15. Implementation of adaptation measures and financing

Some progress has been made in implementing adaptation measures. While progress cannot be determined compared with 2021, as the NAP which was under approval at the time has still not been adopted, some progress can be determined compared with 2018 from reviewing the Adaptation Scoreboard. This is because the draft NAP analyses the role of different public administrations in implementing adaptation actions for each of the sectors included in the NAP. Activities, aligned with the NAS preliminary analysis, have already been rolled out in key vulnerable sectors.

EU funds play a much larger role in funding and financing adaptation implementation than national funds in Italy. There is scope to put climate resilience considerations more to the forefront in Italy's use of EU support from the common agricultural policy and cohesion policy funding.[58]

An experimental programme of interventions for adaptation to climate change in urban settings was launched, focusing on resilience against climate risks such as heatwaves, extreme rainfall and droughts. It includes measures funded with a total allocation of EUR 79.37 million over 3 years.

In agriculture, the national strategic plan for rural development aims, among other things, at promoting adaptation activities for the efficient use of resources and climate resilience in the agro-food and forestry sectors. The Ministry of Health and the Department of Civil Protection have been operating an early warning system in relation to heatwaves.

National guidelines for coastal protection have been developed. The strategic plan for tourism includes specific actions aimed at minimising climate impacts on tourism between 2017 and 2022.

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Progress made by Italy on reducing impacts, vulnerabilities and risks cannot actually be determined as the Plan, which was under approval in 2021, was still not adopted by 2023. Moreover, also after the Adaptation Scoreboard was revised, no progress could be determined since this is focused exclusively on adaptation measures.

For the same reason, progress towards increasing adaptive capacity could not be determined compared to 2021. However, in this case, compared to 2018, some progress could be identified after reviewing the Adaptation Scoreboard. For each risk sector, the NAS identifies a portfolio of measures (classified as soft, green, grey, or long-medium term) and provides a compilation of good practices, win-win solutions, no or 'low-regrets measures', desirable options, sectoral needs, etc. The draft NAP proposes a set of adaptation actions in each of the vulnerable sectors, as well as possible institutions who would be responsible for implementing them. To date, the implementation of adaptation measures has focused primarily on the most vulnerable sectors, specifically agriculture, water use, forests, human health, flood risk, desertification and drought, coastal areas, biodiversity, tourism, and urban settlements.

According to the Adaptation Scoreboard, the draft NAP identifies 361 actions based on the following criteria: effectiveness, economic efficiency, side-effects, performance under uncertainties, and conditions for decision making. Each action has been prioritised as high, medium-high, medium, medium-low or low. However, given that the NAP is still not adopted, assessment of the degree to which priorities are addressed cannot be done.

Italy is trying to overcome barriers to adaptation through systemic actions under the NAP, aimed at developing national governance for adaptation, mainstreaming adaptation into planning at all levels, developing sectoral and cross-sectoral means for implementing adaptation measures, and

[58] Italy intends to invest ca 1.3 billion EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

improving and systemising the knowledge framework. The steering functions of the governance structure include defining roles, responsibilities and priorities for action, identifying sources of funding, and identifying legislative, regulatory, and procedural barriers to adaptation. Some activities aimed at laying the knowledge base on regulatory barriers have already been initiated. However, no specific progress made in tackling barriers was mentioned in the 2023 submission.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

The review and updating of vulnerability and risk assessments and national adaptation policies have not been reported. The NAS provided for, and the Adaptation Scoreboard mentioned a periodic review of adaptation actions on a five-year basis. However, no update has been provided on this, while the latest review should have happened in 2020. Furthermore, while the NAS mentions that the review will be informed by continuous monitoring of the progress and evaluation using indicators, it is unclear at this stage whether it will also be subject to a periodical review while the NAP is not yet adopted.

Italy has applied for the technical support services under the DG REFORM Technical Support Instrument, which will support the development of an Adaptation Facility for Cassa Deposito Prestiti (the national promotional bank) and will help the Rome Commune to improve its resilience capacity and increase public awareness regarding heatwaves and their impacts.

Conclusions. Monitoring has been operationalised with the identification of overall and sector specific indicators. However, the possibility to assess any progress in terms of reducing climate impacts, vulnerabilities and risks and in terms of increasing adaptive capacity has been hindered by the absence in 2023 of an adopted National Adaptation Plan, as was the case in 2021. On the positive side, while a financing mechanism specifically for adaptation has not been reported, and a database of adaptation-related spending does not exist, some examples of adaptation financing from different programmes have been identified. The extent to which barriers to adaptation could be identified and overcome also remains to be assessed. It is unclear whether the national adaptation policies, in particular the Strategy, will be updated while the Plan is still not adopted.

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

No good practices were reported in 2021. Therefore, an assessment of the progress made is not possible. However, some specific projects have been reported and these indicate positive progress in specific areas, such as: i) the testing on adaptive forest planning, closely linked to constant climate monitoring; ii) the integration of meteorological forecasts and other types of data into forecasting systems to anticipate the occurrence of urban heat islands; iii) the implementation of different types of sustainable urban drainage systems in small municipalities; iv) the development of adaptation strategies to improve water management through tools that ensure water storage

(agricultural or multifunctional reservoirs) and that water is distributed when urgently needed; v) measures guaranteeing consistency between different sectors and levels of governance in understanding the impacts of climate change; vi) and the development of regional and local strategies, consistent with national ones. Additionally, Italian regions are involved as demonstrating sites in several Horizon-Europe demonstration projects.[59]

No progress could be confirmed on synergies with other international frameworks and cooperation as no new indications have been provided since 2021.

Conclusions. The country has not reported any new good practices, new synergies with international frameworks or new initiatives in transnational cooperation. However, specific projects reported suggest some progress was made in developing good practices.

Section 6 – Subnational level information

25. Subnational governance structures for adaptation action

Some 7 out of the 21 regions and autonomous provinces adopted an adaptation strategy or plan, 3 officially started planning activities and set up a dedicated working group, while others carried out climate studies as a knowledge base for planning. Furthermore, three regions approved regional laws on climate issues, including adaptation.

Furthermore, several adaptation plans at municipal level have also been published, e.g. the BLUEAP project in Bologna.

26-29. Subnational policies and cooperation

Progress has been identified in terms of integrating climate change into subnational policies, as most of Italian regions have either developed regional adaptations strategies or have started preparing them. Many municipalities are progressively joining adaptation actions as well and more and more are adopting local adaptation plans every year. Italy reported the early-stage development of a system for tracking subnational adaptation activities.

A few examples of projects involving stakeholders in relation to adaptation policy show positive progress in this direction. Specifically, the example from Emilia Romagna is very relevant, proving that the public and private sector collaborate in setting strategic objectives, consult each other on adaptation strategies, and cooperate in implementing adaptation measures.

[59] - Toscana - in regions4climate https://regions4climate.eu/resilient-region/uusimaa/ - Friuli Venezia Giulia and Piemonte in MountResilience : https://cordis.europa.eu/project/id/101112876 - Puglia in RESIST: https://resist-project.eu/regions/

Progress in terms of reviewing and updating subnational adaptation policies, strategies, plans and measures has yet to be registered as the preliminary mapping of good practices is currently being carried out to inform the review.

Also, on international cooperation at subnational level, only three examples provided by Italy, which were carried out before 2020 are worth mentioning. The Interreg Programmme Italy – Croatia, which led to funded projects involving stakeholders from the Adriatic area. However, as those projects were also previously reported, progress cannot be determined.

Some 15 Italian regions, provinces, cities and/or municipalities, covering almost 50% of the national territory, corresponding to approximately 40% of Italian inhabitants, are participating in the EU Mission on Adaptation to Climate Change. Those regional and local entities, which for the most part is also those most exposed to the impact of the changing climate, have signed the Mission Charter declaring their willingness to cooperate, mobilise resources and develop activities to reach their adaptation goals.

Conclusions. Italian regions and cities are increasingly developing and implementing adaptation policies at regional and local level. The strong commitment to adaptation at subnational level is also substantiated by the wide involvement of regional and local entities in the EU Mission on Adaptation to Climate Change. However, reporting does not provide details on progress achieved or updates of those policies. Advancements in international cooperation seems to be limited to the involvement in the Mission's activities.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	?
	6. Have there been any changes to the national governance structures since 2021?	Y
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	↑
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•
	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	?

	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	●
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	●
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	?
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	●
Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	?

	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	•
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	?
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	•
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Latvia according to the European Climate Law

Summary Latvia is working on adapting to climate change, but there is room for improvement. It has plans that follow EU guidelines, like the national plan for adaptation to climate change until 2030 (NAP2030).

Latvia is also examining how climate change affects different areas, like agriculture, but there is uncertainty about sea-level rise. Reported risks have seen minor changes, with lower impacts on biodiversity and forestry, while agriculture and food sectors remain high-risk sectors. Latvia needs to make sure its plans are more specific and focused on reducing the identified risks.

A new department started handling climate issues in 2023 and it is planning to introduce a national climate law for adoption.

Currently, no specific legal framework guides the planning for climate risk. Since 2018, municipalities have created civil protection plans, and environmental impact assessments have integrated climate impacts.

Since 2021, no significant changes in challenges or measures have been reported. Adaptation considerations are integrated into sectoral policies, and stakeholder involvement primarily entails sharing information and consultation. Private sector involvement is not a primary focus.

In 2022, Latvia established procedures for climate monitoring and managing flood risks in high-risk areas. Progress in implementing NAP2030 has been reported since 2021, especially in agriculture, fisheries and forestry. The recovery and resilience plan includes climate adaptation measures. There has been progress made in integrating climate policies into decision-making and sectoral policies, with a mid-term evaluation of adaptation priorities planned. However, it is unclear whether there have been advancements in tackling adaptation barriers. Risk assessments last took place in 2016-2017, with new assessments planned for 2026. Latvia has not planned any revisions of NAP2030 nor has it reported good practices or new synergies with international frameworks. Cooperation with other countries primarily involves LIFE projects.

Regions and cities are developing adaptation policies, with limited information reported on review processes or progress between 2021 and 2023.

Overall, Latvia is progressing towards adapting to climate change, but it needs to be more detailed in evaluating its plans and monitoring the ongoing changes.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections

refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 – National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

The monitoring of climate change parameters is set out in the environment monitoring programme for 2021-2026, adopted in 2022. The reported information does not specify if there are any substantial changes from the previous monitoring framework.

The Latvian Environment, Geology, and Meteorology Centre ('the Centre') serves as the national agency responsible for climate monitoring, modelling, and projections. It collects climate data, monitors extreme events, and manages long-term observations. The Centre implements a monitoring programme, including air and climate-change monitoring, water monitoring, land monitoring and biodiversity monitoring. It provides information to the public, government, and international organisations and offers services to various sectors. The Centre also conducts climate modelling and scenario analysis, sharing findings through various channels, including an online tool.

At the end of 2022, the Centre published climate profiles of municipalities – previously climate change information was not available on a municipal scale. Information on changes in meteorological monitoring stations (amount and coverage) that may have happened in 2023 has not been not provided, therefore a comparison cannot be made.

The Flood Risk Information System is a real-time civil protection and spatial planning instrument, which is publicly available and is administered by the Centre.

2-4. Changes to the reported vulnerabilities and risks since 2021

There have been no significant changes in reported risks and vulnerabilities since 2021. The rating of risks and vulnerabilities remains high in all the identified sectors, with the only decreases in rating in relation to impacts on biodiversity (from a high-impact rating in 2021 to medium in 2023) and the forestry sector (from high to medium). Heatwaves are also recognised as a significantly increasing hazard.

The agriculture and food sectors are listed among the key affected sectors with high impacts, likelihood, vulnerability and future impacts, but water management is not listed among key affected sectors despite Latvia recognising that droughts, floods and chronic hydrological variability are significantly increasing.

Neighbouring countries Lithuania and Estonia reported that sea levels would significantly rise in the future, while the INFORM tool[60] predicts a large increase in the related hazard of coastal flooding. Still, Latvia considered the future of sea level rise as uncertain or unknown. Taking into account the geographical vicinity of the three countries, it would make sense to better align related modelling in the Baltic region. The rise in sea levels and other ocean-related changes could have an impact on coastal ecosystems, fisheries and aquaculture, which the country should prepare for.

Compared with the vulnerability and risk analysis under the INFORM tool, the PESETA project[61] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. In 2022, a 2021-2026 climate change monitoring programme was approved. Since 2021, there have been small changes in reported risks, except lower impact for biodiversity and forestry. Agriculture and food sectors are considered high-risk, while water management is not regarded as key affected sector despite the water-related hazards forecasted. While neighbouring countries anticipate a rise in sea level, Latvia is unsure. The reported vulnerabilities seem comprehensive.

Section 2 – Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

Currently there is no legal act that could govern the development of climate change risk and vulnerability assessments (CRAs) and adaptation planning. The Civil Protection and Disaster Management Law requires municipalities to develop their own civil protection plans that would include identified risks, scenarios, matrices, mapping, prevention, preparedness, response and recovery measures for each risk. As of 2018, the legislation on environmental impact assessment (EIA) requires that climate change impacts be assessed during an EIA itself. As of 2023, the Ministry of Climate and Energy is responsible for tacking issues regarding adaptation to climate change. Responsible authorities for implementing adaptation measures also include the Ministry of Agriculture, Ministry of Welfare, Ministry of Economics, Ministry of the Interior, and the Ministry of Finance. The task of each responsible ministry is to coordinate those NAP2030 activities within their remit. No information is available on the involvement of the prime minister's office in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned. Latvia is currently developing a climate law, that will also strengthen the institutional framework.

[60] The INFORM-tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool

[61] The European Commission's Joint Research Centre (JRC)' PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en

On 1 January 2023, due to structural re-organisation, the Ministry of Climate and Energy (MoEC) was established, replacing the Ministry of Environmental Protection and Regional Development as the single national entity with overall responsibility for the adaptation to climate change issues. This administrative change has not had any significant impact; therefore the changes can be considered as neutral.

Conclusions. There is no legal framework governing climate risk planning. Municipalities must create civil protection plans with risk identification. Since 2018, environmental impact assessments have taken into account climate impacts. As of 2023, the Ministry of Climate and Energy handles adaptation, with various ministries coordinating NAP030 measures. Latvia is developing a climate law. An administrative change in 2023 established the Ministry of Climate and Energy, replacing the Ministry of Environmental Protection and Regional Development as the entity responsible for climate adaptation, but it had a neutral impact.

Section 3 – Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The adaptation priorities, strategies, policies, plans and efforts are defined rather broadly to cover all risks identified in NAP2030. Risks and vulnerabilities identified and reported by Latvia stem from NAP2030. It is not entirely clear from the reported information if the efforts are well aimed to reduce identified risks, due to the broad nature of the reported priorities.

The reported data has not indicated any changes in the challenges, gaps and barriers to adaptation since 2021. The main ones listed are lack of administrative capacity, lack of coordination among stakeholders, including the private sector, and inadequate financing.

Environmental Policy Guidelines for 2021-2027 are listed as a new policy document that includes climate change adaptation elements. The reported risks and vulnerabilities associated with climate change have not changed significantly since 2021, and Latvia has not reported any new key measures to tackle these.

Flood risk management plans and early warning systems have been developed for all territories under significant risk of floods.

10. Nature-based solutions in national adaptation policies

Though the reported information does not include references to nature-based solutions and ecosystem-based adaptation, ‘green infrastructure’ and associated solutions were promoted in 2030NAP. No information was made available on the scale of implementation and impact of nature-based solutions.

11. Integration of adaptation into sectoral policies

Several policy documents have been developed for the new planning period, ranging from broader documents to sector-specific documents which include adaptation aspects. These include: i) 'Strategy of Latvia for the Achievement of Climate Neutrality by 2050'; ii) 'Latvia's National Energy and Climate Plan 2021–2030'; iii) 'National Development plan 2021 – 2027'; iv) 'National Regional and Local Road Construction Strategy'; v) Environmental Policy Guidelines for 2021-2027; vi) the Regional Policy Guidelines for 2021-2027; vii) 'Latvian National Plan of Civil Protection'; viii) 'Cultural Policy Guidelines 2022-2027'; ix) 'Latvian Architecture Strategy 2022-2027'; x) the draft 'Culture Monuments Protection Strategy 2023-2027'; and xi) a draft operational strategy for the State Revenue Service for 2023-2026'

12. Engaging with stakeholders vulnerable to climate change impacts

In the process of drafting NAP2030, vulnerable stakeholders were mapped (older people, children, people with special needs, people employed in agriculture, forestry and tourism, and people living on the coastal areas and flood risk areas). Engagement and cooperation with relevant stakeholders, e.g. sectoral authorities, interest groups, NGOs or representatives from the private sector, took place.

Since NAP2030 was adopted by the Cabinet of Ministers, the cooperation with stakeholders is more in the form of informing, consulting, exchanging information, and integrating climate change adaptation issues into policy planning documents. Latvia claims almost all the 80 adaptation measures in NAP2030 address the concerns of vulnerable stakeholders, primarily aimed at decreasing their vulnerability. Latvia reports that the Ministry is working on increasing the amount of information available on climate change and climate change adaptation for stakeholders. However there is no detailed information provided that would make it possible to assess actual progress with stakeholder involvement since the NAP2030 was adopted. No new information has been reported since 2021.

13. Engaging with private-sector stakeholders

Latvia reports that the private sector was involved in developing risk assessments, but further detail is not provided. The adaptation measures in the Latvian climate change adaptation plan do not contain any that are directly addressed to private sector.

Conclusions. Adaptation efforts broadly cover risks identified in NAP2030. There are no reported changes in challenges or measures since 2021. The new Environmental Policy Guidelines include climate adaptation. Nature-based solutions are not reported but are present in NAP2030. Various sectoral policies integrate adaptation, such as climate neutrality, energy, development, civil protection, culture and architecture. Stakeholder engagement primarily involves informing and consulting. Private sector involvement in climate adaptation measures is not a direct focus.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

In 2022, Latvia adopted a Cabinet of Ministers Regulation No. 675 'GHG inventory, projections and adaptation to climate change reporting system', establishing procedures for preparing and reporting on national adaptation measures and information on the monitoring of indicators of climate change and its impacts. An evaluation of how adaptation measures in the NAP2030 were implemented is planned in the midterm, with another planned after the end of NAP2030 in 2031: the midterm evaluation is to be submitted to the Cabinet of Ministers by 31 December 2026.

15. Implementation of adaptation measures and financing

Though the above-mentioned midterm evaluation is planned by the end of 2026, Latvia also submitted a summary of the planned and ongoing implementation of 18 measures of NAP2030 under Strategic objective 2: 'National economy has the capacity to adapt to the adverse effects of climate change and seize the opportunities derived from climate change', primarily focused on agriculture, fisheries and forestry (under responsibility of the Ministry of Agriculture).

Latvia employs a diverse array of funding sources for climate change adaptation, including state, EU, and EEA funding. Investments are focused on reducing flood and coastal erosion risks, with an emphasis on 'green and blue' solutions to mitigate the impacts of climate change. Improving disaster management is a priority, with funding allocated for rescue services, environmental monitoring, and infrastructure modernisation.

Latvia's recovery and resilience plan, whose implementation is ongoing till 2026, includes a pillar on climate adaptation, consisting of fire and flood prevention measures.

There is scope to put climate resilience considerations more to the forefront in Latvia's use of EU support from the common agricultural policy and cohesion policy funding.[62]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers

Though the mid-term evaluation of how adaptation measures in NAP2030 are implemented is planned by the end of 2026, as mentioned above, Latvia reports that the reduction of risks and vulnerabilities involves integrating aspects of climate change adaptation into sectoral policies such as flood protection, urban planning, building design and coastal protection. To date, further information has not been provided on the effect this has on reducing climate impacts, vulnerabilities, and risks. Also flood risk management plans and early warning systems have been developed for all territories at significant risk of floods, which indicates progress since 2021.

Latvia reported that the adaptive capacity is being increased by actively integrating climate change adaptation policy and measures into decision-making processes and territorial development planning and spatial planning procedures, as well as sectoral policies. The reported information indicates progress since 2021.

[62] Latvia intends to invest ca 155 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

Latvia reports that to tackle barriers to adaptation, the Ministry of Environmental Protection and Regional Development of Latvia supports and is involved in projects and programmes. This information is not sufficient to assess the actual progress made towards tackling barriers to adaptation.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Risk and vulnerability assessments on primary and secondary impacts of climate change were carried out in 2016-2017. There has been no update since then. Latvia is planning to carry out a new assessment by 2026.

The NAP2030 was adopted in 2019. Evaluations of how adaptation measures in NAP2030 are implemented are planned in the midterm (by the end of 2026), and after the NAP2023 ends (2031). A revision of NAP2030 is currently not planned.

Conclusions. In 2022, Latvia established climate-monitoring procedures and flood risk management for high-risk areas. Progress in implementing NAP2030 was reported, especially in agriculture, fisheries, and forestry, since 2021. The country's Recovery and Resilience Plan includes climate adaptation measures. Climate policies integration into decision-making and sectoral policies shows progress, detailed evaluation of adaptation priorities planned in mid-term report. It is unclear whether there have been advancements in addressing adaptation barriers. Risk assessments were last carried out in 2016-2017, new ones are planned for 2026. NAP2030 was adopted in 2019, no revision is planned.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

For 2023, there was no voluntary data submitted on good practices. There were no new synergies identified with other international frameworks and/or conventions in 2023, compared with 2021. Latvia reports continued cooperation with other countries implementing common LIFE projects in the field of adaptation to climate change. New cooperation initiatives that are reported are project-based.

Conclusions. No good practices or new synergies with international frameworks were reported. Cooperation with other countries takes place essentially through LIFE projects.

Section 6 – Subnational level information

25. Subnational governance structures for adaptation actions

Responsibilities in implementing adaptation measures are set in policy documents (NAP2030 and EPG2027). However, there are no legal acts that would set up subnational governance structures.

Collaboration networks consist of expert groups; yet the (legal) basis for setting up and operating these expert groups and their operational structures and requirements is unclear. Regional and local cooperation is ensured through exchanging best practices, implementing projects and publishing relevant information.

26-29. Subnational policies and cooperation

It is reported that since 2021 two additional municipalities have committed to developing sustainable energy and climate action plans ('plans'). It is not clear from the reported information whether these two new plans include any elements related to adaptation.

There are also two Latvian regions who signed the EU Mission on Adaptation to Climate Change Charter.

In 2021, Latvia reported that the NAP2030 was the main instrument for engaging stakeholders. In 2023, new initiatives that involved stakeholders were reported. However, the reported information is rather vague (e.g., reference to participation in 'Covenant of Mayors' and EU Mission on Adaptation to Climate Change) and does not provide information on concrete examples of good practice and initiatives that involve stakeholders in relation to adaptation policy.

In 2021, Latvia referred to NAP2023, without outlining any subnational initiatives. In 2023, Latvia reported that at the end of 2022, the Centre published climate profiles for municipalities, which can be used by local governments to develop and update their adaptation strategies and measures. However, no information is provided on which municipalities have actually updated their adaptation policies, strategies, plans and measures.

The country reports participation in such initiatives as 'Covenant of Mayors', LIFE programme projects, and a 'pre-defined project' under the Norwegian Financial Mechanism 2014-2021: 'Integration of climate change policy into sectoral and regional policies. The Latvian region Zemgale is involved as demonstrating site in two Horizon-Europe demonstration projects[63]. The reported information indicates no progress compared with 2021.

Conclusions. Latvian regions and cities are increasingly developing and implementing adaptation policies at their level, including on transborder cooperation. On the other hand, the reporting by Latvia does not provide details on how these policies are reviewed and updated, and whether there has been significant progress between 2021 and 2023.

[63] RESIST https://resist-project.eu/regions/ & Zemgale Region in NATALIE NAT Press Release Launching EN (cloudinary.com) on nature-based solutions

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	P
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↗

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↑
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	●
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	?
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	P
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↗
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	●
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	●

Assessment of progress on climate adaptation in Lithuania under the European Climate Law

Summary

Lithuania is taking steps to understand and deal with climate change. It has added new weather stations and assessed vulnerability in sectors like forestry, tourism, transport, buildings and fisheries. Some changes have been made since 2021 (for example removing business and industry from the vulnerable sectors list). Water management was left out despite Lithuania acknowledging that the associated water-related risks are increasing.

Some areas in the country are more vulnerable to climate change than others, so Lithuania is also working on climate plans for local areas and collaborating with nearby countries on flood risks.

The Ministry of Environment has been leading on climate adaptation with stable governance since 2021. Not all sectoral vulnerabilities are top priorities, but Lithuania is addressing them. In 2023, Lithuania identified a new vulnerability in electricity distribution. It allocated about EUR 3.3 million for climate-adaptation measures. Stakeholders are engaged through working groups and projects, but it is unclear if vulnerable groups are included. The private sector participates voluntarily.

Lithuania has included little detail in several sections of its reporting, so a thorough analysis is not possible. This may itself be considered an important finding because it may indicate insufficient political prioritisation or insufficient resources for adaptation at the governmental level.

Adaptation-spending was consistent in 2021 and 2023, but Lithuania has not clearly addressed barriers. Nature-based solutions do not receive sufficient emphasis. Challenges still remain in monitoring progress and identifying remaining barriers.

In 2023, Lithuania began a municipal climate-adaptation project that includes climate projections, vulnerability assessment, adaptation planning and staff training. It collaborates effectively with Latvia and Poland in flood risk management. Municipalities are responsible for implementing climate-change management plans and some cities have joined the EU Mission on Adaptation to Climate Change.

In summary, Lithuania is actively updating its climate-adaptation efforts, addressing vulnerabilities in various sectors, maintaining stable governance and fostering collaboration, but there is room for improvement in addressing barriers and nature-based solutions.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections

refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework, climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Lithuania is already working or planning to work on revising and updating its climate risk assessments.

Lithuania, along with other Baltic countries, has been focusing on disaster risk assessments with varying degrees of attention to climate-change aspects since 2021, primarily under civil protection and disaster management policies.

The number of meteorological observation stations increased from 56 in 2021 to 57 in 2022. The country is also working on a nationwide vulnerability analysis of municipalities at subnational assessment scales. In 2023, a new study is being performed, entitled 'Preparation of climate-change projections: a national study on the sensitivity and vulnerability of Lithuanian municipalities to climate change and preparation of the plan for the adaptation of the most sensitive municipality'. The climate projections for the period up to 2100 have been updated as part of the study.

2-4. Changes to the reported vulnerabilities and risks since 2021

Compared with the vulnerability and risk analysis under the INFORM tool [64], the PESETA project [65] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be largely complete.

The vulnerability ranking did not change between 2021 and 2023 for the energy sector (medium); agriculture and food and health sectors (high); and biodiversity including ecosystem-based approaches (medium). By contrast, the 'mixed situation for different key hazards' ranking in 2021 has been changed for the following sectors: forestry and tourism sectors ('low'); transport and buildings ('medium'); and marine and fisheries ('not applicable'). In 2023, business and industry no longer feature on the list of key affected sectors. Water management is not listed as a key affected sector even though Lithuania expects that both drought and flood risk will significantly

[64] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Toolhttps:/drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

[65] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

increase in the future. Heatwaves are also identified as a significantly increasing climate hazard. The Lithuanian Hydrometeorological Service also considers that (coastal) flooding and windstorms in the western part of the country constitute significant climate-related risks. Sea-level rise and other ocean-related changes could have an impact on coastal ecosystems, fisheries and aquaculture that the country should prepare for.

Conclusions. Lithuania is updating its climate risk assessment and new meteorological stations have been added. Vulnerability rankings are mostly stable, with some minor changes in sectors like forestry, tourism, transport, buildings and fisheries. Business and industry have been removed from the list of key vulnerable sectors and water management has been omitted despite rising risks that Lithuania also recognises.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The national governance structure is in place to support adaptation actions. The Ministry of Environment leads on the development and coordination of the implementation of the policy documents and action plans. The action plans are endorsed by the Lithuanian government. The sectoral ministries are responsible for the implementation of actions within their remit and for reporting on progress to the Ministry of Environment.

In addition, the goals and objectives of the National Climate Change Agenda (the Agenda) are implemented by cross-sectoral policies, such as the 2021-2030 National Progress Plan, the National Sustainable Development Programme and specific economic sectors' development programmes or short-term planning documents. The action plans prepared by the Ministry of Environment are endorsed by the Lithuanian government. State and municipal institutions engaged in the implementation of the Agenda provide the Ministry of Environment with information about the progress in implementing the Agenda and its Action Plan – the National Energy and Climate Plan (NECP).

No information is available on the involvement of the prime minister's office in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned. There have been no changes to the national governance structure since 2021. A national governance structure sufficient to support adaptation actions is currently in place.

Lithuania announced a new national adaptation plan (NAP) for 2024.

Conclusions. Lithuania has a stable governance structure. The Ministry of Environment is in the lead for climate-adaptation actions, with cross-sectoral policies in support. No changes have been made since 2021, ensuring adequate support for adaptation efforts.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Lithuania's adaptation priorities are defined in broad terms with specific goals set for 2030:

- flood protection measures are to be taken for all residents in flood-prone areas;
- annual climate-related economic losses should not exceed 0.08% of Lithuania's GDP;
- at least 90% of dangerous natural disasters and catastrophic meteorological events must be predicted.

No specific priorities have been set for agriculture and food, transport, health, or biodiversity, which are all sectors considered as key in terms of vulnerability and risks. However, Lithuania has planned and implemented measures for nine sectors (which do not fully overlap with the key affected sectors reported by the country): water resources, forestry, ecosystems, biodiversity and landscape, transport, infrastructure, agriculture, aquaculture, public health, emergency management and urbanised areas.

The reported challenges, gaps and barriers to adaptation did not decrease between 2021 and 2023. In fact, additional challenges/gaps were added in 2023 (e.g., vulnerability of electricity distribution network infrastructure; and a lack of focus on nature-based solutions, which often help to cope with risks and raise the population's well-being).

The Agenda was adopted in 2021 with short- and long-term adaptation goals. The adaptation plan and all its measures were also adopted and will be included in the updated NECP. The overall funding needed for the implementation of the planned climate-change-adaptation measures in the 2019 NECP amounts to approximately EUR 3.3 million (a breakdown is provided for each sector where vulnerabilities and risks have been identified).

10. Nature-based solutions in national adaptation policies

A lack of nature-based solutions has been identified among the weaknesses in the SWOT (strengths, weaknesses, opportunities and threats) analysis for the updated strategy. However, no further information has been submitted on what measures have been planned to address this weakness. Biodiversity and ecosystems are key areas in the NECP.

11. Integration of adaptation into sectoral policies

In both 2021 and 2023, Lithuania reported that climate-change adaptation was being integrated into sectoral policies, plans and programmes through the 2021-2030 National Progress Plan (Progress Plan), which was adopted by the Lithuanian government in 2020 in order to pursue the main changes identified as necessary and to ensure progress in the social, economic and security fields. The Progress Plan will be implemented through sectoral programmes where measures listed in the NECP will be mainstreamed. The list of such sectoral programmes has not been specified. Sectoral programmes and the NECP are currently being updated.

12. Engaging with stakeholders vulnerable to climate change impacts

Close collaboration with stakeholders has been reported in targeted working groups and projects. The working groups usually play an important role in selecting specific measures or setting monitoring indicators, and also in identifying and addressing knowledge gaps in different sectors. Since the 2021 report, the working group on national risk assessment has been established. Lithuania reports that flooding risk has received the most attention at the subnational level and adaptation projects focusing on coastal management and flood risks are planned. The reporting contains no specific information on whether the stakeholders include groups particularly vulnerable to climate-change impacts.

13. Engaging with private-sector stakeholders

No new information has been reported on cooperation with private stakeholders in 2023. Adaptation measures in the NECP are not directly addressed to the private sector and public institutions are responsible for the implementation of adaptation measures.

There are no legal requirements for the private sector to implement measures to adapt to climate change. However, some projects have been implemented by private companies using EU cohesion policy funds, so the situation is otherwise satisfactory. Lithuania's reporting referred to a specific project on the design of a surface run-off collector in Vilnius with the aim of addressing the accumulation of rainwater in an artificially created hollow that causes flooding. The project is the first in which a municipal surface run-off management system was designed in a 3D environment using BIM digital-information modelling technology and standards. Models and visualisations developed for both existing and new engineering networks, surface run-off treatment facilities and part of the land plot layout have helped to optimise the work and to adopt the best solution.

Conclusions. Lithuania does not treat all sectoral vulnerabilities as priorities, but measures are being implemented to address them all. Challenges increased in 2023, with the addition of the vulnerability of electricity distribution. Stakeholder engagement occurs through working groups and projects, although it remains unclear if vulnerable groups are specifically included. Private-sector engagement happens voluntarily. Integration into sectoral policies is ongoing. The lack of focus on nature-based solutions is a recognised weakness with no specific plans to address it.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14-15. Monitoring mechanisms; and implementation of adaptation measures and financing

Reporting on the implementation of the NAP is on annual basis. It contains detailed information on the achievement of quantitative assessment criteria for each activity and provides financial details for each individual activity. In 2019, Lithuania prepared an evaluation of the implementation of the intended goals, objectives and measures. The results showed that the goals and targets of climate change do not include some sectors that are sensitive to the effects of climate change and include only one economic sector (agriculture); and that no measures had been planned for some economic sectors. The Agenda, which was approved in 2021, therefore includes goals and targets for more economic sectors and addresses the effects of climate-change risk reduction.

The next evaluation is planned for the end of 2023, together with the preparation of an updated adaptation plan.

The reported spending to support climate adaptation in each sector is the same for both 2021 and 2023. The overall funding needed for the implementation of the planned climate-change-adaptation measures in the 2019 NECP amounts to approximately EUR 3.3 million (a breakdown is provided for each sector where vulnerabilities and risks have been identified). There is no update provided on updated costings.

There is scope to put climate resilience considerations more to the forefront in Lithuania's use of EU support from the common agricultural policy and cohesion policy funding.[66]

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

In 2021, Lithuania's reporting referred to a study that identified individual sectors' vulnerability to climate change, assessed risk and opportunities to adapt to climate change; and identified the most efficient adaptation measures and evaluation indicators that had been prepared in 2015. In 2023, Lithuania reported that – based on the evaluation of the implementation of the intended goals, objectives and measures that was completed in 2019 – goals and targets for more economic sectors had been set in the Agenda, which was approved in 2021. The Agenda also addresses the effects of climate change risk reduction.

From the information provided it is not clear whether Lithuania identifies barriers and follows how they change over time.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Lithuania's 2023 reporting contained information on a new ongoing study 'Preparation of climate-change projections: a national study on the sensitivity and vulnerability of Lithuanian municipalities to climate change and preparation of a plan for adaptation of the most sensitive municipality'.

No information was provided for 2021. In 2023, Lithuania reported that – based on the evaluation of the implementation of the intended goals, objectives and measures – goals and targets for more economic sectors have been set in the Agenda, which was approved in 2021. The Agenda also addresses the effects of climate-change risk reduction. Following the Agenda, an adaptation plan with measures and other relevant information will be prepared with the next NECP update.

Conclusions. Lithuania reports annual monitoring of NAP implementation and detailed financial data. Goals have been expanded to cover more sectors in the Agenda. Spending was the same in 2021 and 2023. Barriers are not clearly addressed and progress in reducing risks remains unknown.

[66] Lithuania intends to invest ca 77 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

A new study on climate change vulnerability is ongoing in 2023 and an updated adaptation plan expected with the next NECP update.

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

No data were provided under this voluntary field in 2021. In 2023, Lithuania reported about a new ClimAdapt-LT project to strengthen municipal adaptation to climate change that is being implemented by the Ministry of Environment in 2020-2024. The project partners are the Lithuanian Association of Municipalities and the Norwegian Association of Local and Regional Authorities. The project will produce climate projections, and prepare a climate-vulnerability assessment, an adaptation plan for the most vulnerable municipality and training for municipal staff.

New synergies have been identified since the 2021 report (i.e., with the EU Adaptation Strategy, which was adopted in 2021).

There has been no progress with regard to cooperation with other EU Member States, international cooperation, and cooperation with regional and international organisations, but the situation is currently satisfactory. The reported activities concern cross-border cooperation in flood risk management organised within the framework of already existing intergovernmental agreements between Lithuania, Latvia and Poland to cooperate and exchange information and data in environmental fields. Cross-border cooperation also involves the implementation of the four river-basin management plans.

Conclusions. In 2023, Lithuania initiated a project to enhance municipal climate adaptation. This involves climate projections, vulnerability assessment, adaptation planning and staff training. Synergies with the EU Adaptation Strategy were also identified. There is satisfactory cross-border collaboration with Latvia and Poland in flood risk management via existing agreements and river-basin plans.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation action

The relevant governance structures are in place to support subnational adaptation actions. Guidelines for municipalities on preparation of climate-adaptation plans have been prepared in order to facilitate the development of municipal strategic planning documents.

Managing emergencies that may arise as a result of the effects of climate change, as well as planning and coordination of national and local measures involves the State and municipal

authorities responsible for disaster risk management, prevention of emergencies arising from climate change, warning systems and response measures. Risks from extreme events are addressed in municipal extreme-situation management plans. The guidelines for municipalities on preparation of climate-adaptation plans were developed by the Association of Local Authorities in Lithuania in 2017. Horizontal and vertical coordination of the implementation of adaptation policy is ensured through the work of the National Climate Change Committee, which has an advisory role. The Committee consisted of experts from government, municipal, science and non-governmental organisations until the second quarter of 2023, but now consists only of experts from the scientific community. A representative of the Association of Lithuanian Municipalities (representing 60 Lithuanian municipalities and districts) was included in the interinstitutional working group for the preparation of the NECP and other activities. Working groups are being set up to develop sectoral programmes, related documents and selected measures, and indicators.

26-29. Subnational policies and cooperation

Both the 2021 and 2023 data state that municipalities, together with relevant national-level ministries, are responsible for the implementation of the Agenda as well as for implementation of certain adaptation measures of the Action Plan - NECP. The municipalities have developed emergency management plans, some of which take climate-change risks into account. The municipalities of Panevezys district and Klaipeda city have developed adaptation action plans to improve local adaptive capacity and infrastructure resilience. Additionally, eight Lithuanian cities signed the charter of the EU Mission on Adaptation to Climate Change in 2023.

In 2022, different stakeholders were involved in identifying the sensitivity and vulnerability of Lithuanian municipalities to climate change. This involved seven sectors being selected for the assessment (public health; agriculture; biodiversity; ecosystem services and forestry; water resources and the coastal zone; energy; infrastructure; and extreme situations). The results of the assessment have been used to identify risks and the most vulnerable municipality.

With regard to the review of subnational policies, both the 2021 and 2023 reports refer to the review of the NECP planned in 2023 and the implementation of new adaptation measures based on updated strategy goals and tasks. The progress made is therefore unclear.

Conclusions. Lithuania has established governance structures and guidelines for municipalities to support subnational adaptation actions. Coordination of emergency management and extreme event risks occurs at both national and local levels. Municipalities are responsible for implementing climate-change management plans and certain adaptation measures. Several cities have joined the EU Mission on Adaptation to Climate Change. Progress on subnational policies is linked to the review of the NECP and updated strategy goals.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	P
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	P
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	?
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	●
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	●
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↑
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	●

Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Luxembourg according to the European Climate Law

Summary

Luxembourg has been proactive in tackling the impacts of climate change and it continued to make progress on climate adaptation between 2021 and 2023. Luxembourg adopted its Climate Law in 2020 that sets binding requirements for planning, implementation and governance of adaptation.

The national adaptation strategy (NAS) and national adaptation plan (NAP) 2018-2023 cover all relevant climate hazards. A risk assessment for different sectors was at the time part of the NAS, which also includes sector-specific adaptation plans.

Luxembourg is currently updating its national adaptation strategy and national adaptation plans in accordance with the Climate Law. It is also updating its climate change projections.

Given the small size and nature of the Luxembourg administration, climate adaptation policy is entirely driven at national level. Nevertheless, Luxembourg involves all municipalities in work on climate mitigation, climate adaptation and biodiversity via the Climate Pact and the Nature Pact.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

No changes were reported regarding climate monitoring and modelling between 2021 and 2023.

The Luxembourg Institute of Science and Technology has provided the data used for the NAS and NAP and is now updating the high-resolution climate change projections for Luxembourg. The projections will be integrated in the new version of the NAS/NAP, which is under construction.

2-4. Changes to the reported vulnerabilities and risks since 2021

In the 2023 report, Luxembourg indicated a few more climate change hazards. Luxembourg reports that agriculture and food, forestry, water management and health are the key sectors likely to be

affected by climate hazards. For example, climate hazards may give rise to changes in the vegetation period, the biogeography of plants and animals, wheat crops, grapes and associated wine production. They may also give rise to flooding, droughts and heatwave impacts on public health.

Luxembourg has completed risk and vulnerability assessments for the most relevant sectors but it has not yet carried out a comprehensive climate vulnerability and risk assessment. The climate change threats common for the biogeographical area of Luxembourg have all been identified as relevant for Luxemburg in its national adaptation strategy. There haven't been any changes to the reported vulnerabilities and risks since 2021.

Conclusions. Luxembourg reported no change in the climate monitoring and modelling tools since 2021, apart from indicating that it is in the process of updating high-resolution climate change projections. The reported climate change hazards have increased but the relevance of these hazards is unclear. The sectors impacted remain unchanged and include agriculture and food and water management. Luxembourg has completed a number of sector-based vulnerability assessments, but it has not yet carried out a comprehensive climate vulnerability and risk analysis.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

Luxembourg has put in place national governance structures to support adaptation action. The main national governance structures have not changed since 2021. The main responsibility for the implementing, monitoring and reporting on the NAS and the NAP lies with the Ministry of Environment, Climate and Sustainable Development. No information is available on the involvement of the prime minister's office in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned. The NAS and NAP were adopted in 2018 and cover the period 2018-2023. The Ministry of Environment, Climate and Sustainable Development oversees coordination of the implementation of the 42 measures in the NAS that have been developed for 13 different sectors. For each measure, the strategy indicates which entity is responsible for implementation.

Since December 2020, Luxembourg has a Climate Law, which sets binding requirements for planning, implementing and governing adaptation action. The Climate Law provides that by January 1, 2029, and every ten years thereafter, the government will publish an adaptation strategy to adapt to the effects of climate change with a horizon of at least fifty years. The adaptation strategy is then updated every five years, where applicable. The current adaptation strategy was approved in 2018, so before publication of the Climate Law. The NAS and NAP will therefore be updated in line with the Climate Law. The updating process will start in 2023.

The current NAS and NAP have not been subject to an environmental assessment. For upcoming plans, strategies or updates, Luxembourg plans to carry out an environmental impact assessment.

Conclusions. Luxembourg has a Climate Law (2020), which sets requirements for planning, implementing and governing adaptation action. No major changes in governance structures have taken place since 2021. Luxembourg started evaluating the current Strategy and Plan in view of and preparing an update.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

In the NAS and NAP (2018-2023) Luxembourg identified the climate threats, vulnerabilities and risks the country faces. The documents categorise the impacts into impacts that affect the natural environment (biosphere, hydrosphere, pedosphere) and impacts that affect the anthroposphere. There are 13 sectors in the anthroposphere: housing, energy, forestry, infrastructure, disaster risk management, agriculture, human health, ecosystem, tourism, urban areas, water management and economy.

For each sector, an analysis was made of the severity of the different climate impacts. Based on this analysis, the plan sets out measures to tackle the priority impacts for that sector. Luxembourg has not identified any new key actions since 2021.

Luxembourg is in the process of updating/approving its NAS. The updated NAS is expected to include new fields of action such as governance, the international context and awareness raising.

Luxembourg has described specific indicators for each NAP measure to track progress in implementation. However, it is a challenge to define these indicators to implement the strategy and it is difficult to find indicators to gauge whether a sector is sufficiently adapted to the effects of climate change. These issues will be tackled in the upcoming update of the NAS and NAP.

10. Nature-based solutions in national adaptation policies

Nature-based solutions are specifically mentioned in the NAP and the NAS. . They list current and future measures to protect ecosystems and biodiversity which also support climate adaptation. They state that, in general, nature-based solutions should get priority.

11. Integration of adaptation into sectoral policies

To integrate adaptation action into sector-specific policies, the NAS and NAP contain specific actions on integration. Luxembourg has also developed sector-specific adaptation plans. Together these plans are key policy instruments to effectively integrate adaptation action into existing national and sectoral policies, strategies, plans, programmes, and processes. There is also a special emphasis on cross-sectoral measures. As reporting in 2023 is almost the same as in 2021 and the level of detail is too broad, it is difficult to assess what progress has been made.

12. Engaging with stakeholders who are vulnerable to climate change impacts

Stakeholders are involved in adaptation action via the Climate and Nature Pact at community level. Luxembourg mentioned the Climate Pact in 2021, and the Nature Pact is a new mention in 2023. It was the result of a participatory process to identify priority adaptation measures and tasks in preparing the NAS and the NAP. In the NAS and NAP, 13 sectors are recognised as being sensitive to the impacts of climate change. The reporting makes no explicit mention of action to engage with the stakeholders who are particularly vulnerable to the impacts of climate change.

13. Engaging with private-sector stakeholders

Luxembourg reports that the private sector is involved in both developing and implementing national adaptation policy. Based on the 2023 report, the level of involvement of the private sector does not seem to have changed since 2021.

Conclusions. The national adaptation strategy and plan (2018-2023) forms an important basis for identifying the climate threats, vulnerabilities and risks that Luxembourg faces. There seems to be a good link between the vulnerabilities and risks recognised and the actions planned. The documents explicitly mention the need to promote nature-based solutions and they mention cross-sectoral measures. Luxembourg does not report identifying any new challenges, gaps, or barriers nor any new key efforts in strategies and plans since 2021. Progress on implementation will be evaluated in 2023. Overall stakeholder involvement, including the private sector, has been unchanged since 2021, except for the addition of the Nature Pact with municipalities.

Section 4 - Monitoring and evaluation of adaptation action and processes

14. Monitoring mechanisms

Luxembourg has set up a monitoring mechanism and it is in operation. However, as the 2023 reporting is broadly identical to the 2021 edition, it is difficult to assess progress on this monitoring mechanism. The 2023 report notes that the list of monitoring indicators will be defined together with the next update of the monitoring programme.

15. Implementation of adaptation measures and financing

Luxembourg has not reported the results of evaluation in its 2023 report. It has indicated that the next update of the NAS/NAP would provide an evaluation of a) how adaptation measures and financing have been implemented, b) progress made on reducing climate impacts, vulnerabilities, and risks, c) progress on tackling the barriers to adaptation. There is scope to put climate resilience considerations more to the forefront in Luxembourg's use of EU support from the common agricultural policy and cohesion policy funding.

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers

Luxembourg has not carried out any new thorough climate vulnerability and risk assessment since the vulnerability and risk assessment in the 2018 NAS. It did not report any reduction in climate impacts, vulnerabilities and risk, adaptive capacity nor on tackling barriers.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

The review of the NAS and NAP 2018-2023 started in 2023. The current NAS and NAP were approved in 2018, so before the climate law was published. The NAS and NAP will therefore be updated in line with the provisions of the climate law. The updating process will start in 2023.

Conclusions. Luxembourg has set up a monitoring mechanism and it is in operation. No new information was reported over the period 2021-2023. Luxembourg has announced that the next update of the NAS/NAP would include an evaluation of how it has implemented climate adaptation measures and financing, progress on reducing climate impacts, vulnerabilities and risks, and other aspects. A comprehensive climate vulnerability and risk assessment of the country is still only at the planning stage. The process to review and update the NAS and NAP started in 2023.

Section 5 – Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Luxembourg has indicated in its 2023 reporting under 'good practices and lesson learned' that the Climate Pact in Luxembourg is a platform for engaging with national and local authorities and for providing resources to municipalities. These resources include a catalogue of local-level measures to tackle biodiversity and climate change issues and the option to qualify for a thematic certification for adaptation to climate change.

Given the small size and the nature of Luxembourg's administration, climate adaptation policy is entirely driven at national level. There is no self-governing sub-national level in Luxembourg and there is no sub-national strategy or plan.

Nevertheless, municipalities are involved in climate mitigation and adaptation policy via a Climate Pact between the State and municipalities and via a Nature Pact. All 102 municipalities in Luxembourg are involved in the process via the Climate Pact. The Nature Pact is new and so it was not covered in the 2021 report. 88 municipalities are involved via the Nature Pact. The national level can provide financial support to municipalities to implement mitigation, energy efficiency and adaptation measures. The Pacts provide an effective platform for the municipalities to be involved on future climate adaptation action.

Luxembourg did not report any new synergies with other international frameworks and/or conventions since 2021, nor any new instances of cooperation with EU Member States, international cooperation, or with regional and international organisations. Luxembourg has a well-established cooperation structure with Belgium and the Netherlands on adaptation. The country also engages in transboundary cooperation on climate adaptation through cooperation via international river commissions, such as the Rhine, Mosel, Saar and Meuse.

Conclusions. The projects and funding schemes running in 2021 remain ongoing. The Climate Pact remains instrumental in providing support to communities and the new Nature Pact provides additional value. The country has not reported any new good practices, synergies with international frameworks or initiatives in transnational cooperation.

Section 6 – Subnational-level information

25. Subnational governance structures for adaptation action

Given the small size and the nature of Luxembourg's administration, climate adaptation policy is entirely driven at national level. There is no self-governing subnational level, and so there are no sub-national adaption strategies or plans in Luxembourg.

26-27-28-29. Subnational policies and cooperation

Luxembourg reports that all municipalities are involved in climate mitigation and adaptation policy through a Climate Pact between the state and the municipalities. Since 2021, they have also been involved through a Nature Pact. Under these pacts, the national administration provides resources and financial support to municipalities to implement mitigation, energy efficiency, adaptation and biodiversity measures. These resources include a catalogue of local-level measures to tackle biodiversity and climate change issues and the option to qualify for a thematic certification for adaptation to climate change. It also supports the creation of local 'climate teams', supporting stakeholder engagement. With the launch of the Nature Pact in 2021, the State has expanded the opportunities for stakeholder engagement at local level.

Luxembourg regions and/or local authorities are not participating in the EU Mission on Adaptation to Climate Change. The country mainly engages in transboundary cooperation on climate adaptation through cooperation via international river commissions, such as the Rhine, Mosel, Saar and Meuse.

Conclusions. Adaptation strategies and policies are developed and implemented at national level only. The state has set up the Climate Pact and the Nature Pact with all municipalities, giving them resources and financial support to take measures in several areas, such as climate adaptation. Transboundary cooperation on adaptation is mainly via existing international river commissions.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	•
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made in engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made in engaging with private-sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	●
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	●
	17. Has progress been made towards increasing adaptive capacity?	●
	18. Has progress been made in meeting adaptation priorities?	●
	19. Has progress been made in addressing barriers to adaptation?	●
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	●
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	●

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	N
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↗
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	?
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	●
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress on climate adaptation in Malta according to the European Climate Law

Summary

Malta is progressing in its approach to climate adaptation, but important work remains to be done to reach a mature stage in its adaptation frameworks, policies, planning and implementation of adaptation measures.

Malta has included few details in many sections of its reporting, which means that a thorough analysis has not been possible. This is in itself a pertinent finding as it suggests that there may be insufficient political prioritisation or resources dedicated to adaptation at governmental level.

Malta is making progress in deepening understanding of its climate vulnerabilities. It is currently conducting the 'Vulnerability Risk Assessment of the Maltese Economy', which is expected to be finalised in 2023. This comprehensive assessment aims to prioritise vulnerabilities across sectors, which will then feed into an update of the country's adaptation strategy.

The country has identified several vulnerabilities since 2021, such as increased heavy rainfall and ocean acidification. The country has also identified heatwaves as potential future climate hazards, recognising the potential detriment to sectors such as health and tourism.

Malta has made changes to its national adaptation framework since 2021. It included a chapter on adaptation albeit very succinct in Malta's national low carbon development strategy of October 2021, and then published and adopted its national climate change adaptation strategy (NAS).

Malta listed the sectors and related risks that it considers as a priority for adaptation, and it proposes adaptation measures that seek to address these risks and priorities. However, the adaptation measures listed are not detailed in terms of content, scope, timing, responsible body, budget, and financing.

Malta is laying the ground for integrating climate change resilience into sectoral policies in the future, through the vulnerability risk assessment that is currently underway.

Malta has taken a commendable step in its national strategies to involve stakeholders, both from the public and private sectors, in drafting the adaptation policy in the low carbon development strategy and in selecting adaptation measures. No specific detail on how it has engaged with vulnerable communities is provided.

Malta has not made progress in creating or using monitoring and evaluation mechanisms since 2021. Detailed information is lacking on how adaptation measures have been implemented to date, on financing, on reducing climate impacts, vulnerabilities and risks, meeting adaptation priorities and tackling barriers, and on adaptive capacity.

Malta has reported that adaptation actions are implemented at national level. It has no subnational governance structure to support adaptation action but progress at subnational level has been made.

The Eastern Region and the Port Region are part of the EU Mission on Adaptation to Climate Change and have signed the Mission Charter, which means that these regions have committed to take action and to accelerate action to become climate resilient by 2030.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation action, the climate-monitoring and modelling framework and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

Malta is currently carrying out the 'Climate Vulnerability Risk Assessment of the Maltese Economy'. The aim is to improve understanding of the degree of vulnerability and risks to which society, economic sectors and the natural environment are exposed, taking a more quantitative approach. This assessment is expected to be finalised in 2023. The data produced through the vulnerability risk assessment are intended to feed into the policy cycle and be used as a tool to help prioritise action in subsequent updates of the country's adaptation policy.

Malta is currently assessing the risk of potential future impacts on renewable energy, energy efficiency, energy security, and the internal energy market. The assessment is specifically looking at changes in the supply of renewable energy due to extreme events and reduced water availability, particularly during the summer.

2-4. Changes to the reported vulnerabilities and risks since 2021

The information presented in the 2023 report is based on two major vulnerability studies on Malta, pending completion of the 'Climate Vulnerability Risk Assessment of the Maltese Economy'. These are the study on 'The economic vulnerability and potential for adaptation of the Maltese Islands to climate change' carried out by Briguglio and Cordina in 2003, and the Low Carbon Development Strategy internal report, which also includes adaptation action carried out in 2019.

Checked against the vulnerability and risk analysis under the INFORM tool[67], the PESETA project[68] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete. The INFORM climate change tool indicates that Malta's biggest vulnerability is to tsunamis. Though Malta identified rising sea-level, it does not mention tsunamis.

Malta has not made progress in the agriculture and food sector, but it has laid the ground for future progress by including this sector in the 'observed impacts of key hazards, including changes in frequency and magnitude'. It has not yet made progress in the water management sector but is planning to implement more regulations governing water management. Further information on the character, content and timing of these regulations is not available.

Malta reported more vulnerabilities and risks in 2023 than it did in 2021, such as heavy rainfall and ocean acidification, making the coverage of its hazard mapping more complete. Malta identified heatwaves as a future climate hazard and recognises that this hazard could have a negative impact on both health and tourism.

Conclusions. Malta has made progress since 2021 by reporting new vulnerabilities and risks, such as heavy rainfall and ocean acidification. It has laid the ground for future progress in the agriculture and food sector by including this sector in the 'observed impacts of key hazards, including changes in frequency and magnitude'. Malta is making progress in conducting a climate vulnerability risk assessment.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The Laws of Malta, Chapter 546, (the Climate Action Act) specify that it is the duty of every person, together with the government, to protect the climate and to assist in the taking of preventive and remedial measures to protect the climate. It is the duty of the government to protect the climate for present and future generations.

Malta has made changes to its national adaptation framework since 2021.

It adopted the national climate change adaptation strategy for Malta in 2012. It included adaptation in its low carbon development strategy in October 2021.

On adaptation, the low carbon development strategy lists the priority sectors and risks and proposes a list of adaptation measures for these sectors, including cross-sectoral measures and specific

[67] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC) https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

[68] European Commission's Joint Research Centre (JRC) PESETA project (Projection of economic impacts of climate change in sectors of the European Union based on bottom-up analysis) https://joint-research-centre.ec.europa.eu/peseta-projects_en.

measures for water resources, infrastructure and transport, land use and buildings, natural ecosystems, agriculture and fisheries, health issues, civil protection, migration and tourism. The low carbon development strategy states that the adaptation measures were chosen on the basis of their benefits/impacts, implementation processes and financial considerations. Some of the measures are already underway as part of other sectoral strategies and action plans that are being implemented.

No further information is provided on the adaptation measures falling under other sectoral strategies and action plans. The adaptation measures are described in a brief, general manner and listed in a summary table for each sector. The measures are not detailed in terms of content, scope, timing, the body responsible, budget and financing, etc.

Malta now has a prioritised action framework for Natura 2000, which covers nature and biodiversity (2021-2027).

Malta will receive TSI (technical support) under the climate adaptation flagship initiative for the Coastal-COVER project. This is a TSI-funded project currently underway which focuses on formulating a national strategy for coastal risk protection, coastal monitoring, and specialised analysis of heritage asset vulnerability. This thematic area was selected to build capacity for multilevel planning for climate action, given that it is an area ripe for progress and can draw on other TSIs. It should provide a model method for achieving a more coherent and integrated climate policy and adaptation action planning, which is currently lacking across all policy sectors.

No information is available on the involvement of the prime minister's office in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Conclusions. Malta has made changes to its national adaptation framework since 2021. A chapter on adaptation was included in its national low carbon development strategy of October 2021. The low carbon development strategy states that some of the measures are already underway as part of other sectoral strategies and action plans that are being implemented. No further information is provided on the adaptation measures falling under other sectoral strategies and action plans.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Malta has made progress in planning action in its top priority areas. Based on the vulnerability assessment referred to in the Seventh National Communication of Malta under the UNFCCC prepared in 2017, Malta listed the sectors and risks in those sectors that it considers priority areas for adaptation action in the low carbon development strategy. The priorities are cross-sectoral measures; measures in the specific areas of water resources; infrastructure and transport; land use and buildings; natural ecosystems, agriculture, and fisheries; health, civil protection and immigration; and tourism.

The adaptation measures set out in the low carbon development strategy are measures that seek to tackle these risks and priorities. The low carbon development strategy states that the adaptation measures were chosen on the basis of their benefits/impacts, implementation processes and financial considerations, and that some of the measures are already being taken as part of other sectoral strategies and action plans that are being implemented. However, the adaptation measures listed are not detailed in terms of content, scope, timing, responsible actor, budget, and financing, etc. The 2023 report does not provide information on the status of the proposed adaptation measures and whether implementation is planned, ongoing or completed.

Malta has involved stakeholders, both public and private sector, in developing the adaptation policy in the low carbon development strategy. It factored in their involvement as a key factor in selecting the proposed adaptation measures.

The 2023 report shows no reduction in the reported challenges, gaps and barriers to adaptation in 2023 since 2021, as it is a copy of the same text. Malta notes uncertainty and insufficient knowledge as some of the major challenges in designing adaptation strategies. Malta also notes that adaptation measures typically require immediate implementation costs while the benefits are only materialised over the long term. This can make it challenging to approach adaptation measures with a short-term perspective or over a legislative period.

10. Nature-based solutions in national adaptation policies

Malta identifies natural ecosystems as one of the sectors requiring the most attention when devising adaptation measures (under action on agriculture and fisheries). It makes no other mention of ecosystem or nature-based solutions for adaptation.

11. Integration of adaptation into sectoral policies

Malta reports that considerable efforts have been made to integrate climate action into sectoral policies, plans and programmes, as evidenced by several examples. However, it provides no details on these efforts and it would seem that (most) examples refer to the period before 2021.

Malta is laying the ground for integrating climate change resilience in sectoral policies in the future. It is assessing the impact of climate change on the Maltese economy through a vulnerability risk assessment, which is currently underway and expected to be completed in 2023.

In 2021, the Environment and Resources Authority in Malta published the 'Green Paper on Greening Buildings in Malta: Initiatives for Green Walls and Roofs for Residential, Commercial, and Industrial Buildings.' This is one of the legislative measures to promote environmental sustainability.

12. Engaging with stakeholders who are vulnerable to climate change impacts

Malta has made progress in involving stakeholders in developing its climate adaptation policy. It reports that stakeholders, both public and private sector, were involved in the process of developing the adaptation policy in the low carbon development strategy. This process included holding separate meetings with representatives of regional committees and local councils, a selection of academics, business representatives from the Chamber of Commerce and from the

Chamber of SMEs (transport section), and with various members of civil society (including constituted bodies, NGOs, and other voluntary organisations and bodies), and via a public consultation. The strategy factored in this involvement as a key factor in selecting the measures to be implemented.

However, there are no specific details on engaging with vulnerable communities, the scale of their engagement or the impact of this work.

13. Engaging with private-sector stakeholders

Malta has made progress in involving stakeholders, including private-sector stakeholders, in developing its adaptation policy in the low carbon development strategy. This process included holding separate meetings with business representatives from the Chamber of Commerce and from the Chamber of SMEs (transport section), and with various members of civil society (including constituted bodies, NGOs and other voluntary organisations and bodies), and via a public consultation.

Malta includes the following adaptation measures in the adaptation strategy in the low carbon development strategy: creating an online community to facilitate knowledge sharing on climate change, including potential adaptation measures, conducting awareness campaigns to educate people about climate change and the changing risk landscape, and a study to assess the feasibility and implementation of financial and economic incentives for climate change adaptation measures.

Conclusions. Correlation of risks and vulnerabilities requires the finalisation of the vulnerability assessment that is under preparation. Integration of adaptation into sectoral policies is not illustrated by a list. Nature-based solutions are not included in the strategies and policy documents. Progress has been made in engaging with public and private stakeholders while the is no information on interactions with vulnerable stakeholders.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

The country has not made progress in setting up or using monitoring mechanisms since 2021. The report mentions that the current national adaptation strategy has been monitored and gives a brief description of the governmental bodies responsible for monitoring and some of the process. However, no details are provided on whether a systematic monitoring and evaluation approach is taken to national adaptation strategy implementation or the results of monitoring and evaluation.

15. Implementation of adaptation measures and financing

Malta reports that it is currently implementing measures that focus on the coordination of government action and ensuring that climate vulnerabilities are factored into all sectors, without providing any details. Further information is lacking on the implementation of adaptation measures to date.

In its 2023 report, to provide information on spending on climate change adaptation, Malta refers to the section "State of play of the implementation of measures planned under 'Strategies and Plans', including an overview of the subnational level and the disbursement of funding to increase climate resilience". However, this information was not available.

There is scope to put climate resilience considerations more in the forefront in Malta's use of EU support from the common agricultural policy and cohesion policy funding.

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers

Malta anticipates that the vulnerability and risk assessment currently underway will feed into the update and implementation of adaptation measures to build resilience and reduce vulnerabilities.

Information has not been reported on progress to date on these fronts or in terms of meeting adaptation priorities and tackling the barriers. The 2023 report states that implementation of climate adaptation actions is carried out by the line ministries or departments responsible for the different sectors in which action is taken.

It is also not possible to ascertain whether progress has been made in increasing adaptive capacity, as the report lacks specific information on adaptive capacity.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Malta is currently undertaking a vulnerability and risk assessment, as mentioned in earlier sections.

Malta has updated its national adaptation strategy by including adaptation in its low carbon development strategy in October 2021. However, the proposed adaptation measures are described in a brief, general manner and lack details in terms of the content, scope, timing, responsible bodies, budget and financing, etc.

Conclusions. Malta has not made progress in setting up or using monitoring mechanisms since 2021. Detailed information is lacking on the implementation of adaptation measures to date, on financing, reducing climate impacts, vulnerabilities and risks, meeting adaptation priorities and tackling barriers and on adaptive capacity. Malta is making progress in updating its vulnerability and risk assessments, as it is currently carrying out the climate vulnerability risk assessment of the Maltese economy.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Malta has not made progress since 2021 in identifying good practices and lessons learned. As an example of good practice in 2021, Malta mentioned issuing a guidance document on adaptation to climate change in water management to help ensure that the River Basin Management Plan

integrates needs for climate adaptation. The country has not made progress in identifying new synergies with other international frameworks or conventions since 2021. It lists the National Water Conservation Campaign, which ran from 2018-2022, as an EU-funded project.

Malta has made progress on cooperation. It participated in several projects that involve working together with regional and international partners.

Conclusions. The country has not reported any new good practices or lessons learnt, or any new synergies with international frameworks. Malta has made progress on cooperation, including with both regional and international partners.

Section 6 – Subnational-level information

25. Subnational governance structures for adaptation action

Due to Malta's size and limited resources, it implements climate adaptation action at national level. This means action is dependent on the central administration and there are no subnational governance structures for adaptation action.

26-29. Subnational policies and cooperation

Malta is very well represented in the EU Mission on Adaptation to Climate Change. The Eastern Region and Port Region are part of the Mission and have signed the Mission Charter.

Conclusions. Malta has reported that adaptation action is implemented at national level, it has no subnational governance structure in place to support adaptation action but it participates in the EU Mission on Adaptation to Climate Change.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation action, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	N
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↗

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	?
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private-sector stakeholders in relation to adaptation policy?	↑
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	?
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	●
	17. Has progress been made towards increasing adaptive capacity?	?
	18. Has progress been made in meeting adaptation priorities?	?
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	N
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	●
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	●
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	●
	29. Has progress been made with regards to cooperation at a subnational level?	●

Assessment of progress on climate adaptation in the Netherlands according to the European Climate Law

Summary

The Netherlands has been proactive in tackling the impacts of climate change and it continued to make progress between 2021 and 2023.

The Climate Law (2019) in the Netherlands only covers climate mitigation. The Delta Law (2011) covers climate adaptation action regarding rainfall, drought, sea level rise and heat.

The national adaptation strategy (NAS, 2016) and the national adaptation plan 2018-2019 (NAP) have been evaluated. An update of the NAP is due in 2023. An update of the NAS is planned for 2026, based in part on the new climate risk assessment, which is due to be published by 2025.

In addition to the NAS and NAP, national, regional, and local authorities work closely together under the Delta programme, which tackles the main climate threats for the Netherlands. It has its own monitoring, reporting and evaluation system. In addition, preparations have started on a comprehensive national monitoring, reporting and evaluation system.

Stakeholder involvement is relatively well organised in the different work streams.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to climate-adaptation actions, the climate-monitoring and modelling framework and climate risk and vulnerability assessments

1. Climate-monitoring and modelling framework

In the Netherlands, the climate monitoring and modelling framework seems well developed and has not changed much since 2021. The 2023 report contains new information on wildfire monitoring.

The report notes that droughts, floods, heavy rainfall, changing rainfall patterns and types, hydrological variability, saline intrusion, sea-level rise, water scarcity, coastal erosion, soil degradation, heatwaves, wildfires and changing temperature are expected to increase significantly.

2-4. Changes to the reported vulnerabilities and risks since 2021

Compared to 2021, the 2023 report on vulnerabilities and risks is more detailed. It provided the impacts, likelihood, risks and vulnerabilities for the key affected sectors: energy, ICT, transport, agriculture & food, biodiversity, forestry, public health, coastal areas and water management. Agriculture, food and water management are identified as the key affected sectors.

The Netherlands actively engages in research projects to boost the knowledge base on climate vulnerabilities and risks. It is working to close strategic knowledge gaps by developing new national climate risk assessments (CRAs) that are comprehensive and multi-sectoral and that factor in cascading effects and complex risks, applying the ISO 14091 standard. The Dutch Environmental Agency is responsible for the CRAs. It started updating the risks and impacts due to climate change and the update is expected to be available at end 2023. The updated part on future risks, based on the new KNMI climate scenarios that will be available at end 2023, will be ready at end 2025. Therefore, the Netherlands plans to complete their new CRA by the end of 2025.

Conclusions. The Netherlands' climate monitoring and modelling framework seems well developed and has not changed much since 2021, other than new information on wildfire monitoring. The 2023 reporting on climate vulnerability and risk analysis is more detailed than in 2021. The Dutch Environmental Agency has started work on updating the climate risk assessments, which will be based on the new climate scenarios. The new climate risk assessments are due for 2025.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation action

The main national governance structures have not changed since 2021. The Minister of Infrastructure and Water Management is responsible for climate adaptation.

The Netherlands has a Climate Law (2019), but it focuses only on climate mitigation and does not cover climate adaptation. The Delta Law Flood Prevention and Freshwater Supply (2011) covers climate adaptation in the fields of flood prevention, fresh water supply and spatial adaptation. This Delta Law forms the basis for the Delta Fund, the Delta Commissioner, and the Delta programme.

The national adaptation strategy (NAS) and the Delta programme form the core of the Netherlands' climate adaptation policy. The NAS is the overarching strategy of the national government. It takes a multi-sector approach and covers all climate change threats and their impacts on the whole society. Under the Delta programme, all levels of public authorities work together on adaptation. to the water related climate threats (sea level rise, flooding, droughts) and heat.

The current NAS was adopted in 2016. In 2018, the Netherlands adopted the NAP covering the period 2018-2019. It was evaluated in 2021-2022. The Netherlands plan to update its NAP in 2023. By 2026, it plans to update its NAS, which will be based in part the new climate risk assessment.

In addition to the NAP, the Netherlands has a national Delta programme under which national, regional, and local authorities tackle the main climate threats for the Netherlands (intensive rainfall, drought, sea level rise, storm surges and heat). Each year, the Delta Commissioner presents a new Delta programme to the Minister of Infrastructure and Water Management. It reports on implementation of the planned measures and presents an updated programme of measures in its three Delta plans (flood risk management, freshwater supply, spatial adaptation). Over the last years – as part of the Delta programme – all local and regional authorities have conducted a climate stress test and have held risk dialogues based on the outcome of these stress tests. The prime minister's office participates in the steering group on the NAS.

Risk and vulnerability assessments are carried out by several authorities, the Meteorological Institute, and the Netherlands Environmental Assessment Agency. The Netherlands is developing a new national climate risk assessment, which will also include cascading effects and complex risks. It is due to be published by 2025.

Climate change impacts and resilience are integrated into environmental assessment procedures.

Climate-related disaster loss and risk data can be found in the Climate Impact Atlas and the Climate Damage Atlas, information is available free of charge and all data is public.

In terms of integrating climate change impacts and adaptation planning into disaster risk management frameworks, the Netherlands took the new step to include risks caused by climate change in the national security strategy (2023-2027).

Conclusions. The NAS Climate Law (2019) in the Netherlands is limited to climate mitigation. The Delta Law (2011) addresses climate adaptation action regarding rainfall, drought, sea level rise and heat. the Delta programme are the main sources of the country's adaptation policy. The Netherlands evaluated the NAP 2018-2019 in 2021/2022 and plans to update it by 2023. The Delta programme is adopted each year by all authorities involved. Mainstreaming climate adaptation in policy fields is aided by cross-ministerial coordination. Preparations have started on a new climate risk assessment, planned for 2025.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The Netherlands is updating its NAS (expected 2026) and its NAP (expected 2023).

The country regularly updates the Dutch Delta programme and its three Delta plans (to cover flood risk management, freshwater supply, and spatial adaptation).

The Netherlands has both formulated and implemented a large number of the adaptation priorities, strategies, policies, plans and projects. They correlate with the vulnerabilities and risks identified. The overall framing at national level is given by the NAS, which was adopted in 2016. The NAP for 2018-2019 was evaluated in 2021-2022. The Dutch government plans to adopt a new NAP by

the end of 2023 and to update the NAS by 2026. It will be based in part on the new climate risk assessment, due for 2025.

The Netherlands reported an increase in the challenges, gaps and barriers to adaptation in 2023. Since climate adaptation is a relatively new policy field, detailed information on the effectiveness and costs of adaptation tools and measures is limited. It is also recognised that more knowledge is needed to select the right measures to deal with future impacts of drought, heat and shifting climate zones. For the policy fields where climate adaptation is relatively new, overcoming organisational and financial barriers is an additional challenge.

In 2022, the national government adopted the new policy 'water and soil as a steering principle'. The aim is to ensure that the capacity of water and soil (including climate change impacts on them) will form the basis for decision making in spatial planning. This steering principle is also included in the national strategy on spatial planning and the environment (NOVI), which was adopted by the national government in 2023. The 2023 report also makes reference to the ongoing action programmes on climate and the built environment (2020), climate adaptive agriculture (2020) and on nature (2021). These new elements are in line with the vulnerabilities and risks identified.

10. Nature-based solutions in national adaptation policies

The reporting doesn't give clear details on the promotion of nature-based solutions and ecosystem-based adaptation. The 2016 NAS emphasises the need to take measures to enable nature to cope with climate change by underlining the importance of considering nature as a (partial) solution to problems in other sectors. The examples of adaptation action provided by the Netherlands, such as maintaining the coast through sand replenishment, securing more room for rivers and the policy to take "water and soil as a steering principle" shows that nature-based solutions and/or ecosystem-based adaptation is actively supported.

11. Integration of adaptation into sectoral policies

The Netherlands has made progress in integrating climate adaptation into sectoral plans and policies, such as health, the built environment, agriculture, water management, nature, vital and vulnerable functions (such as energy, ICT, telecoms and transport networks, drinking water, sewage, and nuclear facilities) and freshwater supply.

12. Engaging with stakeholders who are vulnerable to climate change impacts & 13. *Engaging with private-sector stakeholders*

Over the period 2021-2023, stakeholder engagement seems to have remained at a relatively high level. The broad-based outreach to stakeholders includes the private sector as well as stakeholders who are particularly vulnerable to the impacts of climate change. In 2023, the Netherlands Scientific Council for Government Policy (WRR) published the report "Justice in climate policy; on the distribution of climate costs". The WRR analysed the status of equality in Dutch climate policies and set out options for improving equality.

Conclusions. The Netherlands has many adaptation priorities, strategies, policies, plans and projects, with the NAS and Delta programme forming the core of adaptation policy. In 2023, it

reported an increase in the challenges, gaps and barriers, mainly due to the lack of knowledge on the effectiveness of adaptation tools and measures and new policy fields where adaptation needs to be mainstreamed. Although it seems as though the Netherlands promotes nature-based solutions for adaptation action, information on how it is promoted and what funding is available is lacking. Stakeholder engagement is ongoing at a rather large scale, but it is not clear how much special attention is given to stakeholders who are particularly vulnerable to the impacts of climate change.

Section 4 - Monitoring and evaluation of adaptation action and processes

14. Monitoring mechanisms

The Netherlands have well-developed monitoring, reporting and evaluation methodologies for climate change threats and impacts, with the Dutch meteorological institute KNMI playing an important role.

However, the monitoring, reporting and evaluation of vulnerabilities and risks is not yet available. The Netherlands has indicated in its 2023 report that a project has started under which the Ministry of Infrastructure and Water Management together with the Dutch Environment Agency will design a monitoring and evaluation system that will be helpful for assessing effectiveness of policy actions and integral to the climate adaptation policy cycle.

15. Implementation of adaptation measures and financing

The monitoring programme of the Delta programme, which focuses on outputs, outcomes, the level of integrated approach and participation, plays an important role in the methodology for implementing adaption action. More information has also been provided on several other monitoring mechanisms.

The 2021-2022 evaluation of the implementation of the NAP 2018-2019 also provided insights into the extent to which the adaptation measures contained in the NAP have been implemented. There is scope to put climate resilience considerations more in the forefront in the Netherlands' use of EU support from the common agricultural policy and cohesion policy funding.

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

In 2023, the Netherlands did not report any specific information on progress towards reducing climate impacts, vulnerabilities and risks; or progress on adaptive capacity, meeting adaptation priorities or on tackling barriers. The Netherlands has indicated that it would include information on progress in reducing climate impacts, vulnerabilities and risks in the 2025 report.

The 2023 report gave more detailed information on the disbursement of funding to increase climate resilience. The national Delta Fund remains the key mechanism to finance adaptation measures. The Delta Fund has made reservations for different areas of action such as flood prevention, fresh water supply and spatial adaptation. The budget available for implementing adaptation measures in the Delta Fund is around EUR 1.2 billion per year. In addition, other ministries finance

adaptation measures too. Detailed information was not available on the share of spending used to fund climate adaptation in each sector.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

The 2023 report indicates that the NAS and the NAP 2018-2019 were evaluated in 2021-2022. A new national adaptation strategy will be developed over the coming years and published in 2026. The new NAS will be based upon/include an update of the 2014 climate risk assessment. The first step is an update of the current climate change impacts and risks (expected at end 2023) and then a new assessment of the future climate impacts and risks (expected at end 2025). The new NAS will also include a comprehensive national monitoring scheme for climate adaptation.

The plans and strategic decisions that form the basis of the different sub-plans and regional programs of the Delta programme are evaluated and updated on a regular basis. The Netherlands adopted the last update of the strategic decisions in 2021.

Conclusions. The Netherlands has put in place a system for monitoring, reporting and evaluation of climate threats and impacts and it is developing a similar system for vulnerabilities and risks. The NAS and NAP have been evaluated. The plans and measures contained in the Delta programme are part of this monitoring framework. The Netherlands makes available information on annual spending on climate change underadaptation the Delta Fund on flood prevention, freshwater supply and spatial adaptation. It has not brought in any new financing mechanism beyond the current operational programmes and a comprehensive database of adaptation-related spending is still not available. The results of adaptation policy (reducing risks, increasing adaptive capacity etc.) are difficult to demonstrate, partly because a comprehensive vulnerability assessment of the country is still only at the planning stage and is linked to a planned revision of the NAS by 2026.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation.

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

The Netherlands has a relatively high level of cooperation with EU Member States, international partners and with regional and international organisations, both in terms of knowledge sharing and in enhancing climate adaptation action. This includes a well-established cooperation structure with Belgium and Luxembourg.

The Netherlands did not directly report any new good practices, lessons learned or synergies with international frameworks in 2023 since 2021 or any new forms of cooperation with EU Member States, international partners or regional and international organisations. However, the Netherlands notes a website with examples of climate adaptation measures listing new good practices and lessons learnt.

The Netherlands has been involved in transnational adaptation action through EU funding schemes for cooperation, including EU Interreg programmes. Examples are the programmes on future-proof flood defence infrastructure (FAIR), blue-green infrastructure solutions in large cities (BEGIN) or the restoration of drained and degraded wetlands (CANAPE) under the North Sea programme. Additionally, the Netherlands' research centre is project leader in the EU Mission on Adaptation to Climate Change cascading project on risk assessment in European regions (CLIMAAX)[69].

Conclusions. The Netherlands has not reported any good new practices, synergies with international frameworks or initiatives in transnational cooperation. However, the Netherlands is actively sharing the knowledge in EU funded projects.

Section 6 – Subnational-level information

25. Subnational governance structures for adaptation action

The Netherlands has put in place effective subnational governance structures to support adaptation action. The Delta programme and the national adaptation strategy are frameworks used to coordinate climate adaptation across different levels of government. Under the Delta programme there are different regions, including 45 regions under the subprogramme spatial adaptation to coordinate adaptation action. In addition, there is a network of professionals working on climate adaptation called Samen Klimaatbestendig.

26-29. Subnational policies and cooperation

The Netherlands makes no mention of any new key actions in sub-national strategies, policies, plans and projects from 2021 to 2023. The description provides an update on ongoing action and cooperation between different stakeholders to mainstream climate adaptation into spatial planning and water management, and to develop adaptation policies and strategies at subnational level.

The Netherlands made progress between 2021 and 2023 in engaging with stakeholders on adaptation policy. The authorities held a series of climate adaptation dialogues with all stakeholders including ministries, associations, federations, and organisations. In February 2023, a report was published analysing the status of equality in Dutch climate policies. The national knowledge and innovation programme on water and climate has been running since 2015 and it invests in action to adapt to climate change.

It is not clear whether any progress has been made in reviewing and updating subnational adaptation policies, strategies, plans and measures from 2021 to 2023. It still uses the same seven-step approach to spatial adaptation as outlined in 2021, suggesting that the focus remains on implementing the measures and tools in place rather than on revising them.

The level of cooperation at a subnational level has remained the same between 2021 and 2023.

[69] https://www.climaax.eu/

Seven regions (including provinces) and three cities have signed the charter of the EU Mission on Adaptation to Climate Change (provinces of Drenthe, Friesland, Gelderland, Groningen, Utrecht and Zuid-Holland, Zwolle, Rotterdam, Utrecht and Groene Metropoolregio Arnhem-Nijmegen).

Conclusions. The Netherlands has put in place effective subnational governance structures to support adaptation action. It has made progress in engaging with stakeholders on adaptation policy. It is not clear, however, whether any progress has been made in reviewing and updating subnational adaptation policies, strategies, plans and measures from 2021 to 2023.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↗
	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	•
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	•

Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	?
	18. Has progress been made in meeting adaptation priorities?	?
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	●
Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	●
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	●

Assessment of progress towards adaptation in Poland under the European Climate Law

Summary

Poland has actively pursued actions to increase its adaptive capacity and resilience. Over recent years, the country has intensified its commitment to climate-change adaptation, aiming to prepare for the diverse impacts of a changing climate.

Poland has undertaken steps to update its National Adaptation Strategy and improve the coordination of adaptation actions by the national authorities. This should be finalised soon.

The country has made progress on the vulnerability assessment, including at subnational level, and provided guidelines for preparing local adaptation plans. The risks of drought and flooding have increased, affecting the key sectors of agriculture and food, and water management. Poland has adopted adequate plans to counteract these risks.

Poland has a tool to collect and communicate information and guidelines on climate, but it is not clear how useful it is for monitoring the progress made in climate-change adaptation. Better monitoring would provide a better insight into progress and the suitability of climate-adaptation actions.

Climate-adaptation considerations could be better factored into sectoral policies. There is no central coordinating body at the national level that would ensure higher efficiency of adaptation actions across regions and sectors.

The financing of adaptation comes mostly from EU funds. Allocations have increased. These actions help increase the adaptive capacity. The use of EU support from the common agricultural policy and cohesion policy funding should give more priority to climate-resilience considerations.

Further efforts are required to enhance the climate resilience of infrastructure and greater use of adaptation solutions that benefit both people and nature.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments

1. Climate monitoring and modelling framework

There have been no significant changes in the climate monitoring framework since 2021. The Institute of Environmental Protection – National Research Institute (IOŚ-PIB) continues to implement Klimada 2.0 - a Cohesion fund project on the knowledge-based on climate change and adaptationadapting to climate-change impacts. The project includes development of climate scenarios up to 2100 for temperature, radiation, precipitation, wind, snow, humidity, nebulosity, and renewables. It also supports the development of the knowledge-database on adaptation to climate change.

For drought-monitoring, the 2021-2027 a Plan for Counteracting the Effects of Drought (PPSS) was adopted in 2021. Similarly, to reduce the potential negative effects of flooding, hazard and flood risk maps and flood risk management plans (PZRPs Flood Risk Management Plans (PZRP) were drawn up for the entire area of Poland. The PZRPs were adopted in 2022.

2-3-4. Changes to the reported vulnerabilities and risks since 2021

There have been some changes in the reported vulnerabilities and risks. In particular, a significant increase in the risk of heatwave, drought and flooding (both coastal and fluvial) has been reported, while the risk of cold wave has decreased slightly. The ranking of vulnerabilities and risks and related information has remained mostly the same. The one notable change has been in forestry, where the vulnerability is considered high, due to expected changes in species composition and forest types.

The key sectors affected by climate change remain the agriculture and food, and water management sectors. Floods and droughts are both reported as significant risks, although the situation varies between regions for agriculture. In the case of water management, cities may be particularly affected by floods and inundations, which may be exacerbated by sealed ground surfaces and limited possibilities of drainage for excess water through sewage and drainage systems, as well as not taking proper account of water retention in most cities.

Poland’s housing is also highly vulnerable to climate change. Key elements are the adaptation of sewage networks receiving more rainwater and better spatial management in cities.

Coastal areas will be affected by a sea-level rise, an increase in the frequency of storm floods and degradation of coastal cliffs and the seashore.

Compared with the vulnerability and risk analysis under the INFORM tool [70], the PESETA project [71] and Poland's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. Poland has maintained its climate monitoring and modelling tools and conducted a nationwide climate risks assessment at subnational level. There is considerable capacity for systemic risk assessment.

The climate vulnerability and risk analysis has not identified risks that were not already identified in 2021, but the reported risks and sectors appear consistent with the results of independent analysis by the European Commission's Joint Research Centre and the Poland's own national risk assessment.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation actions

The main national governance structures have not changed since 2021. The National Strategy for Adaptation to Climate Change by 2020 with the perspective of 2030 (NAS2020) is part of the broader KLIMADA research project which covers the period until 2070, includes climate risk and vulnerability assessment of the whole country, and serves as the basis for the conclusions presented in the NAS. The process of revising the NAS Strategy accompanied by an update of the coordination mechanisms, has been launched.

Climate-adaptation planning in the water sector is included in several documents, such as the Plan for Counteracting the Effects of Drought (PPSS), which was developed by the state water company (Water Company Polish Waters) and adopted in 2021, and the River Basin Risk Management Plans.

The Polish Environmental Policy 2030 (PEP 30) and NAS 2020 include performance indicators that are measured and reported every year. Additionally, the Strategy for Responsible Development and PEP 2030 indicate strategic projects that include various smaller projects and initiatives. Their implementation is monitored and reported on a quarterly basis by the Prime Minister's Office and Ministry of Climate and Environment.

Poland's Energy Policy until 2040 (PEP2040) and NAS2020 include indicators for monitoring quarterly progress. Projects which are co-financed from EU funds are obliged to use the

[70] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC): https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Toolhttps:/drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool.

[71] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

methodologies indicated in a "Guide to Investment Preparation Respecting Climate Change Mitigation and Adaptation as well as Resilience to Natural Disasters".

No information has been made available on Poland adopting legislative obligations on climate adaptation. No information is available either on the involvement of the prime minister's office in the inter-ministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned, beyond the aforementioned monitoring and reporting process.

Conclusions. Poland has a number of documents that provide a framework for adaptation policies. There are no major changes in governance structures since 2021, and overall coordination and cooperation at the national, regional, and local levels is lacking, but Poland has started to revise the NAS and to update the governance structure. No information has been made available on Poland adopting legislative obligations on climate adaptation.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The climate-adaptation actions in Poland are covered by several documents: the Polish National Strategy for Adaptation to Climate Change by 2020 with the perspective until 2030 (NAS 2020), the National Environmental Policy 2030 (PEP 2030), the National Urban Policy 2030 (KPM 2030) and the Strategy for Responsible Development by 2020 (with a perspective until 2030) (SOR 2020).

Most of these programmes are the same as those reported in 2021. The National Urban Policy 2030 has been adopted in 2022 but the new efforts on the whole are not necessarily directly related to the identified risk and vulnerabilities and the challenges raised focus primarily on urban development. One of the main challenges is the non-adjusted storm-water drainage system in cities, which lack capacity to manage heavy rain. Flooding could have a high economic impact on the country, although the climate protection gap has been narrowing for floods. Residential insurance penetration for this peril is above 50% and from 2018, construction on floodplains is prohibited except for specific cases.

10. Nature-based solutions in national adaptation policies

The Ministry of Climate and Environment is leading the 'adaptation to climate change' strategic project, including implementation of the 'no more concrete in city centres' initiative', which aims to provide public administration institutions and local governments with the knowledge and effective instruments they need to implement adaptation measures to strengthen resilience to climate change by increasing the level of micro and small retention and greenery in cities. The Ministry of Climate and Environment has also continued the 'Climate-friendly cities' initiative, launched in 2020, by supporting the development of green and blue infrastructure.

The water-management authorities in rural areas are planning reforms and investments, which are included in the recovery and resilience plan. These will prioritise nature-based climate-change-resilient methods and practices for water management in agricultural lands and forests.[72]

11. Integration of adaptation into sectoral policies

Poland has integrated climate-change impacts into its national Disaster Risk Management frameworks and sectoral planning (including national civil-protection plans, national disaster risk management plans, national risk assessments, drought management plans, flood risk management plans and river-basin management plans).

New initiatives include measures related to water management, air quality, spatial planning, disaster risk reduction and healthcare.

12. Engagement of stakeholders vulnerable to climate change impacts

Measures have been undertaken with a view to increasing the engagement of stakeholders vulnerable to climate-change impacts. The Adaptation Manual for cities, guidelines for preparing the Urban Climate Change Adaptation Plan recommends involving residents exposed to the effects of climate change when developing urban adaptation plans. Other engagements take place through new projects, such as the 'no more concrete in city centres'centres' and 'Climate-friendly cities' initiatives. However, these have not directly involved stakeholders that are particularly vulnerable to climate-change impacts.

13. Engagement of private-sector stakeholders

Poland finances adaptation projects that support innovation and private-sector involvement and has launched new projects which include financing options for private stakeholders. The second edition of the 'Adaptation to climate change' programme co-finances water-management projects and the National Fund for Environmental Protection and Water Management has funded dozens of programmes in the field of environmental protection.

The Adaptation Manual for cities highlights the importance of involving entrepreneurs and of efforts to understand the conditions and needs of vulnerable groups in order to inform ongoing adaptation-planning.

Conclusions. several documents include adaptation actions but there is no central coordination body to oversee adaptation efforts. The available funding and active involvement at several levels make it possible to increase adaptive capacity. The NAS will be updated, and implementation would benefit from a better and more consolidated monitoring system. Stakeholder engagement is ongoing but is not defined very clearly and does not appear to be focused on vulnerable groups.

[72] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022SC0161

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

There has been no progress in monitoring and evaluating the implementation of adaptation measures. However, some adaptation-relevant monitoring data can be found on the STRATEG website managed by the Polish Statistical Office and financed by the EU Cohesion fund.

15. Implementation of adaptation measures and financing

Poland has set up a series of measures, financing instruments and projects that are aligned with the six adaptation objectives in NAS2020 and make it possible to meet its adaptation priorities. Projects like KLIMADA 2.0 are central to these efforts. KLIMADA 2.0 was initiated in order to identify climate risks, impacts and vulnerabilities. Its findings had by 2023 highlighted challenges and provided potential solutions. In particular, adaptation activities receive support from the National Fund for Environmental Protection and Water Management and are supplemented by EU funds. The allocations for actions to build climate resilience have been increased in cohesion policy programmes for 2021-2027. However, the share of spending at the sectoral level has not been reported.

The financing for adaptation, prevention and resilience-building comes from both national and EU funds. Poland has included investments in water and waste-water management that aim at adapting to climate change, while ensuring sustainable water use, in the Recovery and Resilience Plan.

There is scope to put climate resilience considerations more to the forefront in Poland's use of EU support from the common agricultural policy and cohesion policy funding.[73]

16-19. Reducing climate impacts, vulnerabilities and risks, increasing adaptive capacity, meeting adaptation priorities, and addressing barriers.

Poland has made progress with the initiatives, projects and activities designed to increase adaptive capacity. As a result of significant financial resources and various soft activities such as preparation of guidelines, training, awareness-raising, and implementation of strategic projects by the Ministry of Climate and Environment and at all levels of government (local, regional and national), the adaptive capacity at all levels increases significantly.

The measures, financing, projects, regulations, and long-term directions of the actions to meet adaptation priorities, which are envisaged or underway, are aligned with the six adaptation objectives of NAS 2020.

Poland has made some progress in addressing the barriers to implementation of adaptation measures. The Ministry of Climate and Environment has carried out analyses which identify the most frequently occurring obstacles to the implementation of adaptation measures and outline appropriate solutions for each barrier.

[73] Poland intends to invest ca 3.2 billion EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

20-21. Updating vulnerability and risk assessments, and national adaptation policies

Poland has conducted nationwide climate risk assessments (CRAs) at subnational level. The subnational CRAs and regional climate projections are primarily designed with multisectoral assessments in mind. Moreover, the updates regarding climate-risk knowledge have been shared on dedicated Polish CRA web-portals. Poland has contributed to the progress and substantial achievements in the development of CRA-related methodologies, including a technical manual for calculating climate indicators for sustainable urban development.

Risk assessment is a key component of Poland's strategy. The Klimada 2.0 project has, for instance, carried out comprehensive risk assessments for territorial municipalities in seven sectors (public health, biodiversity, forestry, road transport, agriculture, tourism, and water management), devising methods for multicriteria analyses of risks. The positive outcomes indicate that this method could be applied in other sectors.

Poland has applied for technical support under DG REFORM's Technical Support Instrument. The aim is to provide Poland with a revision of climate-adaptation strategy, detailed climate-adaptation actions to be taken, as well as coordination mechanisms to facilitate the implementation of adaptation actions and the monitoring of progress in this area. The project is envisaged to end in 2024.

Conclusions. Poland is preparing for the revision of its adaptation strategy and coordination mechanisms for better implementation. Many numerous financing mechanisms have been deployed to ensure good progress. Klimada 2.0 is the central information and data point.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Poland has been relatively active on the international front. There is ongoing cooperation in the field of border waters with the Czechia, Germany, Lithuania, Slovakia and Ukraine. This cooperation is focused on the assessment of water status, cooperation in hydrology and flood control on border waters as well as implementation of tasks under the Water Framework Directive and the Floods Directive.

Moreover, as a member of the Baltic Marine Environment Protection Commission – also known as the Helsinki Commission (HELCOM) – Poland cooperates with Denmark, Germany, Estonia, Latvia, Lithuania, Finland, Sweden and Russia.

Conclusions. Poland is maintaining its cooperation on border waters and the Baltic marine environment with the neighbouring countries. No new good practices, new synergies with international frameworks or new initiatives in transnational cooperation have been reported.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation actions

The environmental protection policy is implemented by provinces, , counties and communes and should take into account the principles of sustainable development. The Ministry of Climate and Environment has been coordinating the '"Environment for Development Partnership' national network, whose thematic areas include adaptation to climate change.

Poland has also reported on a series of good practices. These include workshops with representatives of cities regarding the identification of challenges related to the de-sealing and greening of public spaces in cities (as part of the 'no more concrete in city centres' initiative'); and active cooperation with (local/regional/private-sector) partners of LIFE projects related to climate-change adaptation.

26-29. Subnational policies and cooperation

There has been progress in terms of climate adaptation at subnational level. The National Urban Policy 2030 (KPM 2030) was adopted in 2022. KPM 2030 provides tools and solutions which will make it easier for the authorities of cities and functional urban areas across Poland to implement local sustainable development policies.

Local activities like local or municipal adaptation strategies and plans have been strengthened in Poland to support the increase of adaptive capacity. Polish cities and municipalities continue to develop their local adaptation strategies and plans under the Covenant of Mayors initiative. All Polish cities with more than 100 000 inhabitants and 40% of local authorities with more than 20 000 inhabitants have a municipal adaptation plan. Reports on the implementation of these plans are currently being prepared.

Five Polish cities have joined the EU Mission: Climate-Neutral and Smart Cities and 19 Polish regions and local authorities have aligned themselves with the EU Mission on Adaptation to Climate Change. These actions underscore Poland'scommitment to collaborative efforts to address the challenges of climate change.

Conclusions. Polish regions and cities are increasingly developing and implementing adaptation policies at their level, including in cross-border cooperation.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 – National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 – Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 – Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	↗
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	Y
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	↑
Section 4 – Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	•
	15. Has progress been made in the implementation of adaptation measures?	?
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↑
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 – Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↑
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↗
	24. Has progress been made with regards to cooperation?	↑

Section 6 – Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress towards adaptation in Portugal under the European Climate Law

Summary

In its 2023 report, Portugal demonstrates that it has made continuous progress in enhancing its adaptive capacity. This progress can be seen on both the legal and implementation sides. The Portuguese report also shows that climate threats are continuing to increase.

The policies on adaptation to climate change in Portugal are set out in Portugal's first Climate Law, which was published on 31 December 2021. The Law confirms the already existing requirement to establish a national climate-change adaptation strategy (ENAAC) which is to be renewed every 10 years. The first ENAAC was from 2010 and the current ENAAC is from 2020. The Portuguese Action Programme for Climate Change Adaptation (P-3AC) concretely sets out the measures with which the ENAAC is being implemented. The Climate Law also introduced new elements such as the creation of a climate-action portal, the development of municipal and regional climate-action plans, the development of sectoral adaptation plans, additional monitoring, and reporting processes (including in the national budget). It also introduced a climate-legislative impact assessment and requires the integration of climate risks into the decision-making of public and private institutions and agents.

96% of Portuguese territory is covered by intermunicipal climate-change adaptation plans. These plans describe climate scenarios, vulnerability assessments and adaptation actions. Most of these strategies and policies are still relatively new and are not expected to undergo review in the near future (except for Madeira's climate-change adaptation strategy, for which a revision started in 2022).

Portugal has also been proactive on other fronts in developing and implementing initiatives to address climate-change adaptation.

New practices in the health and land-use planning sectors have been reported, including the national vector (concerning vector-borne diseases); the REVIVE surveillance network; and the landscape planning and management programmes for Serras de Monchique and Silves.

Portugal has expanded its international cooperation, including with American universities and Global Science and Technology Partnerships Portugal. Portugal's engagement at the national, macro-regional and international levels includes participating in international negotiations, fulfilling international cooperation commitments, and providing humanitarian aid following natural disasters.

Progress regarding stakeholder engagement, particularly with those most vulnerable to climate change impacts, remains unclear. No added information was provided on the forest sector or on the involvement of the private sector.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments

1. Climate monitoring and modelling framework

The modelling and monitoring framework has not changed since 2021. Portugal has provided information on a new project (The 2100 National Roadmap for Adaptation), which is an assessment of Portugal's vulnerability to climate change in the twenty-first century. The project aims to assess the impacts and adaptation needs resulting from global warming in Portugal. It will focus on the key mainland vulnerabilities: hydrological balance, forest fires, agroforestry, sea-level rise, coastal erosion and storm surges. In the context of this project, a multi-variable ensemble was built and tested to serve as the baseline for assessing future projections for three different emission scenarios (IPCC RCP2.6, RCP4.5 and RCP8.5) throughout the twenty-first century.

New information was provided on the Portuguese Environment Agency's keeping of records of historical flood marks and its management of a network of meteorological and hydrological monitoring stations.

The Climate Portal remains the main information tool. It uses past climate data and the IPCC (Intergovernmental Panel on Climate Change) AR5 climate-projection data (CORDEX project) for dissemination through the website. It provides climate projections for Portugal (down to NUTS-3 level) with more than 40 climate variables. The projections are currently being further refined, so they will include results for the IPCC RCP2.6 scenario and Copernicus CMIP6-based projections for the Azores and Madeira.

2-3-4. Changes to the reported vulnerabilities and risks since 2021

Portugal has extended the description of impacts on biodiversity and landscape. It expects substantial impacts on land and ecosystems, with decreasing biodiversity in some areas like the cork forests, replacement of eucalyptus forests by wildwood and a possible increase in biodiversity in mountain areas. A considerable increase in demand for energy for cooling in the summer months is expected due to the projected increase in temperatures and the frequency, duration and severity of heatwaves and tropical nights. More generally, Portugal has identified heatwaves as a future climate hazard and reported that it is significantly increasing. A significant part of the population – the neediest – may have difficulty adapting to these changes, given the characteristics of many

of the residential buildings and the lack of financial capacity to invest in their thermal comfort and installation and use of climatization systems.

As for agriculture, a reduction in productivity is expected in any of the projected climate scenarios and in all crops, with activities being displaced to northern and coastal areas in the case of mainland Portugal.

The rise in temperature and the prolonged periods of drought are also likely to be responsible for the increase in the number of rural fires, especially the number of large forest fires (>= 10 000 ha), that spread by canopy and become uncontrollable in certain atmospheric conditions. The risk associated with these occurrences has increased dramatically.

The reduction in annual precipitation, the increase in its variability and the consequent change in the flow regime will reduce river flows, affect the recharge of aquifers, and even dry out the sources of essential rivers in the Iberian Peninsula for longer or shorter periods. These changes may be accompanied by water-quality problems, intensification of drought events and increased desertification pressure. The coastline is particularly vulnerable to coastal erosion and coastal overtopping with significant and severe effects.

All risks, vulnerabilities and impacts described by Portugal correspond to what has been described by independent scientific sources.

Conclusions. The climate monitoring and modelling tools used by Portugal have not changed since 2021. Compared with 2021, Portugal in 2023 considers that some risks have increased (forest fires, heat, and risks for water management). All risks, vulnerabilities and impacts described by Portugal correspond to what has been described by independent scientific sources.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation actions

The policies on climate-change adaptation in Portugal are set out in Portugal's first climate law, which was published on 31 December 2021. The Climate Law confirms the pre-existing requirement to establish a national climate-change adaptation strategy (ENAAC) which is to be renewed every 10 years. The first ENAAC was from 2010 and the current ENAAC is from 2020. The Portuguese Action Programme for Climate Change Adaptation (P-3AC) concretely set outs the measures by which the ENAAC is implemented. The Climate Law also introduced new elements such as the creation of a climate-action portal, the development of municipal and regional climate-action plans, the development of sectoral adaptation plans, additional monitoring, and reporting processes (including in the national budget), introduces a climate-legislative impact assessment and requires the integration of climate risks into the decision-making of public and private institutions and agents.

Important bodies and institutions in the governance structure are the ENAAC Coordination Group; the Portuguese Environment Agency, which chairs this group; and the ENAAC general coordinator.

No information is available on the involvement of the Prime Minister's office in the interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned. There is an important role for the Climate Action Commission (CAC) chaired by the Minister of the Environment and Climate Action, and various government departments (e.g., in the areas of energy, spatial planning, finance and agriculture) as well as for the regional governments of the Azores and Madeira. The Climate Action Council, which was established in 2023, works as an independent advisory body for the parliament and government.

In addition, the Portuguese National Authority for Emergency and Civil Protection (ANEPC) is a partner in defining and executing Portuguese climate-adaptation policies as well as the coordinators of thematic areas and sectoral working groups.

There is no information provided as to which institutions steer or carry out the climate vulnerability and risk assessment and the integration of climate-change impacts and resilience into environmental assessment procedures. For these sections, Portugal included a description of the assessment itself instead of information related to the governance.

The description of the collection, ownership and reuse of relevant data and access to it has been completely revised and now includes information on the ANEPC. In addition, the information on the integration of climate-change impacts and adaptation planning into disaster risk management frameworks and vice versa has been completely revised. It previously described the risk assessments and now includes information on the National Strategy for Preventive Civil Protection.

Portugal will use the European Commission's Technical Support Instrument to carry out a project on forest management to reduce forest fire risks.

Conclusions. Portugal published its first climate law at the end of 2021. This introduced new elements such as the creation of a climate-action portal, the development of municipal and regional climate-action plans, the development of sectoral adaptation plans, additional monitoring and reporting processes (including in the national budget) and a climate-legislative impact assessment. It requires the integration of climate risks into the decision-making of public and private institutions and agents. In addition, an independent advisory body (the Climate Action Council) was established in 2023.

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks; and change in the reported challenges

It is difficult to assess whether the adaptation strategies, concrete adaptation plans and efforts are correlated with the identified vulnerabilities and risks, because the information provided in Section 3 is a more general summary that highlights the importance of strengthening national capacities, the involvement of the various sectors, and the need for research and provision of information to the public. It reports on the risks for biodiversity, which probably already existed to the same extent in 2021 but were not reported then. The reported number of risks has therefore increased. There has not been any new strategy or plan in place since 2021.

10. Nature-based solutions in national adaptation policies

Nature-based solutions and ecosystem-based adaptation are not specifically mentioned in the national adaptation strategy. However, several of the measures described in the National Action Programme for Adaptation to Climate Change (P-3AC) are nature-based solutions. These include measures to reduce wildfire risk, improve agricultural soils and reduce the need for irrigation in agriculture.

11. Integration of adaptation into sectoral policies

There are four policies or programmes, which were not previously reported but which integrate adaptation measures into sectors. It is not clear whether these programmes are new or whether they were simply not reported in 2021.

- The National Landscape Transformation Programme (PTP) promotes transformations towards a landscape that guarantees resilience, sustainability, and recognition of territory.
- The coastal zone management plans (POOCs) cover prevention of and adaptation to coastal risks.
- The Seasonal Health Contingency Plan addresses the negative effects of intense cold and heat.
- The Water Sanitary Surveillance Programmes monitor the quality of water intended for human consumption; including natural mineral waters and spring waters; and bathingsites.

12. Engagement of stakeholders vulnerable to climate change impacts

There does not seem to be any progress regarding the involvement of particularly vulnerable stakeholders. The information on agriculture, food and rural development, health, tourism and water management is the same for 2021 and 2023. The information on the energy sector has been modified, but there is still no concrete information on how the stakeholders were involved. Information on the forestry sector was omitted in 2023. A new paragraph on the Climate Law was inserted, providing some generic information on public participation regarding climate policy instruments.

13. Engagement of private-sector stakeholders

The information provided in 2021 and 2023 is almost identical. The paragraph on biodiversity and water management, floodings is no longer included. A paragraph on the coastal zone has been added but does not explain how the private sector has been involved. Progress is therefore unclear.

Conclusions. Portugal provides little information about correlation between adaptation efforts, vulnerabilities, and risks. It is similarly unclear whether there have been developments concerning the integration of adaptation into sectoral policies or the engagement of stakeholders. Nature-based solutions are not promoted but are used to reduce certain risks.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Monitoring mechanisms have evolved since 2021. Most of the reported progress is currently described in qualitative terms, but the Climate Law introduced new provisions for annual monitoring and reporting to the Portuguese parliament. The first P-3AC progress report following these new provisions will be published in 2023. The progress report will update the indicators (including on the allocation of funds) established for each of its nine lines of action. These indicators and most of the P-3AC targets are taken directly from the funding programmes (e.g., the European Structural and Investment Funds) or from sectoral plans and strategies (e.g. PNUEA – the National Plan for Efficient Water Use).

15. Implementation of adaptation measures and financing

Portugal provides information on the main financial sources for adaptation at EU level (e.g., the POSEUR and 2020 Rural Development Programme, the recovery and resilience plan, the national environment fund, and grants by the European Environmental Agency). The 2023 report provides examples on projects currently funded in each key sector (e.g., agriculture, food, tourism and biodiversity). The new cohesion-policy partnership agreement between the European Commission and Portugal ('Portugal 2030') includes a thematic operational programme called 'Climate action and sustainability and maritime' (EUR 3.1 billion is provided by the Cohesion Fund), which aims to ensure climate transition and actions promoting adaptation to climate change, the circular economy and transport and mobility. Portugal has also developed a national recovery and resilience plan which foresees significant resources for adaptation to climate change notably regarding water scarcity and the resilience of the Algarve, Alentejo and the autonomous region of Madeira.

The information provided does not allow an assessment of the actual progress made in implementing the adaptation measures.

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

The report does not provide information on reductions of climate risks, but work has now started to enable regular assessments in the future of impacts, vulnerabilities, and risks, and to assess the progress made in reducing them. An ENAAC 2020 progress report for 2019 and 2020 was concluded in 2022. Regarding the monitoring report of P-3AC, the indicators and values of the monitoring parameters are being updated in collaboration with the sectoral working groups and thematic areas of ENAAC 2020.

Progress has been made regarding the coverage of the national territory by climate-change adaptation strategies and plans. By the end of 2022, 96% of Portuguese municipalities had developed such a plan or strategy, whereas only three municipalities had done so in 2015.

Information is provided on three objectives of ENAAC 2020.

1. Improvement of the level of knowledge about climate change: a research and innovation agenda for climate change was developed within the 'research and innovation' thematic area. It focuses on the identification of needs and knowledge gaps and on the establishment of priority areas for research.
2. Implementation of adaptation measures: the publication of the P-3AC and the progress on the financial mechanisms were the major milestones.
3. Promotion of the mainstreaming of adaptation into sectoral policies: the review of the National Programme for Spatial Planning Policies (PNPOT) was the priority within ENAAC's 'Mainstreaming Adaptation - Spatial Planning' thematic area. The PNPOT considered climate change as a cross-policy theme and integrated it into the different themes in the environmental, social, and economic areas, assessing the impact of global scenarios applied to the national territory.

As explained above, the development of adaptation strategies and plans by municipalities has increased in recent years.

20-21. Updating vulnerability and risk assessments; and national adaptation policies

Progress in reviewing and updating vulnerability and risk assessments is currently being assessed. The assessment is expected to be delivered by the end of 2023.

The adoption of the Climate Law at the end of 2021 has been a major addition to Portugal's adaptation policies. The Climate Law requires the ENAAC to be renewed every 10 years. The current strategy will run until 2030.

Conclusions. The Climate Law adopted at the end of 2021 introduced new monitoring and reporting obligations for the Portuguese parliament. The first output following these obligations is expected in 2023. Regarding implementation, Portugal reports mostly on the use of funding programmes for adaptation. There is no reporting on actual progress made in terms of risk reduction. However, progress has been reported regarding adaptation planning, where almost the

whole country can now refer to regional/municipal adaptation plans. Progress has also been made on several objectives of the 2020 national adaptation strategy (ENAAC 2020).

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Portugal reports a total of 13 good practice examples. 4 of these are new compared with 2021.

The National Vector Surveillance Network (REVIVE) provides a seasonal health contingency plan and the water sanitary surveillance programmes. The landscape planning and management programmes (PRGPs) for Serras de Monchique and Silves have identified priority intervention areas aimed at the enhancement of water lines and agro-forestry mosaics for fuel management, the rehabilitation of the terrace system and the recovery of surplus forest biomass.

In 2021 and 2022, a total of 71 integrated landscape management areas (AIGPs) were set up to achieve a common management and exploitation of agricultural and forestry spaces in small properties and high-fire-risk areas, to ensure greater resilience to fire and to improve ecosystem services, while also promoting the revitalisation of these territories and adaptation to climate change. The National Landscape Award 2020 awarded two honourable mentions that address sustainability and the territory's resilience to climate change.

Regarding synergies, Portugal has for the first time reported a synergy between the United Nations Convention to Combat Desertification and Portugal's National Action Programme to Combat Desertification, which will be revised in 2024. Other synergies had already been reported in 2021.

Portugal emphasises the 'Go Portugal – Global Science and Technology Partnerships Portugal' programme to fund 25 new projects, with a total of EUR 55.2 million over the next 3 years (including EUR 16.7 million funded by American partner universities). These projects include projects on adaptation, namely a robotic system for forest cleaning and fire prevention.

The Portuguese Space Agency has established the Earth Observation (EO) doctoral fellowships covering R&D activities for intelligent space systems, for technological development for (EO) satellite constellations, and for use of satellite data and artificial intelligence to create applications. It will also promote studies that will combine EO and AI to create solutions that support sustainable development goals and assessment, mitigation and adaptation to the impacts of climate change.

Portugal has reported two new examples of cooperation to enhance adaptation action at the national, macro-regional and international levels. The Portuguese 2030 Development Cooperation Strategy aims to ensure participation in international negotiations, responding to international commitments of cooperation and support to developing countries in this field and privileging priority countries. The Unit for the Coordination of Operational Strategy for Humanitarian and Emergency Action promotes action in the case of Portugal's public aid to developing countries

that require humanitarian and emergency action following natural disasters caused by extreme weather events.

Portuguese regions are involved as demonstrating sites in several Horizon Europe demonstration projects[74].

Conclusions. Projects and funding schemes that were already running in 2021 remain ongoing and new examples of both good practices and cooperation have been added to the 2023 report.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation actions

The ENAAC integrates adaptation in sectoral policies and territorial programmes and plans at subnational level. The regional governments and the association of Portuguese municipalities participate in the ENAAC governance structure. In addition, adaptation aspects of spatial planning involve the subnational level. The autonomous regions of Madeira and the Azores have their own specific adaptation programmes. The ENAAC Coordination Group also includes representatives from the autonomous regions of the Azores and Madeira and the National Association of Portuguese Municipalities.

26-29. Subnational policies and cooperation

50 Portuguese regions, intermunicipal structures and municipalities are participating in the Mission on Adaptation to Climate Change and ensure that all parts of Portugal (except the Azores) are represented in the Mission by at least one municipality. Funchal is a signatory, so the autonomous region of Madeira (an outermost region of the EU) is represented.

96% of Portugal's territory is covered by intermunicipal climate-change adaptation plans. The establishment of these plans contains 2 phases:

- in the first phase, the impacts, and vulnerabilities (including the adaptive capacity and the current and future vulnerabilities) of the territories are identified on the basis of climate scenarios;
- in the second phase, adaptation actions (including priorities, deadlines, institutional responsibilities, monitoring, and communication to support their implementation) are identified.

The Climate Law requires all municipalities, all intermunicipal communities (NUTS-3 level) and all regional development and coordination commissions (corresponding approximately to the

[74] - Azores - in regions4climate and Baixo Alentejo in RESIST

NUTS-2 level) to develop climate-action plans (both mitigation and adaptation) by the end of 2023.

Portugal has reported on the various working groups under the Subcommission of the National Platform for Disaster Risk Reduction. It has highlighted the preparation of several practice guides in recent years (e.g., the 'Resilient Cities in 2018' guide and the 'Flood Management: support document for good practices' guide).

Portugal's strategies and policies are all relatively new and there is therefore no plan to review them as yet. However, the autonomous region of Madeira did start to revise its Madeira Climate Change Adaptation Strategy (including a re-evaluation of the climate risks) in 2022.

Conclusions. Portuguese regions, municipalities and intermunicipal structures must all develop climate-change adaptation plans by the end of 2023. They have already been developed for 96% of Portugal's territory.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↑
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	?
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies, and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	•
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	•
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	•
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	•
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience, and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	↑
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	●
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	?
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	?

Assessment of progress towards adaptation in Romania under the European Climate Law

Summary

Romania reports that the revision of its national adaptation strategy (NAS) and national adaptation plan (NAP) are under way, together with new thematic or sectoral climate risk assessments and efforts to improve its national risk assessment methodology. It is important to note that these will include an explicit identification of adaptation goals, which are critical for tracking progress and ensuring the efficient implementation of adaptive measures, backed up by budgeting. They should also remedy the current lack of a robust national monitoring, reporting and evaluation framework.

The most important climate-change hazards to which the country is exposed include drought, floods and heatwaves. 16 key sectors are reported to be affected by climate change. Agriculture is highlighted as being particularly vulnerable to the physical impacts of the climate crisis.

There are initiatives to mainstream climate-change adaptation into sectoral strategies, including agriculture, energy, health, tourism and insurance. Information is not available on the extent, direction and impact of these initiatives. The involvement of the private sector appears to have been minimal. Some steps have been taken to involve vulnerable stakeholders, but information is not available on the impact.

Romania has not reported on nature-based solutions, but the country's national recovery and resilience plan includes some that build resilience to climate impacts, such as reforesting floodplains. There is considerable scope for integrating nature-based solutions into national, sectoral and local adaptation plans.

Romania has reported that weak interinstitutional coordination has been a barrier to adaptation action. A high-level national body, the Interministerial Committee on Climate Change, was established in 2022 to analyse, monitor and propose annual priority policies in the field of climate change. This should in principle include adaptation, although this is not explicitly stated. If so, the high-level political support may address some of the coordination-related challenges to date.

Detailed analysis

Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the

assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

1. Climate monitoring and modelling framework

The description of climate monitoring, modelling and projection approaches and tools did not significantly change between 2021 and 2023. The number of meteorological stations was updated. Romania reported 166 operational weather stations managed by the National Meteorological Administration (NMA), including 68 weather stations that carry out an agrometeorological measurement programme. In addition, 7 Doppler weather radar systems together with the images and data from geostationary satellites (METEOSAT-7 and MASG-1,2,3) complete the network of meteorological measurements.

The NMA started a new activity in regional climate modelling in 2023, focused around high-resolution climate projections and climate predictions (monthly-seasonal). Its main objective is to provide information on climate-projection estimates (and uncertainty) at subregional level.

The NMA's modelling activity is linked to international networks, but at national level the aim of developing collaborative work with stakeholders and potential users of the modelling activity has not yet been met.

Romania has also acknowledged computing resources and storage as a main challenge, especially when considering the high-resolution scenarios required for impact assessment and extremes analysis.

2-4. Changes to the reported vulnerabilities and risks since 2021

The information on vulnerabilities and risks was the same in both the 2021 and 2023 submissions. However, Romania has initiated new thematic and sectoral climate risk assessments at the national level. Related to this, the country reports work to improve its national risk assessment methodology in order to allow better consideration of multiple hazards, multiple risk, urban risk, disaster losses and cross-sectoral issues (including in the context of climate change).

The relevant hazards and risks identified and reported by Romania correspond to the hazards and risks identified by other independent sources. Drought and flooding are the most significant hazards. Heatwaves will become significantly more frequent increasing by mid-century.

Romania has reported more than 16 key sectors affected by climate change. The agriculture and food sector is characterised as a sector with a high likelihood of key hazards and high vulnerability. Impacts and the risk of future impacts are rated as medium. Drought is the key hazard for this sector. Overall, the potential impacts of climate change on agriculture in Romania are likely to greatly increase the risk of crop failure, especially in the south and south-east of the country. The

PESETA IV [75] project estimates that, in value, the agricultural losses in Romania would be 16% higher in a world that is 2.0°C hotter than at present.

Water management is characterised as a sector with high impacts and a high risk of future impacts. Health, forestry, and other sectors have been identified as key sectors affected by climate change but are not included by Romania among the priority sectors.

The INFORM tool [76] places Romania among the top three countries with an increasing vulnerability gap and an increase in risks computed for mid-century (2050) relative to the current vulnerability and baseline risk, respectively.

Conclusions. Romania has reported recent developments on climate monitoring and modelling tools. Work is ongoing to revise and update the national climate risk assessments. The identified vulnerabilities and risks are the same as in 2021 and appear consistent with additional, non-authoritative sources. Drought and flood are the most significant hazards, and the occurrence of heatwaves will significantly increase in the coming decades. Over 15 sectors are reported to be affected by climate change.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation actions

In April 2022, a new Interministerial Committee on Climate Change was established. Its members are the ministers of over 15 ministries as well as the offices of the president and the prime minister. It is chaired by the prime minister. Its remit includes analysing, monitoring and proposing annual priority policies in the field of climate change in accordance with Romania's commitments to the EU. This should in principle include resilience to climate change, but resilience and adaptation are not explicitly mentioned[77]. This development should ensure more effective coordination and implementation thanks to political support from the highest level.

The Ministry of Environment, Water and Forests (MEWF) is the leading national authority on climate change. It coordinates the integration of climate-change objectives in sectoral policies, which includes setting up judicial, institutional, administrative, and financial instruments. The MEWF is also responsible for reporting to international and EU institutions on climate change.

The Ministry of Agriculture and Rural Development and the Ministry of Internal Affairs, through the General Inspectorate for Emergency Situations (IGSU), also play a role in the implementation,

[75] The European Commission's Joint Research Centre (JRC)'s PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

[77] This references the Governance Regulation (Regulation (EU) 2018/1999) but not the 2021 Climate Law. The Committee also analyses, monitors, and evaluates the degree of implementation of measures assigned to authorities and institutions responsible for implementing policies outlined in the Integrated National Plan for Energy and Climate Change.

monitoring, evaluation and revision of adaptation policies, along with the NMA and the National Directorate of Forests (Romsilva).

Cross-institutional coordination has traditionally been weak between the authorities focusing on disaster risk management and those tasked with climate-change adaptation. The new Interministerial Committee on Climate Change referred to above could potentially remedy this.

An NAS is in place for 2016-2030. Romania does not formally report on how and when it is planned that the revision of the climate risk assessments will feed into a revised adaptation strategy, but a revised NAS and NAP were submitted for a final round of public consultation at the end of August. Another important development since the last reporting period was Romania's adoption of an NAP in June 2022 to implement the NAS.

Conclusions. Romania has made progress in strengthening the national governance structures supporting climate-adaptation action. An NAP was also adopted in 2022. It is unclear how and when the updating of national climate risk assessments will feed into an updating of the NAS and NAP. The Interministerial Committee on Climate Change, which was established in 2022, has been charged with the role of ensuring consistent implementation and monitoring of climate-change policies. Its formal remit may be interpreted as including climate resilience, but this is not explicitly mentioned.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

Romania's adaptation priorities cover 13 priority sectors: industry; agriculture and fisheries; tourism; public health; buildings and infrastructure; transport; water resources; forests; energy; biodiversity; insurance; recreation activities; and education. These largely correspond to the sectors for which vulnerabilities and risks were identified. The fisheries and education sectors are present only among the priority sectors and not among key affected sectors.

The actions set out in the NAS address a number of areas, including sectoral planning processes and climate-resilient infrastructure. The progress made in implementing these actions is unclear. Romania's national recovery and resilience plan contains measures on water disposal and storage, the reduction of flood risks and the adaptation of forest ecosystems.

Romania's reporting on challenges, gaps and barriers to adaptation was the same for both 2021 and 2023. It identifies weak cooperation between different actors and institutions as one of the main barriers to progress, as well as limited financing. The establishment of the Interministerial Committee on Climate Change could improve cooperation. Romania is one of the Member States with the highest number of environmental infringements [78] and shortcomings in law enforcement

[78] https://ec.europa.eu/environment/eir/pdf/report_ro_en.pdf

may be added to the list of barriers. For example, illegal logging is a serious threat [79], including to one of the few remaining primary and old-growth forests in Europe and to Natura 2000 sites. This also threatens the ecosystems services provided by these forests (including carbon capture and storage, flood defence and biodiversity) and cannot be compensated for by planting new forests elsewhere that would be less resilient than the established biodiverse ecosystems.

Romania has a pronounced gap in insurance protection for flooding that could pose a risk for public finances if insurance coverage remains low. There is a national insurance programme in the agricultural sector (covering six hazards), but the limited number of insurance policyholders in general suggests that the disaster protection insurance system in Romania is not sustainable.

Romania has also reported on studies in the fields of agriculture and rural development; water and drinking water; forestry; and public health and emergency response services that address barriers to adaptation. However, it has not provided further detail either on those barriers or on policy action taken in response. The reporting in this respect was identical for both 2021 and 2023.

10. Nature-based solutions in national adaptation policies

In its 2023 reporting, Romania does not provide any information on nature-based solutions or ecosystem-based adaptation.

Romania's national recovery and resilience plan contains some nature-based solutions that promise benefits and progress on adaptation, such as reforesting floodplains. There is considerable scope to further expand nature-based solutions, starting with the effective protection of primary and old-growth forests and Natura 2000 sites from logging (authorised or illegal). There is evidence of large-scale logging in these forests since Romania's 2007 accession to the EU, but the Romanian authorities contest the various estimates, including the extent of area still covered by primary forests.

Romania has areas with a relatively high concentration of dams, some poorly maintained, and a focus on requesting EU funding. If some of these dams were to be breached, flood risks might be exacerbated. Removing some of these dams and restoring upstream floodplains (while maintaining other existing dams, possibly on the same waterway, that are necessary to mitigate residual risk) may bring important benefits. In this context, citizen science suggests that 239 dams and barriers were removed in 17 EU countries in 2021 (including 108 in Spain) and that 325 more dams were removed in 2022 [80]. Romania does appear to have removed some dams in recent years, but data on dam removal is not currently officially reported.

Romania has the Danube Delta, the second largest river delta in Europe, and is the best preserved on the continent, largest European wetland, and reed bed, and also constitutes Europe's largest water purification system. It is of high importance as nature-based solutions for biodiversity and climate mitigation and adaptation[81]. Climate change will affect the riverine network locally as well

[79] Parliamentary question | Answer for question E-004377/21 | E-004377/2021(ASW) | European Parliament (europa.eu), Texts adopted - Illegal logging in the EU - Thursday, 23 June 2022 (europa.eu)
[80] Maps - Dam Removal Europe
[81] (PDF) Aboveground biomass and carbon stock of the riparian vegetation in the Danube Delta (researchgate.net)

as at basin scale with implications for the riverine ecosystem and related human uses. Protection of ecological corridors along the riverine network facilitating species migrations can help to mitigate some climate change vulnerabilities. The ecological status is threatened by the important role the Danube plays in developing a climate-friendly trans-European transportation network. The Danube is furthermore a major part of the Rhine-Danube transport Corridor. Enhancing transportation capacity must respect ecological requirements. Joint solutions serving ecological and societal needs have to be sought.

11. Integration of adaptation into sectoral policies

Romania reports that line ministries are working together to mainstream climate-change adaptation measures into their plans, alongside the development of national and regional disaster risk management plans. This concerns sectors such as agriculture, tourism and insurance, along with emergency and crisis management, disaster risk reduction, flood risk management and river-basin management. Further details are not available.

12. Engagement of stakeholders vulnerable to climate change impacts

No fresh information was reported on engagement with stakeholders that are particularly vulnerable to climate-change impacts, but there is a reference to the engagement of vulnerable groups through questionnaires developed during projects. Further information (including on the impact that this engagement has had on shaping adaptation policy and its implementation) is not available.

The reporting mentions other bodies that could facilitate dialogue in relation to adaptation policy. These include the Coalition for Sustainable Development, NGOs, development and innovation institutions and the academic community. Such partners could indeed provide valuable support to groups of vulnerable stakeholders when they engage at the policy-making level. The steps being planned or taken to this end from the policy side are not clear.

13. Engagement of private-sector stakeholders

No new information was reported in 2023 about engagement with private-sector stakeholders. Romania reports that all key stakeholders were involved in the development of the 2030/2020 Sustainable Development Strategy. Romania also reported that there is no legal requirement for private entities and stakeholders to report directly to the ministry responsible for the adaptation component (this is not unusual).

Romania also mentions recent actions in the financial and banking sector to factor climate risks into risk assessments.

At national level, Romania reports that it intends to develop its collaboration with stakeholders in, and potential users of, climate modelling. This does appear to have been done as yet.

Conclusions. Several sectoral strategies have been adopted for mainstreaming climate-change adaptation. Romania's 2023 reporting does not provide any information on nature-based solutions or ecosystem-based adaptation, but some related measures are under way in the context of the national recovery and resilience plan and there is scope for more in Romania's adaptation policies.

The engagement of the private sector appears minimal and there is little information on the effective engagement of vulnerable stakeholders. The report indicates that weak cooperation between different actors and institutions and limited financing are barriers to adaptation action. Shortcomings in law enforcement are a further barrier. The establishment of the Interministerial Committee on Climate Change could help to address the challenge of cooperation.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

There is no information on monitoring and evaluation mechanisms in either the 2021 or the 2023 reporting. The new strategy and plan that are currently under development could promote this.

15. Implementation of adaptation measures and financing

There is no information on the progress of implementation towards meeting adaptation goals in either the 2021 or the 2023 reporting.

Romania reports that limited funding is available to support effective climate policies and disaster risk reduction, but there is no specific information on the budgeting for adaptation. The report also indicates a relatively high rate of mainstreaming and implementation of climate actions in the sectoral measures financed by the European structural and investment funds. It is unclear what this translates into concretely, including specifically for adaptation within the broader climate envelope.

16-19. Reducing climate impacts, vulnerabilities and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Romania does not report any information on the progress made in reducing climate impacts, vulnerabilities and risks. It does report that a national database on disaster loss and damage and a national procedure for collecting and processing data on this are under development but does not provide a target date for their completion.

On increasing adaptive capacity, the information provided in 2023 is identical to the reporting in 2021. The examples of increasing adaptive capacity include the growing numbers of cities taking action under the Covenant of Mayors (16 cities, up from 11 cities as of 2018); the creation of a climate working group under the presidency and the ongoing work in an interministerial committee for sustainable development; and capacity-building measures that are part of the national 2016-2020 climate action plan (no further detail is provided).

Romania also states that the reorganisation of the National Commission for Climate Change (NCCC) via a 2014 governmental decision created a framework that enhances interministerial coordination to meet Romania's climate objectives. Since Romania also reports weak coordination in 2023 as an obstacle to adaptation, the implication appears to be that this reorganisation nearly a decade earlier did not sufficiently meet its objectives in this respect.

20-21. Updating vulnerability and risk assessments; and the NAP

Romania reports that it is revising its NAS while also working on a new NAP. However, the information provided in 2023 is the same as that provided in 2021 and there is no indication of progress.

Romania similarly reports on steps taken to review and update vulnerability and risk assessments. These include the improvement of the national risk assessment methodology, the development of a national methodology for disaster loss assessment and the development of a national database for disaster loss and damage.

In 2020, Romania integrated climate-change impacts into its national disaster risk management frameworks and sectoral planning.

Conclusions. Romania has signalled that the revision of its NAS and NAP are under way. That would constitute progress. It also reports on the integration of the climate-change assessments into its national disaster risk management frameworks. Romania's reporting still does not explicitly identify adaptation goals or provide information on progress made in meeting such goals. There appears to be no sufficient national monitoring, reporting and evaluation framework in place. No new progress was reported on adaptive capacity-building, although some examples were already reported in 2021.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

The synergies reported with other international frameworks or conventions were the same in both 2021 and 2023.

A new cooperation project has been launched in the field of strategic policy, common risk assessment methodology (SEERISK) and response to drought emergencies for the Danube macro-region with 14 partners from 9 countries (CAMARO-D).

Information on a new cooperation project (SUSCAP) was provided, namely a project in which farmers, crop breeders and policymakers worked together to identify region-specific adaptations to improve crop-resource use-efficiency and productivity. The full link with climate resilience is not clear.

Conclusions. Romania has not reported any new synergies with international frameworks. However, a new transnational cooperation projects has been launched in the field of strategic policy, common risk assessment methodology and response to drought emergencies for the Danube macro-region.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation actions

Subnational governance structures are described on a general level. The line ministries and various authorities, alongside (and in some cases in collaboration with) private actors develop plans, programmes and projects that are implemented at local, regional, or national levels. The NCCC and various working groups for plans, strategies and programmes are mentioned as examples of subnational governance structures.

26-29. Subnational policies and cooperation

Information on several municipal climate-change mitigation and adaptation plans is provided as examples of new subnational efforts.

Two Romanian regions along with a number of municipalities have signed up to the EU Mission on Adaptation to Climate Change to build resilience against the impacts of climate change.

In 2018-2021, a slightly increasing number of Romanian cities and municipalities developed local adaptation strategies and plans as part of the Covenant of Mayors initiative. Romania considers the municipality of Alba Iulia's action plan for adaptation to climate change as an example of recent good practice. It was developed at the local level within the context of the initiative of the Covenant of Mayors and resulted from collaboration between Alba Iulia's local energy agency and the local authority.

Romania also reports a new initiative in the form of a small grant scheme for the development of climate-change mitigation and adaptation plans in municipalities.

Subnational monitoring and reporting to the Ministry of the Environment and Forests is reported to be taking place, but there is no further information (including on its scope).

Conclusions. A slightly increasing number of Romanian cities and municipalities are developing tailored local adaptation strategies. Two regions and a number of municipalities are participating in the EU Mission on Adaptation to Climate Change.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	N
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	●
	15. Has progress been made in the implementation of adaptation measures?	●
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	●
	18. Has progress been made in meeting adaptation priorities?	●
	19. Has progress been made in addressing barriers to adaptation?	●
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	●
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	?
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress towards adaptation in Slovakia under the European Climate Law

Summary

Slovakia has been proactive in addressing climate-change impacts and continued to make progress between 2021 and 2023. Enhanced climate-observation tools inform decision-making in specific sectors. A crucial step was the approval of the national adaptation plan (NAP) in 2021, which outlines the priorities for adaptation in the sectors identified as vulnerable to climate change (notably water management, agriculture, forestry, nature, health and urban planning).

Slovakia still needs to comprehensively assess its vulnerability to climate change. It plans to do so in the context of the new climate law, referenced in the new Government Manifesto[82], and of the update of its national adaptation strategy (NAS).

Guidelines are available on how to monitor and evaluate adaptation policy, but it is still difficult to know how much public money is spent overall on climate adaptation and to measure results. Finding sufficient financing from the appropriate sources remains a challenge in sectors that need to adapt. An evaluation of progress achieved by the NAP implementation had been carried out and submitted to the government [1]. The main barriers to successful implementation are insufficient funding; low awareness at regional and local level; and the currently inadequate level of interministerial cooperation (especially for mainstreaming climate adaptation into sectoral policies and plans).

Further efforts are required to enhance the climate resilience of infrastructure and relying more on adaptation solutions that benefit both people and nature.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

[82] nrsr.sk/web/Dynamic/DocumentPreview.aspx?DocID=535376

Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments

1. Climate monitoring and modelling framework

The number of national meteorological and hydrological monitoring facilities increased between 2021 and 2023. Regarding the drought-monitoring system, the National Forestry Centre implemented the 'research and development to support the competitiveness of Slovak forestry (SLOV-LES)' research project in 2019-2021. Results included a new online web-platform for forestry meteorological monitoring [2] and framework recommendations for selected risks related to climate change. There have also been further changes to the key tool (the Climatological and Meteorological Information System (KMIS)) in many data domains, thus improving data collection on water availability, different types of droughts and several aspects of agriculture (e.g., climate-change impacts on soil health and pollination).

Slovakia has reported issues with data, knowledge, and information regarding climate risk assessments. This highlights its limited capacity for systemic risk assessments and challenges in responding to climate risk information with practicable solutions.

Slovakia has also acknowledged the need for new methodological guidelines for obtaining and evaluating data in the field of adaptation and for mainstreaming climate risks across policy areas.

2-3-4. Changes to the reported vulnerabilities and risks since 2021

There have only been slight changes. The ranking of vulnerabilities and risks and related information is mostly the same. The most notable change is in agriculture, where the new focus is on droughts, the development of new crop varieties, selection of crop species, cropping systems, irrigation systems and the adjustment of livestock nutrition and feeding systems. The impacts and likelihood of key hazards as well as the vulnerability of both the agriculture and food, and water management sectors are identified as 'high'. Floods and droughts are both reported as significant risks.

Slovakia anticipates that extreme weather events, floods, heatwaves or drought could impact demand and supply for the energy system and reduce nuclear power production due to a lack of cooling water.

Slovakia considers that the consequences and impacts of climate change may pose a threat to business continuity and supply chains.

Compared with the vulnerability and risk analysis under the INFORM tool [3], the PESETA project [4] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported vulnerabilities and key affected sectors appears to be complete.

Conclusions. Slovakia has continued to develop its climate monitoring and modelling tools, but methodological gaps in monitoring adaptation and climate risks remain. There is limited capacity for systemic risk assessments and challenges in translating climate risk information into practicable solutions. The climate vulnerability and risk analysis has not identified further risks

that were not reported in 2021 and the reported risks and sectors appear consistent with the results of independent analysis by the Joint Research Centre and the country's own national risk assessment.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation actions

The main national governance structures have not changed since 2021. The main responsibility for the implementation, monitoring and reporting of the NAS and the NAP lies with the Ministry of Environment, which coordinates interministerial and cross-cutting tasks. Operational coordination of implementation is carried out through the Adaptation Working Group, whose members are representatives of individual ministries and other central government bodies, organisations, academia, NGOs, and other interested groups. The Ministry of the Interior is working on disaster risk management tasks at both national (adoption of a strategy, action plan and disaster risk assessment) and international level. In 2023, Slovakia also reported that the Council of the Government for the European Green Deal is also adequately involved in interministerial coordination, and that interministerial coordination is integrating climate-change considerations into sectoral policies. Since 2020, the Ministry of Environment has been the presiding body of the Council of the Government for the European Green Deal (EGD), of which the EU Adaptation Strategy is a part. The Council of the Government is an advisory body authorised to implement measures in line with the EGD's goals and to advise and coordinate at the national level. No information is available on the involvement of the Prime Minister's office in the interministerial coordination on adaptation, or of another body with strong political authority across all sectoral policies concerned.

Resolution of the Government of the Slovak Republic[83] approved the National Strategy for Security Threat Risk Management in 2022. This aims to strengthen the effective management of security risks, which is directly related to increasing the resilience and strength of the State's security system.

Climate-related vulnerability and risk assessment is regulated [84]. Incorporating climate-change impacts and resilience into environmental impact assessment procedures is an ongoing task and climate-change impacts should be more fully reflected in legislation. Progress has been reported in mainstreaming climate change into environmental assessment procedures using online tools, methodologies, checklists, and guidance. According to the 2023 reporting, it is further planned that the climate resilience of infrastructure will also be supported by a methodology for assessing the climate vulnerability and climate resilience of new investments and projects and incorporating it into the environmental impact assessments, strategic environmental assessments process, which

[83] Act No 65/2022 Coll.

[84] Act No 24/2006 Coll. on Environmental Impact Assessment / Strategic Environmental Assessment. This has addressed climate vulnerability (impact) since its amendment (No 142/2017 Coll.).

is being prepared by the Ministry of Environment in cooperation with the Slovak Agency for Environment as part of the ‘Methodology for the Assessment of Investment Risks associated with the Adverse Impacts of Climate Change’ project.

The Ministry of Environment is preparing a draft national climate law that reflects the obligation to develop strategies and action plans on climate change and low-carbon transformation at the regional and local levels. The new Government Manifesto stipulates that: 'the government will continue in the finalisation of the proposal of the climate law'.... 'climate protection is above one department task’ … ‘the started wide discussion will enable to calibrate the law in a way, to make it 'executable' (implementable)′.

Conclusions. no major changes in governance structures have taken place since 2021, but Slovakia is continuously working on the mainstreaming of climate adaptation in interministerial coordination, disaster risk management and environmental impact assessments. It is also preparing the adoption of a national climate law.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The adaptation priorities, strategies, policies, plans and efforts are defined in broad and general terms.

The adoption of the NAP represented a substantial improvement regarding a systematic approach to adaptation. The government approved the NAP in August 2021. The core areas include water conservation, management, and use; sustainable agriculture; adapted forestry; natural environment and biodiversity; health and healthy populations; adapted human settlements; and technical, economic and social measures. These are overall in line with the risks that are expected to increase in the future. Sustainable agriculture in relation to increased risk of droughts is also a new focus of the 2023 vulnerabilities report. Sectors like transport, tourism, civil protection, and emergency management are included in cross-policy issues chapters. The specific risks and vulnerabilities of the energy and business sectors mentioned in Slovakia’s reporting on adaptation in support of the Energy Union objectives in accordance with the Governance Regulation are not covered in the NAP.

However, the 2023 reporting does not state whether there has been an improvement regarding the conflicting interests of the different ministries on adaptation that were reported in 2021.

One of the key 2021 barriers remained in 2023: ensuring funding for adaptation from the right combination of sources across all sectors where it should be mainstreamed.

Flooding and wildfires represent a very high risk, but insurance penetration for all perils is below 50% [5], which suggests the need for more assertive integration of climate-risk management into insurance policies in Slovakia.

The first-ever law on climate change and low-carbon transformation (the Climate Act) is currently being prepared. The Climate Act will also address the issue of adaptation in the relevant sections.

10. Nature-based solutions in national adaptation policies

Nature-based solutions and ecosystem-based adaptations are not specifically mentioned in the NAP, NAS, or Greener Slovakia strategy, and they are not planned for inclusion in the draft Climate Act. However, key areas of the NAP include natural environment and biodiversity and the recovery and resilience plan also supports nature-based solutions (i.e. the restoration of watercourses and protection of natural parks).

11. Integration of adaptation into sectoral policies

The 2021 reporting did not detail any integration of climate-change adaptation into sectoral policies, plans and programmes, but the 2023 reporting contains a list of specific and recent examples of integration in the sectors of agriculture and food, biodiversity, buildings, energy, forestry, transport, urban, water management, industry, geology, insurance and disaster risk reduction. There is not enough information to be able to judge the scale and actual or likely impact.

12. Engagement of stakeholders vulnerable to climate change impacts

A participatory process of defining priority adaptation measures and tasks was applied in the preparation of the NAP. Several measures are being taken to reach and engage different stakeholder groups. The 2023 report stated that the NAS also included various activities and projects with stakeholder engagement but did not specify whether stakeholders that are particularly vulnerable to climate impacts were involved.

13. Engagement of private-sector stakeholders

The section on cooperation with private-sector stakeholders did not change between 2021 and 2023. The situation is currently satisfying. The private sector is responsible for the selection and prioritisation of adaptation measures and implementation of plans and measures. The NAS and the NAP also support the establishment of formal public-private partnerships for the preparation and implementation of adaptation measures at regional and local level.

Conclusions. The 2021 adoption of the National Adaptation Plan to implement the National Adaptation Strategy was an important step in addressing the challenges of climate-change adaptation. Adaptation appears to have been effectively mainstreamed since 2021. Climate-risk management does not seem to be integrated into insurance policies, resulting in a climate protection gap that could substantially affect public finances should a major event occur. The lack of funding and lack of promotion of nature-based solutions is despite the inclusion of a dedicated chapter in Slovakia's recovery and resilience plan. It is also unclear whether the conflict of interest between the different ministries has been resolved. Stakeholder engagement is ongoing but does not appear to be focused on vulnerable groups.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Progress has been made in establishing and operationalising a monitoring mechanism. The 2021 reporting did not mention any special national monitoring, reporting and evaluation methodology for reducing climate impacts, vulnerabilities and risks, and increasing adaptive capacity. The 2023 reporting states that 10 specific monitoring, reporting and evaluation (MRE) methodological guidelines are being prepared within the framework of the 'methodology for the assessment of investment risks associated with the adverse effects of climate change' project. According to the 2021 reporting, the MRE methodology for the implementation of adaptation actions at national level had not yet been developed. In 2023, the approved NAP defines the MRE indicators, methodologies, and implementation of individual adaptation measures/tasks. For each task, an indicator(s) is/are assigned and evaluated on an ongoing basis. Individual tasks are annually evaluated by the Adaptation Working Group in accordance with the deadlines set for their implementation.

15. Implementation of adaptation measures and financing

Progress has been made in implementing adaptation measures. The 2021 reporting included the adaptation measures that had been set out in the 2018 revised NAS. The 2023 reporting also includes the objectives and specific tasks that are elaborated in the 2021 NAP.

The same key financial mechanisms were used in both the 2021 and the 2023 reporting. This includes the 2014-2020 Environmental Quality Operational Programme, whose funds can be used until 2023. However, there has been no progress in creating a comprehensive database of financial resources and the amount of financial resources spent on supporting adaptation projects and activities. The Integrated Regional Operational Programme (IROP) remains the key financial mechanism for financing adaptation measures and the funds have been further extended between the two reporting periods. There is scope to give greater priority to climate-resilience considerations in Slovakia's use of EU support from common agricultural policy funding.[85]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Slovakia has not provided evidence on the reduction of impacts, vulnerabilities and risks because a comprehensive vulnerability and risk assessment is only planned for the next NAS. To prepare this, the SHMÚ project 'development of comprehensive (2030/2050) climate-change scenarios with a focus on the vulnerability of selected sectors in relation to adaptation measures' aims to improve the linkage of climate-change scenarios with the development of policies and strategies in selected sectors at national and local level, and also to provide a basis for future risk management. Progress related to adaptive capacity is unclear: most of the 2023 submission is the

[85] Slovakia intends to invest ca 332 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

same as the 2021 submission. This states that Slovakia does not have an information system to comprehensively evaluate how the measures and implemented projects contribute to increasing the adaptive capacity, but that progress in this area should be made through the implementation of the measures proposed in the NAP. The 2023 submission identifies the same issues and states that progress should be made by implementing methodological procedures for obtaining, collecting, and evaluating data and information in the field of climate-change adaptation.

Slovakia has illustrated the achievement by 2023 of the 2021 NAP adaptation priorities by referring to specific measures taken in the priority areas of water management, sustainable agriculture, forest management, natural environment and biodiversity, health, the built environment, and insurance. The specific progress made in addressing barriers is not described in the 2023 reporting.

20-21. Updating vulnerability and risk assessments; and national adaptation policies

The review and updating of vulnerability and risk assessments and of national adaptation policies are prescribed by government resolutions that are passed when specific documents are adopted. Slovakia has applied for technical support under the DG REFORM Technical Support Instrument, which will also provide an assessment report on climate risks and vulnerabilities and support the update of the Slovak NAS (to be issued in 2025).

Conclusions. Specific MRE guidelines have been prepared with a view to following the implementation of the 2021 NAP. This is an important practical step towards achieving the commitments made in the NAS. No new financing mechanism has been introduced in addition to the existing operational programmes. A database of adaptation-related spending is still lacking. The results of adaptation policy (reduction in risks, increase in adaptive capacity, etc.) are difficult to demonstrate, partly because a comprehensive vulnerability assessment of the country is still only in the planning stage (in connection with a planned revision of the NAS).

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Slovakia has again listed ‘The Green Economy’ information platform and the Village Renewal Grant Programme as examples of good practices that are being continued. No new lessons learned, or synergies with international frameworks were identified in 2023 as compared with 2021. Nor have new examples been identified of cooperation with other Member States, international cooperation, or cooperation with regional and international organisations. Many cooperation initiatives and projects are still running, such as the ‘green infrastructure minimising the urban heat island effect’ LIFE17 project, the Danube transnational programme on ‘enhanced cooperation on flood forecasting in the Danube River basin’ and the LIFE17 project on ‘developing a resilient, low-carbon and more liveable urban residential area’. Slovakia has been involved in transnational

adaptation efforts through EU funding schemes for transnational cooperation like the EU Interreg programmes [86] and research programmes such as Horizon Europe, ERA-NET and ERA-NET+.

Conclusions. Projects and funding schemes already running in 2021 remain ongoing. Slovakia has not reported any new synergies with international frameworks or new initiatives in transnational cooperation.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation actions

The relevant governance structures related to climate-change adaptation are defined [87]. The Spatial Planning Act [88] contains adaptation measures at the regional level. A new climate law is being drafted that could oblige municipalities and municipalities with more than 2 000 inhabitants to develop an adaptation strategy. Slovakia is part of the Covenant of Mayors for Climate and Energy and representatives of the Association of Towns and Municipalities of Slovakia are members of its Adaptation Working Group. Cities and municipalities active in climate change adaptation include Bratislava, Banská Bystrica, Košice and Trenčín.

26-29. Subnational policies and cooperation

There has been progress in terms of integrating climate-change adaptation into subnational policies. The 2021 reporting mentioned only the adaptation strategy of the capital city Bratislava, but the 2023 reporting states that, at the regional level, individual self-governing regions have developed economic and social development plans up to 2030, in which the topic of adaptation to climate change is also addressed. The Bratislava, Prešov, Banská Bystrica and Košice regions are also preparing specific climate-change adaptation documents for their territories.

Actions in cities have been intensified by implementing activities and projects. Some of these projects were funded by international grants (including from EU funds).

It is not clear how much progress has been made in reviewing and updating subnational adaptation policies, strategies, plans and measures.

There has been progress in international cooperation at subnational level. The 2023 reporting mentioned specific new projects, such as the CLIMADAM adaptation strategy for climate change and mitigation activities for the Slovak-Ukrainian border region.

[86] The 'framework for improving water balance and nutrient balancing through the application of small-scale water retention measures' (the project partner is the Slovak Water Management Company); and the DEEPWATER-CE project (the project partner is the Research Institute of Water Management).
[87] Act No 525/2003 Coll. on the State Administration of Environmental Protection and Act No 369/1990 Coll. on Municipal Establishment.
[88] No. 200/2022 Coll.

Four regions (Banská Bystrica, Žilina, Trnava and Košice) and a municipality in Lučenec are signatories of the EU Mission on Adaptation to Climate Change.

Conclusions. Slovak regions and cities are increasingly developing and implementing adaptation policies at their level, including in cross-border cooperation. However, Slovakia's 2023 reporting does not detail how these policies are reviewed and updated.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	↗
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↑
	17. Has progress been made towards increasing adaptive capacity?	?
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	?
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	?
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	●

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	?
	29. Has progress been made with regards to cooperation at a subnational level?	↑

[1] Resolution no. 110/2023, https://rokovania.gov.sk/RVL/Material/28128/1

[2] http://www.forestweather.sk/

[3] The INFORM-tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre (JRC) https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool

[4] European Commission's Joint Research Centre (JRC)' PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis) https://joint-research-centre.ec.europa.eu/peseta-projects_en

[5] Data from 1980 – 2017 show that only 5-20% of economic losses were insured

Assessment of progress towards adaptation in Slovenia under the European Climate Law

Summary

The assessment of the progress made by Slovenia at national level indicates a degree of stagnation. However, several strategic documents reflect Slovenia's commitment to address climate-change impacts. These include the 2021 long-term strategy, the 2017-2021 strategy for the sustainable growth of tourism and the 2016-2021 Water Management Plan for the Danube and Adriatic Basins (these last two documents include measures to assess climate-change vulnerability in their respective sectors).Agriculture and forestry emerge as prominent sectors that have embraced adaptation strategies, addressing climate-change impacts through both national and EU funding, although implementation has been delayed and uneven. Infrastructure projects now require the evaluation of climate impacts with a view to a holistic approach to development that takes future climate challenges into account.

There are obvious challenges, however. There has been only limited progress in implementing adaptation measures and no clear financial commitment for such measures. Slovenia acknowledges the lack of a national comprehensive assessment of climate-change impacts, vulnerabilities, and risks. Similarly, there is a tangible absence of initiatives to identify and address barriers to adaptation, and this further complicates Slovenia's pursuit of climate-resilient development following major weather events in recent years (wildfires in 2022 and windstorms with heavy floods in 2023).

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments

1. Climate monitoring and modelling framework

There were no changes or updates to the climate monitoring and modelling framework between 2021 and 2023.

The Slovene Agency for Environment issued in 2018 an assessment of further climate change in Slovenia until the end of the twenty-first century [89]. It has intentions to revise these projections, but this will not be finalised before 2026. The assessments of climate-change impacts on individual sectors, which were planned for when the projections had been finalised, were not continued as planned.

2-3-4. Changes to the reported vulnerabilities and risks since 2021

Compared with the vulnerability and risk analysis under the INFORM tool [90], the PESETA project [91] and the country's own national risk assessment under the Union Civil Protection Mechanism, the list of reported risk and vulnerabilities by Slovenia has increased and appears complete, save for coastal flooding. The PESETA study shows a significant increase in risks that could become material in terms of the expected population exposed each year, the compromising of power generation and damage sustained each year.

Slovenia has considered agriculture and food, biodiversity, forestry and civil protection and emergency management as key affected sectors – but not (explicitly) water management. Temperature heatwaves have already been observed and are identified as a future climate hazard in Slovenia.

Slovenia was affected by major windstorms and heavy flooding in the summer of 2023. The government has estimated the damage at almost EUR 10 billion, using the international PDNA (Post-Disaster Needs Assessment) methodology. The PDNA covers everything from ensuring replacement of buildings, rehabilitation of watercourses, and restoration of infrastructure and other facilities. The disaster affected 183 municipalities (86% of Slovenia's municipalities) and the total extent of the affected area is estimated at 17 203 square kilometres (85% of Slovenia's territory).

The risk of major wildfires is mainly related to the Karst area, the Koper coastal area and the Goriška region, but it is spreading to other parts of Slovenia (the Alpine region). The number of wildfires in Slovenia generally depends on the weather conditions. The average number in the last 20 years (2002-2021) was 93 per year. This number increases in very dry and hot years, however, and so does the area of damaged forest. In 2022, there were 172 forest wildfires in the year to October, the major one taking place in July 2022 in the Karst region.

Conclusions. Slovenia has not improved its climate monitoring and modelling tools. Methodological gaps in monitoring adaptation and climate risks remain. The climate vulnerability

[89] CCA21, Synthesis Report, Part 1, Ministry of the Environment and Spatial Planning, the Slovenian Environment Agency, 2018.
[90] The INFORM tool at the Disaster Risk and Knowledge Management Centre of the European Commission's Joint Research Centre: https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool
[91] The European Commission's Joint Research Centre's PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis): https://joint-research-centre.ec.europa.eu/peseta-projects_en.

and risk analysis has identified further risks compared with 2021 but does not cover coastal flooding.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation actions

The main national governance structure has changed since 2021[92]. Responsibility for the implementation, monitoring and reporting of the national adaptation strategy (NAS) and national adaptation plan (NAP) now lies with the Ministry of Environment, Climate and Energy, which has a coordinating function within the interministerial and cross-policy work. Spatial planning and natural resources fall within the remit of another ministry.

In addition, the ministries in charge of relevant sectors are responsible for developing climate-related vulnerabilities and risks and mitigation plans. In practice, only agriculture and forestry are covered by plans for adaptation measures.

The Interdepartmental Working Group on Climate-Change Adaptation (WGA), which is made up of members from all concerned ministries, agencies and government offices, was officially established by the government in 2016, but discussions have so far taken place mostly in the bilateral and trilateral settings. It is planned to restructure this group by establishing it at two levels (technical and political).

The Environment Protection Law[93] regulates adaptation only in relation to the provision of finances from the Climate Fund to adaptation measures. Slovenia began to prepare a climate law that will include adaptation-related provisions in 2022 and adoption is expected in the course of 2024.

Conclusions. The transfer of adaptation responsibilities to the new ministry and the appearance of climate in its mission statement suggest that climate policies will become more visible and also calls for strong cooperation with the other ministries in the restructured Interdepartmental Working Group on Climate-Change Adaptation. Slovenia is preparing a new national climate law with adaptation provisions that holds promise to make the policy more prominent.

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The adaptation-related priorities, strategies, policies, plans and efforts are defined in cross-policy, broad and general terms with only limited sector-specific interventions (sometimes mandated by

[92] Act on the Government of the Republic of Slovenia, November 2022.
[93] Official Gazette of RS, No 44/22.

EU regulations such as the CAP Strategic Plan). In Slovenia, the climate-change vulnerabilities of the different sectors have not yet been fully assessed (only five sectors are highlighted), so it is difficult to identify whether the adaptation priorities, strategies and policies correspond to the identified vulnerabilities and risks. Adaptation priorities are laid down in the Strategic Framework for Climate-Change Adaptation, which the government adopted in December 2016. The document provides a long-term vision, purpose, and strategic guidelines for enhancing adaptation-related activities under four chapters that are relevant for all sectors and territories: (i) mainstreaming, (ii) wider cooperation, (iii) research and development and education, (iv) training, communication and public awareness. The significant climatic and socio-economic diversity of the territory described in the submission makes the regional and municipal adaptation plans a more appropriate level for intervention, obligation and objective-setting.

The reported challenges, gaps and barriers have not decreased. The 2023 reporting includes detail with regard to agriculture and forestry as well as water management plans. It also includes an overview of national strategies to respond to general and sectoral risks and vulnerabilities.

10. Nature-based solutions in national adaptation policies

Slovenia has the largest proportion of Natura 2000 areas in the EU (almost 38% of its total territory) and great potential for sustainable climate solutions to help adapt to mitigate climate change. In September 2019, Slovenia became a member of the Nature-Based Solutions Coalition[94] at the UN Climate Action Summit in New York and undertook to implement four manifesto priorities[95].

The main document providing a special focus on biodiversity protection and a set of measures to preserve biodiversity by mitigating and adapt to climate change is the Long-term Climate Strategy until 2050 [96].

No other policies or strategies explicitly foresee an uptake of nature-based solutions. This lack of clear recognition of the benefits of nature-based solutions (e.g., floodplains) may hinder its wider uptake (for example, EUR 50 million was dedicated to a water-retention infrastructure that is based on grey solutions). As part of the recovery and resilience plan, a new document on nature-based solutions with flood-protection measures is planned. It could become a guideline for the anti-flood measures under the Recovery and Resilience Facility and cohesion policy funding. [97]

[94] Background document for the global preparatory meeting for the global preparatory meeting for the UN Climate Action Summit 2019 (unep.org)

[95] The four manifesto priorities are: (i) increasing and mainstreaming nature-based solutions within national governance, climate action and climate-policy-related instruments; (ii) enhancing regional and international cooperation; (iii) generating the shifts needed in both domestic and international governance and finance to value nature; and (iv) scaling up nature-based solutionsfor mitigation, resilience and adaptation.

[96] https://unfccc.int/documents/302702

[97] Annex 6 of the National Flood Risk Management Plan (FRMP), updated in October 2023. The revised Annex 6 has been submitted to SG RECOVER in the context of milestone M46 of the Slovenian RRP.

11. Integration of adaptation into sectoral policies

The 2021 and 2023 responses are the same, so no progress has been made.

Some sectors (e.g., the agriculture and forestry sectors) have their own adaptation strategies and carry out measures which address climate-change impacts through both national and EU funding (e.g. the 2023-2027 CAP Strategic Plan). There are also specific strategic documents (e.g. the 2017-2021 strategy for sustainable growth of Slovenian tourism and the 2016-2021 Water Management Plan for the Danube and Adriatic Basins) that include measures to conduct climate change vulnerability assessments for the sector/area.

The future revision of the NAS and its expansion in sectoral coverage could boost the currently stagnating integration of adaptation considerations.

12. Engagement of stakeholders vulnerable to climate change impacts

The 2021 and 2023 responses are the same, so no progress has been reported.

However, stakeholders are being engaged in general policymaking (for example, the national disaster risk assessment included risk assessments that integrated climate impacts for flooding and drought). All infrastructure projects and government plans must assess climate-change impacts through strategic environmental assessment and environment impact assessment (SEA/EIA) procedures. A dedicated process to promote stakeholders' involvement is an integral part of the preparation of environment reports in SEA and EIA procedures. Cooperation with external experts takes place; plans on how to involve vulnerable stakeholders are developed; and several public events and regular consultations with experts are held.

13. Engagement of private-sector stakeholders

The section on cooperation with private-sector stakeholders stayed the same between 2021 and 2023. Slovenia has engaged with private-sector stakeholders (particularly in the field of agriculture) by increasing resilience by promoting self-sufficiency in food. Municipalities are also actively encouraging local production and supply (by facilitating farmers' produce in kindergartens, etc.).

Conclusions. Further integration of climate-change adaptation into sectoral policies is necessary, given the stalled progress and therefore the limited basis for addressing all the identified risks. This would also require further identification of vulnerabilities beyond the already identified sectors of agriculture and forestry. Further uptake of nature-based solutions would be facilitated by anchoring it into more strategic documents and planning tools. Stakeholder engagement is ongoing but is not particularly focused on vulnerable groups.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Limited progress has been made in establishing and operationalising a monitoring mechanism, and there is no national monitoring, reporting and evaluation system in place. Slovenia has continued to carry out and monitor adaptation measures and progress in the priority sectors of water management, flood risk and agriculture and forestry. Measuring the effectiveness/efficiency of adaptation progress has been developed with the vulnerability indicator [98]. However, the assessment of progress in the long-term strategy considers the lack of progress in preparing the vulnerability indicator and assessments as 'the greatest failure'. Assessment of the degree of Slovenia's vulnerability at the national and municipal levels was carried out throughout 2022 and finished in February 2023, but there is no information on the final overview of municipalities' vulnerabilities and capacities. Partial information is available in some municipalities' sustainable energy and climate action plans. Vulnerability indicators for municipalities in Slovenia could show the level of exposure, adaptive capacity and sensitivity; and target areas and municipalities for adaptation action by the government or at the regional level (to which those municipalities belong) could then be determined. Slovenia should assess the practicalities and feasibility of such an approach (instead of a regional approach).

A system for the periodic review of adaptation action at sectoral and local levels and the allocation of reporting responsibilities is planned to be developed within the framework of the NAS update within the framework of the proposed 'SLOVE LIFE4ADAPT' integrated project (submitted in 2023). Development of a monitoring and the establishment of an evaluation system are also planned. Indicators have been developed within the wider framework of the Slovenian Environment Agency's environment indicators (specifically on climate change adaptation) [99].

15. Implementation of adaptation measures and financing

No progress appears to have been made in implementing adaptation measures. An adaptation action plan has not yet been prepared at either the national or regional level. No funding has been earmarked for adaptation measures with the notable exception of the current EU Cohesion policy programme, and Slovenia states that it is difficult to monitor spending for adaptation only.

Slovenia should put climate resilience considerations more to the forefront in the use of EU support from the common agricultural policy and cohesion policy funds.[100]

[98] described in Annex 4 (process of development and structure of the vulnerability indicator) of the Strategic Framework for Climate Change Adaptation; SOzP_priloga4.pdf (gov.si)
[99] Prilagajanje podnebnim spremembam | Okoljski kazalci (gov.si)
[100] Slovenia intends to invest ca 159 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

16-19. Reducing climate impacts, vulnerabilities, and risks, increasing adaptive capacity, meeting adaptation priorities, addressing barriers.

Slovenia does not yet have a national comprehensive climate risk assessment. It is therefore understandable that Slovenia has not provided evidence on the reduction of impacts, vulnerabilities and risks; and progress made in reducing climate-change impacts, vulnerabilities, and risks has not yet been assessed in Slovenia. There is no assessment of progress made in increasing adaptive capacity in Slovenia.

Slovenia has made moderate progress with the adaptation priorities set out in the NAS. It has set up a qualitative and quantitative monitoring process for the implementation of the NAS. The latter outlines a set of indicators that will form the vulnerability indicator. The aim is to monitor climate change by collecting information on a range of variables (e.g. exposure, sensitivity and adaptive capacity variables; key climate change impacts; and identified risks and opportunities). Monitoring of the implementation of measures will be set-up when the NAS is updated, and new adaptation plans and actions are developed. Qualitative assessment of progress made in meeting the adaptation priorities set in the NAS has been carried out through an assessment of actions performed under each guideline and corresponding steps in the draft report on implementation of the NAS in 2016-2020. The results were as follows:

- actions considered as successful: the incorporation of climate adaptation considerations into strategic planning, EU and international activities, into provision of climate services. Steps undertaken with regards to the preparation of situation analyses and disseminated through in the field of education;
- actions considered as partially successful: enhanced application of EIA and Certified EIA instruments; interministerial cooperation; and interconnection of databases and communication activities;
- actions considered as unsuccessful: integration between local and regional levels (a national contact point has not been established) and the private sector; and establishment of regular cooperation between researchers and decision-makers (a climate portal has not been established);
- actions considered as a failure: the lack of progress in preparing the vulnerability indicator and assessments. The Resolution on the National Environment Protection Programme [101] (ReNPVO20-30) has postponed this activity to later years.

No progress has been made in addressing barriers to adaptation, which were only implicitly acknowledged and assessed in the 2016 NAS. Barriers to adaptation in Slovenia relate to the knowledge gap (there is no comprehensive climate vulnerability and risk assessment) and to the insufficient consistency between sectors in planning and management. With a limited uptake of sectoral plans and delayed implementation of their measures, this barrier persists. The lack of awareness of the need for adaptation and lack of understanding is to be addressed through

[101] Official Gazette of RS, No 31/20.

education, training, and additional research. Since the vulnerability assessment is devolved to the level of municipalities with regions as coordinators, it would be important to make progress with these assessments and to improve administrative consistency.

20-21. Updating vulnerability and risk assessments; and national adaptation policies

The national or regional action plan(s) drafting has not yet started and will be further delayed due to the updating of the NAS. The first vulnerability assessments for sectors and municipalities are still ongoing. Indicators and a periodic adaptation review system are to be developed. Additional support for the process will be required at the municipalities' level.

There is an unofficial commitment to review the NAS as part of an integrated project, which is submitted for funding.

Conclusions. No monitoring, reporting and evaluation (MRE) system is in place. No new financing mechanism has been introduced in addition to the existing operational programmes. A database of adaptation-related spending is still lacking. The results of adaptation policy (reduction in risks, increase in adaptive capacity, etc.) are difficult to assess because the progress of assessment of municipalities' vulnerabilities has slowed down and a comprehensive vulnerability assessment for the country is still only at the planning stage and linked to a set of new projections, revision of the NAS, new adaptation plans and local plans.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

No new good practices, lessons learned or synergies with international frameworks were identified in 2023 compared with 2021. On the basis of shared cross-border watercourses and mountains, Slovenia participates in two international river commissions, three EU regional strategies and the Alpine Convention. There are several cross-border and transboundary cooperation projects that deal with specific adaptation needs on the ground.

No new cooperation has been launched since 2021. Slovenia is continuing to cooperate with its neighbours and other countries in the Western Balkans within the framework of the Sava River Basin Framework Agreement. Within this framework, a regional flood warning system for the countries of the Sava River basin was established with one of its centres in Slovenia. In addition, since 2006, the Slovenian Environment Agency has been hosting the World Meteorological Organisation Drought Management Centre for south-eastern Europe that helps the countries in the region prepare, assess and improve their drought management.

Under the Technical Support Instrument's climate-adaptation flagship, which is administered by DG REFORM, Slovenia is also a beneficiary of a multicountry project with the Ministry of

Defence, which is responsible for civil protection and disaster relief). The main areas the project is addressing are:

- disaster management (protection and rescue, and civil protection): the burden on resources has increased due to increased activities for fire suppression, which should be addressed through organisational measures to address deficiencies at policy level and, consequently, in the internal documents and organisation of various stakeholders. This would ensure a faster and more efficient response;

- the recovery/restoration plan after the 2022 Karst forest fires.

Conclusions. Projects and funding schemes that were already running in 2021 remain ongoing. Slovenia has not reported any good new practices, new synergies with international frameworks or new initiatives in cross-border cooperation. The new Technical Support Instrument project can provide important lessons at the policy level in terms of preparedness and prevention and can help mobilise stakeholders.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation actions

In line with the policy frameworks, municipalities are the relevant subnational governance structures in Slovenia. Municipalities have an extensive role in spatial planning, housing, water management, economic development, and environmental protection. There are no legal requirements for municipalities to prepare adaptation plans, but climate-change impacts should be integrated into their spatial plans through the strategic environmental assessment of these plans. At the regional level, new spatial-planning legislation requires regional spatial plans to include climate-change impact assessments. Regional development agencies will play a role in developing the newly required regional development plans.

26-29. Subnational policies and cooperation

Municipalities have many strategies and plans in place to plan for the development of municipalities in a sustainable way. Many include climate-adaptation measures such as green infrastructure, flood protection measures and other support for increasing resilience to extreme weather events. However, no progress was reported between 2021 and 2023. These plans are mainly carried out through spatial planning, detailed spatial plans and strategic spatial plans. Larger, city-level municipalities have also adopted sustainable urban development strategies and some municipalities have grouped themselves into regions and adopted the Sustainable Energy and Climate Action Plan. There is one local-level strategy for climate-change adaptation in agriculture (the Climate Change Adaptation Strategy for Agriculture in the Vipava Valley for 2017-2021), which was developed within a LIFE project (ViVaCCAdapt). Nevertheless, as pointed out in a recent submission for the integrated projects, climate-change adaptation initiatives at local and/or regional levels are often not used, taken up or replicated after the project ends.

Slovenia has not yet prepared an overview of good practice examples from the subnational levels in order to engage with stakeholders that are particularly vulnerable to climate-change impacts. There have been several projects to address energy poverty. The Slovenian Eco Fund has provided substantive funding for measures that help to address energy poverty.

Subnational adaptation plans, policies, strategies and measures are in the early stages of development.

Progress has been made and Slovenia reports many projects (currently ongoing or concluded) that enhance adaptation action at the subnational level, such as:

- The Interreg Italy-Slovenia ECO-SMART (2020-2022) project to more effectively monitor climate change and to plan appropriate adaptation measures to prevent the negative impacts that threaten the quality of biodiversity in selected coastal NATURA 2000 sites in the included regions in Slovenia and Italy. An adaptation plan has been developed for Slovenia's protected area Škocjanski zatok.
- The Interreg Italy-Slovenia project POSEIDONE (2023-2026) covers the North Adriatic Sea functional area stretching from Chioggia in Italy to the end of Slovenia's coast. The main objective is to promote local responses to common needs and challenges through interventions in three different fields: protection of nature and biodiversity; development of green and blue infrastructure (in Natura 2000 sites and in agriculture); and the reduction of touristic pressure on natural parks.
- The Interreg SLO-AT CROSSRISK (2014-2020) was an Interreg bilateral project between Slovenia and Austria to improve human safety and the protection of infrastructure in the programme area. It consisted of eight Slovenian and nine Austrian regions. It supported tourism with a view to raising awareness of opportunities and risks by improving information on the safety of touring skiing and improving predictions of the potential for artificial snowfall.
- The DriDanube (Danube Region) and ADO (Alpine Area) projects developed drought indicators for the Danube region (a flatter and agriculturally oriented area) and the Alps (a rugged area). The major contributions of both projects were to supplement existing drought-monitoring with additional data sources (satellite observations and model calculations) and a database on the effects of drought that can serve as the basis for a more comprehensive assessment of the impact of climate change on frequency and intensity of droughts in the future.

63 municipalities (out of a total of 212) have so far joined the Covenant of Mayors and three regions (out of 12) have joined the EU Mission on Adaptation to Climate Change.

Slovenia intends to establish a local contact point as a helpdesk to support regions and municipalities with knowledge, tools and capacity-building.

Conclusions. Subnational work is continuing. The main challenge is to make collaboration a continuous process rather than a one-off process (as part of a project). Three regions have joined

the EU Mission on Adaptation to Climate Change and could, through this initiative, galvanise or trigger more actions in favour of adaptation by municipalities.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	•
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	P
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	P
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	P
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, policies and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	P
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↗
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↗
	15. Has progress been made in the implementation of adaptation measures?	↗
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	?
	18. Has progress been made in meeting adaptation priorities?	↗
	19. Has progress been made in addressing barriers to adaptation?	●
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	●
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	●
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	?
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	●

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, policies, plans and efforts?	•
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	•
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	•
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress towards adaptation in Spain under the European Climate Law

Summary

Spain has proactively addressed climate-change impacts and continued to make progress between 2021 and 2023. Spain's Climate Change and Energy Transition Law (the Climate Act) was adopted in 2021, a few months before the European Climate Law entered into force. It legally ties the preparation and updating of CRAs to the revision cycles of the national adaptation strategy (NAS) and national adaptation plan (NAP). The prime minister's office is part of the coordinating body on climate change adaptation and mitigation.

Spain's NAS and NAP cover all the relevant hazards. The risk assessment is moving towards considering compound hazards and Spain is in this respect one of the frontrunners in the EU. The main policy documents on adaptation also have a broad sectoral coverage and the relevant ministries are involved in the preparation of these documents.

Climate resilience is unevenly reflected in sectoral strategies and plans. In the energy sector, work has progressed on mapping risks to energy supply and actions are planned to address remaining knowledge gaps. In agriculture, there are very significant vulnerabilities when it comes to water (considered in a systemic perspective along with the needs of all other water users) as well as exposure to increasing maximum temperatures and the number of hot days that affect crop yield, nutritional value, and livestock mortality and morbidity. Given the significance of Spanish production in some segments of the food system in the EU, this also has a strong economic dimension for the EU as a whole.

Spain's NAP includes important elements that are intended to work with nature to increase resilience to climate impacts. These include actions to restore 'room for the river' and green urban spaces.

It is still difficult to know how much public money is spent on climate adaptation overall and to measure results. Finding sufficient financing from the appropriate sources remains a challenge in sectors that need climate-change adaptation.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments

1. Climate monitoring and modelling framework

An extensive network of institutions carries out and contributes to climate monitoring in Spain. The Spanish Meteorological Agency provides atmospheric-climate data and analyses (and weather warnings). The Spanish Oceanographic Institute and the State Ports Authority contribute oceanographic observations. On land and beyond, the Directorate-General for Water manages the main water-observation networks – the Global-Change Monitoring Network in National Parks provides infrastructure for *in situ* data collection, and the Ministry of Agriculture, Fisheries and Food and the Autonomous Communities manage a network of agroclimatic stations. The compilation of these climate variables is coordinated by the Spanish Office of Climate Change within the Ministry for the Ecological Transition.

Spain has legally anchored the preparation and regular updates of climate risk assessments (CRAs) in its national climate legislation. The new Climate Act requires a national CRA report to be prepared every 5 years.

The climatic reference scenarios are being updated in line with the latest IPCC scenarios. Dynamic regionalisation and statistical regionalisation techniques are both being deployed. The AdapteCCa Climate Change Scenario Viewer is a tool to facilitate the use of the downscaled climate-change scenarios and is kept up to date by a dedicated working group. Other tools support the integration of climate-change adaptation into the planning and management of coastal zones and have fed into the Strategy for the Adaptation of the Spanish Coast to Climate Change as well as the framework document of the Marine Strategies.

Spain has initiated new thematic or sectoral CRAs at the national scale, while working on multisectoral national CRAs. Strategic knowledge gaps are also being addressed, particularly cascading effects and complex risks.

2-3-4. Changes to the reported vulnerabilities and risks since 2021

Spain reports that it has already experienced most climate-related hazards. The exceptions are sea-ice cover and glacial lake-outbursts, which are not relevant given Spain's geography. The identification of vulnerabilities and risks in 2023 is substantially the same as in 2021.

The vast majority of hazards are expected to significantly increase in frequency and/or intensity in the future. The future evolution of some (e.g., tornadoes) is considered uncertain or unknown, while snow-load and ice-load are expected to decrease significantly. The hazards identified by Spain mostly correspond to the analysis in the relevant scientific literature, with some uncertainty over the future potential magnitude of storms.

Only a few of the important climate hazards can be highlighted in the small amount of space available here. Drought is one of the hazards most likely to increase in the coming decades in Spain. It is expected to have a significantly increasing impact on agriculture, buildings, power generation and water supply. Extreme temperatures have the greatest repercussions in terms of

morbidity and mortality. Since 1984, the number of days per year on which heatwave temperature thresholds are exceeded in peninsular Spain has already doubled and will continue to grow (potentially at an increasing pace) in the foreseeable future.

There are also strong interrelationships between key climate-related hazards in Spain that can greatly intensify the consequences if they occur together. For example, heat waves, droughts and extreme winds multiply wildfire risk. Coastal flooding becomes stronger and more severe with sea-level rises, heavy precipitation, and storm surges.

Global warming will aggravate existing pressures that stem from the over-exploitation of natural resources such as freshwater, soil, forests, the sea and the coastline. Intensive agriculture linked to the over-exploitation of water resources poses severe risks to both surface and groundwater bodies in terms of quality and quantity and these pressures will be exacerbated by climate-related alterations to the hydrological cycle and temperatures. Rising sea-levels may also contribute to water-resource depletion due to salt water entering aquifers. Similar dynamics apply to the existing long-term problem of land-degradation and desertification in some Spanish regions, which has negative consequences for soil productivity and water quality.

One example that has been identified of cascading effects from the climate-related hazards concerns the impact on the health of the Spanish population of (i) direct effects of global heating such as heat waves, floods, and droughts; and (ii) indirect effects such as an increase in atmospheric pollution and aeroallergens, a change in the distribution of disease-transmitting vectors, and a reduction in water or food quality. The increased frequency and intensity of extreme weather events also creates a mental health burden on top of physical impacts.

Conclusions. Spain has an extensive system of climate monitoring and modelling tools, which it is continuing to develop. CRAs and their regular update are mandated by law. The climate vulnerability and risk analysis has not identified any new risks compared with 2021, but the reported risks and sectors appear consistent with the results of independent analysis including by the Joint Research Centre.

Section 2 - Legal and policy frameworks and institutional arrangements

5-6. National governance structures supporting adaptation actions

A notable change to national governance structures took place with the adoption of the Climate Act (Law 7/2021) in May 2021. The Climate Act has introduced a new reporting requirement for the Ministry for the Ecological Transition to prepare a report detailing the evolution of climate-change impacts and risks in collaboration with other ministries and the regional governments. The Spanish Office for Climate Change, which is situated within the Ministry for the Ecological Transition, serves as the central coordination body for the preparation of the national adaptation strategy and plan. The prime minister’s office is part of the commission for the coordination of climate change policies that is the coordinating body on adaptation and mitigation.

The NAS (the 2021-2030 PNACC, which was approved in 2020) is and adopted by the Council of Ministers, is an integral part of Spain's broader strategic energy and climate framework. It is the basic planning instrument for promoting coordinated and coherent action to address the effects of climate change in Spain. It defines objectives, criteria, areas of work and lines of action to promote adaptation and resilience to climate change. This framework comprises a range of instruments that address climate-change adaptation, including the National Integrated Energy and Climate Plan (PNIEC), the Just Transition strategy and the Climate Change Act, which has been amended in accordance with the European Climate Law.

The Climate Act states that the NAS will be executed through NAPs (National Work Programmes), equivalent to a national adaptation plan, to be implemented over consecutive 5-year periods. The 2021-2025 NAP outlines specific measures to be executed during the initial 5 years of implementing the NAS development, designates entities responsible for implementation, and specifies monitoring, reporting and evaluation (MRE) mechanisms. The 2021-2025 NAP was developed by the Ministry for the Ecological Transition with contributions from 18 [102] of the 22 ministries, as well as state agencies and autonomous bodies. It also went through a period of public consultation and participation.

Implementation is further supported through sectoral and territorial plans (see also below). These are instruments for the detailed planning of adaptation in specific areas of work or territories. These plans include a diagnosis of the main risks identified in the area in question, definition of objectives that respond to those risks and a set of measures to meet the objectives.

Spain employs two critical assessment tools: the Strategic Environmental Assessment of plans and programmes; and the Environmental Impact Assessment of projects, to assess the potential effects of climate change across short-, medium-, and long-term planning and project implementation. In addition, the National Civil Protection Strategy provides a framework for managing disaster risks and enhancing resilience in the face of climate-related disasters.

Conclusion. Spain has established a governance framework for climate adaptation, with the NAS at its core. The ministries responsible for the sectors most exposed to climate hazards are involved in the preparation of the NAP. Spain has taken an important legislative step to enhance the reporting and monitoring of climate-change impacts and risks, and action to build resilience with the approval in 2021 of the Climate Act (Law 7/2021).

[102] These are the Ministries of Agriculture, Fisheries and Food; Foreign Affairs; European Union and Cooperation; Culture and Sports; Education and Vocational Training; Science and Innovation; Consumer Affairs; Industry, Commerce and Tourism; Economic Affairs and Digital Transformation; Defence; the Interior; Employment and Social Economy; Transport, Mobility and the Urban Agenda; Territorial Policy; Finance; Health; and Equality.

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The National Adaptation Strategy defines 18 areas where further work is needed in both the public and the private sectors. These are: climate scenarios; human health; water resources; natural heritage, biodiversity and protected areas; agriculture, livestock, fisheries, aquaculture and food; coasts and the marine environment; forestry, desertification, hunting and inland fishing; the city, urban planning and building; cultural heritage; energy; mobility and transport; industry and services; tourism; the financial system and insurance activity; disaster risk reduction; research and innovation; education and society; and peace, security and social cohesion.

The scale of the adaptation challenge varies across these sectors and policy fields, as does the degree to which adaptation efforts match the challenge. There are many impressive aspects to this work, whose breadth requires considerable coordination effort. The reported challenges to effectively implementing adaptation action relate to governance and financing issues, which have not changed since 2021.

There is scope to incentivise and make it easier to finance adaptation action. Spain, in common with the other EU Member States, does not have any budgetary targets for climate resilience. The Commission is funding a review of public spending (at central and regional level) on climate-change adaptation and risk-reduction policies along with an assessment of the economic impact of climate-change-related risks in Spain.

The steps taken to address water-related climatic challenges merit highlighting. Flood management plans are now required to take future climatic conditions into account. The new drought plans also represent a considerable step forward. Projections of water supply have been developed, and work has begun on projections of water demand. The water-management plans provide a framework for reconciling the needs of different water users with current and future water availability. Freshwater is already over-exploited in Spain, so difficult decisions will need to be taken to put its use on a sustainable footing.

Agriculture is one of the sectors most exposed to the physical impacts of global heating and efforts to build resilience do not appear commensurate with the identified vulnerabilities and risks. The resilience of Spanish agriculture has an added EU dimension due to its significant share of the EU's market for fruit and vegetables in particular. There is a need to reassess where and what type of agriculture and crops/livestock will be viable under future climatic conditions.

10. Nature-based solutions in national adaptation policies

Spanish adaptation policy includes important elements that aim to work with nature to increase resilience to climate impacts. Key documents (including the NAS and NAP) feature nature-based solutions. They are further supported by documents such as the 2021 National Strategy for Green Infrastructure and Ecological Connectivity and Restoration.

Measures to be highlighted include those that restore space to rivers, thus strengthening both flood and drought defences and carbon sinks. The NAS includes measures to improve the status of surface-water bodies and associated aquatic ecosystems. These include improving the hydromorphological condition of water bodies through nature-based solutions and restoring riverside forests. Pilot nature-based solutions have also been implemented in coastal areas and should be further explored.

The city of Valencia was a partner in the GrowGreen initiative to scale up the use of nature-based solutions to climate challenges. These included a small forest in a neighbourhood with an ageing population with nature-based solutions to manage rainwater and reduce heat stress; establishing a green-blue corridor to link existing green spaces; and installing vertical gardens and green roofs in schools and senior centres.

The Ministry for the Ecological Transition has launched several calls within the framework of the Next Generation funds in order to give a strong boost to projects for the renaturalization of cities and the restoration of urban river ecosystems that contribute to climate adaptation and urban resilience. This financing amounts to 195 million euros, and projects in 74 Spanish municipalities will be supported.

11. Integration of adaptation into sectoral policies

The Climate Act was approved in 2021. It promotes the incorporation of adaptation strategies into water planning and management, infrastructure planning and management, biodiversity protection, forestry policy, rural development and urban planning. The incorporation of adaptation into these sectoral policies is put into practice and consolidated by integrating it into the government´s strategies, plans and programmes, as well as the set of regulations for each sectoral area. Since 2021, a generation of sectoral policies has continued to incorporate adaptation to climate change measures.

The strategies and plans in the sectors particularly exposed to climate-related risks do not reflect climate-resilience uniformly or in proportion to the need to act. The agricultural system, in particular, is not dimensioned for future climatic conditions. Food production faces very significant vulnerabilities when it comes to water (when considered in the wider context of all water users' needs) and is exposed to increases in maximum temperatures and the number of hot days that affect crop yield, nutritional value, and livestock mortality and morbidity.

12. Engagement of stakeholders vulnerable to climate change impacts

A Citizens' Climate Assembly was organised in 2021-2022, bringing together 100 citizens who provided recommendations on climate policy. The main theme was 'A safer and fairer Spain in the face of climate change: how do we do it?' The assembly's final report included a set of 172 recommendations and was presented to the prime minister, the presidents of the Spanish Parliament and a number of regional governments and social groups.

In addition, a series of thematic seminars have been conducted since 2021. No new specific actions have been reported to engage stakeholders who are especially susceptible to the impacts of climate

change. The recommendations from the Citizens' Climate Assembly [103] were formally submitted to the authorities, but information is not available on their implementation.

Existing tools have been used to improve access to information and communication (such as the AdapteCCa platform, advisory forums, social studies and thematic seminars). The 2023 'Guide for the assessment of risks associated with climate change' addresses a number of matters, including territorial and social vulnerability; gender considerations; risk perception; and social participation. The preparation process for the development of this guide included a range of experts and institutions but no vulnerable social groups were involved.

13. Engagement of private-sector stakeholders

Cooperation and engagement with private stakeholders in the context of adaptation policy does not appear to have changed between 2021 and 2023. Spain encourages private-sector engagement through the NAS and the 2021-2025 NAP, which the private sector also helped to develop through multi-stakeholder seminars.

The Spanish Office for climate change ('the Office') and the Ministry for Ecological Transition continue to work with the private sector, through projects and programmes that were already established by 2021 (e.g. the Iniciativa ADAPTA project and the PIMA Adapta Plan). Iniciativa ADAPTA is a project by the Office in collaboration with key Spanish companies. It integrates climate considerations into business strategies, with a focus on climate-change risk and adaptation. The PIMA Adapta Plan has been providing competitive grants for climate adaptation projects since 2016, emphasising actions such as developing business plans and strategies and involving entities including small and medium-sized enterprises.

The Office had collaborated with five companies that are pioneers in climate-change adaptation in the tourism, energy, transport, construction and food industry sectors. A second phase of this pilot project (Iniciativa ADAPTA-2) used a variety of methods in 2016 to undertake cost-benefit analyses of adaptation measures in two major energy and infrastructure companies.

In more recent years, there have been calls for proposals for grants, on a competitive basis, for different types of entities (including SMEs) to carry out climate-change adaptation projects. Priority lines of action have included the development and implementation of adaptation business plans and strategies.

Various forums and associations are in place to foster public-private collaboration to respond to environmental challenges, including climate resilience. These include the Spanish Group for Green Growth and the Spanish Climate Action Platform. The Forética association has developed a 'Cities Climate-Change Adaptation Toolbox', which is a collection of products and services (including business solutions for cities). The Office has worked with insurers to produce the 'impacts, vulnerability and adaptation to climate change in the insurance business (2020)' report.

[103] Informe-recomendaciones-Asamblea-Ciudadana-Clima_rev-es-en_gb-R-C.pdf (asambleaciudadanadelcambioclimatico.es)

Conclusions. Engagement with private-sector stakeholders continues to involve disseminating information, participation in the formulation of adaptation policy, and funding. Iniciativa ADAPTA and PIMA Adapta Plan are two of the main vehicles for this engagement. There is little available information on the extent of uptake of the tools developed in this context and on the impact of such activities.

Section 4 - Monitoring and evaluation of adaptation actions and processes

14. Monitoring mechanisms

Progress has been made in establishing and operationalising monitoring mechanisms. The monitoring mechanism has been extended by the Climate Act, which mandates the drafting of reports on the evolution of climate risk and the measures adopted for climate-change adaptation. These reports are to be compiled by the Ministry for the Ecological Transition with the collaboration of other ministries and the regional governments.

In Spain, municipalities and regions have significant responsibility for implementing and evaluating climate strategies and measures at a local level. Some autonomous communities have developed, or are about to complete, their own monitoring systems for their plans, programmes and/or strategies. These include Andalusia, Madrid, Asturias, La Rioja, Catalonia, Murcia, Valencia, Basque Country and Extremadura. Their frequency and coverage is variable.

A new impact- and risk-assessment process is currently under way, in accordance with the Climate Act. In 2023, three workshops with different stakeholders have been held to define the assessment's scope and methodology. This assessment will be finalised in 2025, and the results and findings will inform the next (2026-2030) NAP under the NAS.

The climate-change and monitoring indicators published in an annex to the NAS will be reviewed in 2023 to complete and, if necessary, adjust the initial collection. From 2023 onwards, the data series relating to the defined set of indicators will be updated every two years and made public. Complementary sectoral indicators have been developed (e.g. on health and climate change).

15. Implementation of adaptation measures and financing

The fifth monitoring report under the NAS, covering the period of 2018-2020, noted that progress had been made relative to the 2019 evaluation report (when around 81% of the actions included in the NAS and its work programmeswork programmes had been implemented or were in progress).

Notably, there has been a further integration of adaptation into sectoral regulations, with advances in fields such as civil protection, hydrological planning and energy planning. Impact and risk assessments were developed in sectors that had not previously been addressed, such as the insurance sector and land transport infrastructure. There has also been a increase in measures in the field of stakeholder engagement, and manuals and guides have been drafted to facilitate sectoral adaptation at the initiative of social organisations and academia.

A new monitoring report is planned on the actions and measures developed within the framework of the 2021-2025 NAP and will serve as a basis for developing the second NAP (2026-2030).

The estimated budget of the 2021-2025 NAP is more than EUR 1.5 billion. Information on actual expenditure on implementing these measures will not be available until the NAP has been completed.

Spain has committed national funds for the financing of the implementation of national and sectoral adaptation actions. These include the PIMA funds, which draw on revenues from the auctioning of emission rights and are further divided into funds managed by various units of the general state administration and territorial funds managed through the autonomous communities. The other major source for financing climate resilience is the Carbon Fund for a Sustainable Economy.

At EU level, funding from the recovery and resilience facility as well as the regular funds from the 2021-2017 multiannual financial framework2027 Multiannual Financial Framework are used to finance adaptation action. Other instruments (e.g., the LIFE financial instrument) also contribute. There is nevertheless still scope to put climate resilience considerations more to the forefront in Spain's use of EU support from the common agricultural policy and cohesion policy funding.[104]

It is unclear how the scale and proportion of funding committed to climate-change adaptation in this period compares with the pre-2021 period. There is no information on public spending on measures whose primary objective is not climate adaptation, but which nevertheless influence climate resilience (either positively or negatively).

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

Spain has not yet carried out a comprehensive monitoring or evaluation of the consequences of climate-change adaptation actions in terms of impacts, vulnerability, and risk reduction.

Partial evidence is available. Recent studies indicate that adaptation to high temperatures over the last 35 years has been adequate for the present climatic conditions for a large part of Spain, but that there are territorial differences. In the area of health, the mortality thresholds (temperatures at which deaths increase rapidly) have increased in some cities but not in others. For example, in Seville this threshold has increased from 40ºC in 2000-2009 to 41.5°C, which suggests a degree of successful adaptation (even if the specific contribution of different types of adaptation measures cannot be determined). Partial analysis of wildfires suggests that the area affected by forest fires has decreased, even though fire risk indices have increased because of climate change.

Conclusions cannot be drawn about the adequacy of adaptation actions for future climatic conditions. It is still generally the case that there are limits to what it is physically possible to adapt to.

[104] Spain intends to invest ca 815 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

Adaptive capacity is supported via the promotion of good practices (for example, in land-use planning and the use of nature-based solutions) through the AdapteCCa and LIFE Shara websites, which communicate case-studies, and through PIMA Adapta funding (from the auctioning of emissions trading system allowances) for pilot projects. The integration of adaptation into sectoral strategies and plans may also be presumed to support the building of broader adaptive capacity in the national administration. However, the scale and impact of these initiatives on adaptive capacity cannot be estimated.

The second NAS builds on the knowledge generated under its predecessor to define objectives and priorities. The latter were selected on the basis of criteria described in the 2021-2025 NAP. These include measures that contribute to managing imminent and very serious risks; those that have a high cost-efficiency ratio; and those that are essential for the development of further measures. Information is not available on the degree to which Spain has made progress in meeting its adaptation priorities since their definition. A comprehensive assessment of progress will be carried out in 2025.

Spain identifies governance and finance as the main barriers to adaptation but does not provide further detail on governance. The Commission's Structural Reform Support Programme is supporting a review of public spending on climate-change adaptation and risk-reduction policies.

Spain has been systematically working to detect and address these knowledge gaps, which can hinder action. It has, for example, launched cutting-edge analytic projects relating to complex and cascading hazards (such as the co-occurrence of wildfire, high temperatures and Saharan dust; and the impact of such a phenomenon on the energy system). The NAS includes clear objectives to improve knowledge on, for example, the impact of climate change on renewable energy production potential, on energy demand and on the functionality and resilience of energy infrastructure.

20-21. Updating vulnerability and risk assessments, and national adaptation policies

The NAS and the Climate Act require Spain to produce reports every 5 years on the evolution of climate-change risks and impacts and on policies to enhance resilience.

The groundwork for a new impact and risk assessment has begun, with three workshops involving social agents, civil society organisations, regional governments, and scientists to define its scope and methodology. This assessment, which takes into account the latest developments (such as cascading risks), is due to finish in 2025 and will inform the second, 2026-2030, NAP under the NAS.

Sectoral assessments focusing on impacts, vulnerability, risks, and adaptation are also being developed or updated.

This process is supported by a 'Guide for the assessment of risks associated with climate change', published in 2023, to provide clarity on risk-analysis terminology and general guidelines. This guide is intended to standardise results across different organisations and regions, addressing crucial aspects like territorial and social vulnerability, gender considerations, risk perception and social participation.

Conclusions. Spain intends to produce reports every 5 years on the evolution of climate-change risks and impacts and policies to enhance resilience. Sectoral assessments focusing on impacts, vulnerability, risks, and adaptation are also being developed or updated, supported by a 2023 guide.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Spain has many good practices in building climate-resilience, but no new examples were reported in 2023 (compared with 2021). The AdapteCCa platform continues to offer new good examples, such as eight new initiatives located in national parks and biosphere reserves.

Synergies are recognised between Spanish adaptation goals and practices, and the EU-level 2030 agenda and the UN Sustainable Development Goals (in particular SDG13 on climate action and SDG2 on resilient agricultural practices). The realisation of these synergies falls within the remit of the Spanish Office for Climate Change.

The synergies between the Spanish climate-change-adaptation framework and the Sendai Framework for Disaster Risk Reduction are secured through the participation of the Office as a member of the Spanish Committee for UNDRR.

In response to the new agendas of the United Nations Convention to Combat Desertification and the UN Convention on Biological Diversity, Spain has recently approved a 2030 Strategic Plan for Natural Heritage and Biodiversity and a National Strategy to Combat Desertification. Both instruments take climate-change adaptation into consideration.

A bilateral cooperation framework with Portugal has been set up to good governance practices relating to climate-change adaptation within the framework of the 2016-2021 LIFE SHARA project. The exchange of information on shared vulnerabilities and the identification of priorities for common actions between both countries has continued beyond the end of the LIFE project.

Spain remains active in the Ibero-American climate-change adaptation context, where it supports three well-established networks that bring together responsible persons in the water, weather and climate-change sectors: (i) the Conference of Ibero-American Directors of Water (CODIA); (ii) the Conference of the Directors of Ibero-American National Meteorological and Hydrological Services (CIMHET); and (iii) the Ibero-American Network of Climate Change Offices (RIOCC). These are forums for discussion, exchange of information and experience, and development of sectoral activities (including climate-change adaptation activities). Spain acts as the permanent secretariat and supports adaptation-related activities that are consistent with the countries' priorities.

The Spanish Cooperation Plan for Knowledge Transfer, Exchange and Management in Latin America and the Caribbean, which is carried out by the Spanish Agency for International Development Cooperation, also supports several climate-resilience actions.

Conclusions. Spain exploits synergies with international frameworks and actively cooperates across borders on climate adaptation. In addition to its bilateral collaboration with Portugal, Spain cooperates intensively with Latin American countries on climate resilience.

Section 6 - Subnational level information

25. Subnational governance structures for adaptation actions

Spain has several subnational networks in place that support climate-change adaptation. The structures were already in place in 2021. These networks include: (i) the Spanish Network of Cities for Climate, which includes 364 Spanish locallocal entities (over 60% of the Spanish population) (an increase on the 316 entities reported in 2021); (ii) the Pyrenean Climate Change Observatory, which brings together regions from Spain, France and Andorra; (iii) the Basque Network of Municipalities for Sustainability (an example of collaboration between regional and local authorities); whose platform includes highlighting good practices about adaptation

26-29. Subnational policies and cooperation

Several regional governments have, when exercising their competencies, developed their own strategic frameworks. New adaptation plans and programmes or laws have been initiated or completed. The regions that have approved new climate-change-adaptation instruments since 2021 are Andalucia, Canarias, Catalunya, Extremadura, Navarra, País Vasco and Comunitat Valenciana at the time of the 2023 reporting. Other regions are currently in the process of adopting new instruments on adaptation.

The regions have implemented good practices on systems to monitor adaptation strategies, incorporating elements like policy-coordination committees, participatory processes, scientific and technical committees, and integrated strategies to review and update subnational climate-change-adaptation plans, policies and measures.

Nearly all Spanish regions, as well as a number of municipalities, are participating in the Horizon EU Mission on Adaptation to Climate Change.

In terms of engagement with stakeholders in relation to adaptation policy, progress has been made since 2021 in relation to subnational activities to address aspects of climate justice, intersectionality, gender and children's vulnerability. Some of the good practices taken by the regions to engage with the private sector are carried out through participatory bodies (such as regional climate councils) and concern the design and monitoring of climate change policies.

Further information can be found on the AdapteCCA platform, which provides summary information on climate-change-adaptation policies developed at the regional level.

Furthermore, with regard to cooperation at subnational level, the regions support some international and cross-border cooperation initiatives to enhance adaptation at subnational level. These include several Interreg projects.

Conclusions. Spain has continued to promote regional climate-change initiatives since 2021 and a number of regions have adopted new adaptation measures. Subnational policies involve implementing monitoring systems and stakeholder engagement on climate justice, intersectionality, gender and children's vulnerability. Spain also has several subnational networks that support climate-adaptation measures.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↗
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	•
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	Y
	6. Have there been any changes to the national governance structures since 2021?	↗
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	↑

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	N
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	↑
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	●
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	?
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	?
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	↑
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25.Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	↑
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑

Assessment of progress towards adaptation in Sweden under the European Climate Law

Summary

Sweden has, since 2021, enhanced its efforts to address the imminent risks and challenges posed by climate change. It has deepened its understanding of vulnerabilities and risks in multiple sectors, such as agriculture, energy, and water management. The risks posed by heatwaves, floods, and droughts to these sectors and the environment have been thoroughly evaluated. The Rossby Centre at the Swedish Meteorological and Hydrological Institute (SMHI) has played an instrumental role by providing indispensable climate data.

The state agencies, county administrative boards (CABs) and a number of national authorities have carried out vulnerability assessments in compliance with Sweden's 2019 Adaptation Ordinance. This ordinance has facilitated the integration of climate adaptation into national sectoral work. Entities like the National Board of Housing, Building and Planning, and the Swedish Food Agency have been tasked with national climate-adaptation duties.

Sweden has implemented all the measures in the 2018 National Adaptation Strategy and a new strategy is expected to be introduced soon. An upward trend has been observed with more municipalities creating action plans for adaptation work and implementing climate-adaptation measures. Sweden has increased funding for municipalities for preventive measures against natural disasters such as landslides and floods, thus effectively reducing risks and increasing adaptive capacity.

Sweden has demonstrated a strong commitment to international scientific collaboration projects and adaptation initiatives, participating in projects such as the Coupled Model Intercomparison Project, the Coordinated Regional Climate Downscaling Experiment and the Copernicus Climate Change Service. Various Swedish cities and regions have also signed the Charter of the EU Mission for Adaptation to Climate Change.

Forestry remains a significant problem area. https://euc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-US&rs=en-IE&actnavid=eyJjIjo2ODg2NzcyODR9&wopisrc=https://eceuropaeu.sharepoint.com/teams/GRP-MSadaptationprogressassessment/_vti_bin/wopi.ashx/files/4a7b29ceea2b472892ede8701071e88b&wdenableroaming=1&mscc=1&hid=5F8CF1A0-500A-7000-A608-68C81F58577A&wdorigin=Outlook-Body.Sharing.DirectLink&wdhostclicktime=1700917744517&jsapi=1&jsapiver=v1&newsession=1&corrid=5d120306-10d4-4127-bf3a-133b4b5ea4ee&usid=5d120306-10d4-4127-bf3a-133b4b5ea4ee&sftc=1&cac=1&mtf=1&sfp=1&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush&rct=Normal&ctp=LeastProtected According to the Swedish Portal

for Climate Change Adaptation,[105] the changing climate entails new and increased risks of damage to Swedish forests, and therefore a the forestry sector needs to profoundly transform so that it becomes resilient to climate-change impacts, as well as better contributing to biodiversity protection. The CABs coordinate adaptation efforts regionally, with municipalities playing a pivotal role, backed by the Planning and Building Act and networks like the National Network for Adaptation. coordinate adaptation efforts regionally, with municipalities playing a pivotal role, backed by the Planning and Building Act and networks like the National Network for Adaptation.

Adaptation efforts in Sweden are to a large extent decentralised to sectoral, regional and local levels.

Detailed analysis

For ease of reference, the sections in the analysis below mirror those in the country reporting on national adaptation submitted in accordance with Article 19 of the Regulation on the Governance of the Energy Union and Climate Action. The numbering of the subsections inside the sections refers to the table on page 8 of this document, which lists the questions examined during the assessment of the individual Member States. The discussion of some of the questions was merged in the analysis below, but the related question numbers are still shown.

Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments

1. Climate monitoring and modelling framework

The main actor on climate monitoring, modelling, projections and scenarios is the Rossby Centre at the SMHI, which focuses on meteorological aspects. The SMHI's website[106] presents climate information free of charge in the form of maps, diagrams and downloadable data. It was updated in 2021 to include more models, introduce higher resolution and provide better data. No substantial changes have been reported to the main approaches, methodologies and tools, and associated uncertainties and challenges.

2-3-4. Changes to the reported vulnerabilities and risks since 2021

Climate Risk and Vulnerability Assessments

Sweden reported more than 15 key sectors affected by climate change in 2023. Since 2021, new sector-specific assessments have been conducted at a national scale in Sweden. Obligatory updating of risk assessments is enforced by national authorities in Sweden.

105 Swedish Portal for Climate Change Adaptation | Swedish portal for climate change adaptation (klimatanpassning.se)

106 https://www.smhi.se/en/climate/

Sweden focuses on international and cross-border risks as well as on cross-sectoral interactions, aiming at a 'systemic' understanding of vulnerability.

Innovative approaches to coupling national Climate Risk Assessments (CRAs) with monitoring, reporting and evaluation (MRE) systems are being developed in Sweden, with a view to moving towards a more continuous process. Sweden has established an online reporting mechanism for obligatory CRAs, which is overseen by the SMHI and reports on progress annually. Despite the progress that has been made, knowledge-gaps relevant to CRAs are reported as barriers to progress in Sweden's climate-change adaptation.

Climate change has a negative impact on agriculture due to challenges (including extreme weather events such as droughts, heatwaves and heavy rains) that can affect crops and threaten animal production and health. However, detailed information on the impact and likelihood of key hazards for agriculture and food is not available.

Sweden expects that climate change will have an impact on freshwater ecosystems. However, detailed information on the impact and likelihood of key hazards for water management is not available.

Vulnerabilities are described in 2023 for agriculture and food, biodiversity, business/industry, coastal areas, energy, finance and insurance, forestry, health, ICT, marine and fisheries, tourism, transport, land use planning, water management, cultural heritage, and reindeer husbandry, where no previous data were available in 2021. The risks have remained similar, but more detail has been provided for many sectors in 2023.

The most significant hazards reported by Sweden (drought, flooding and coastal flooding) are in line with those identified by the INFORM climate-change tool.

Heatwaves have been identified as a significantly increasing climate hazard.

Sweden's 2019 Adaptation Ordinance requires local authorities to complete risk and vulnerability assessments, which should be updated in the case of significant changes and, in any case, at least every 5 years. The authorities are also required to complete adaptation action plans, which should be also updated in the case of significant changes and, in any case, at least every 5 years.

Conclusions. Sweden has a solid legal basis for conducting Climate Risk and Vulnerability Assessments. New sector-specific assessments have been conducted at national level since 2021. Sweden reported more than 15 key sectors affected by climate change in 2023.

Section 2 - Legal and policy frameworks and institutional arrangements

Legislation and regulatory measures

5-6. National governance structures supporting adaptation actions

Sweden's governance systems involve decentralisation to sectoral, regional, and local authorities, which then report to central coordinating bodies. Sweden has statutory requirements for

subnational adaptation-planning derived from the national Climate Law and other central legislation. The Adaptation Ordinance requires sectoral agencies and CABs to draw up adaptation action plans and monitor the municipalities' adaptation work. The Planning and Building Act provides legislative guidance for and imposes requirements on municipalities.

Notwithstanding Sweden's established coordination mechanism, institutional arrangements, and legal regimes for adaptation, it has reported substantial challenges related to the governance of adaptation (particularly in terms of institutional coordination, and financial, technical and human capacities).

State agencies (including the CABs) complete and continuously update vulnerability assessments within their areas of responsibility and within their missions, in accordance with the Adaptation Ordinance.

As proposed in the national adaptation strategy, the government has established the Expert Council on Climate Adaptation as a scientific advisory body on adaptation plans.

The Adaptation Ordinance regulates the work of 32 agencies and all CABs on matters related to climate-change adaptation. It also ensures that adaptation is mainstreamed into the work of sectoral national authorities, for instance:

- the National Board of Housing, Building and Planning, which coordinates national climate-change adaptation work for the built environment.
- the Swedish Food Agency, which is responsible for national coordination of drinking water, especially as regards adaptation to climate change.

There have been no major changes to the national governance structures since 2021.

Conclusions. State agencies, including the CABs, complete and continuously update vulnerability assessments within their areas of responsibility and within their missions, in accordance with the Adaptation Ordinance. Despite a well-established governance framework, there are governance challenges in Sweden (particularly in terms of institutional coordination, and financial, technical and human capacities).

Section 3 - Adaptation strategies, policies, plans and goals

7-8-9. Correlation of adaptation efforts with the identified vulnerabilities and risks, change in the reported challenges

The 2018 NAS states that adaptation measures should be taken within several sectors and geographic areas. The seven priority areas are:

- landslides and erosion that threaten communities, infrastructure and businesses;
- flooding that threatens communities, infrastructure and businesses;
- high temperatures that involve risks for the health and wellbeing of people and animals;
- water-supply shortages for individuals, agriculture and industry;

- biological and ecological impacts that affect sustainable development;
- the impact on domestic and international food production and commerce;
- increased incidence of pests, diseases and invasive non-native species that affect people, animals and plants.

These priority areas correspond to the identified vulnerabilities and risks.

A 2022 report by Sweden's Expert Council on Climate Adaptation identified the latest challenges to and gaps in adaptation work. This should help Sweden update its NAS in 2023. The report does not indicate a decrease in the reported challenges, gaps and barriers.

10. Nature-based solutions in national adaptation policies

Nature-based solutions and ecosystem-based adaptations are not specifically mentioned in the NAS and NAP However, they are mentioned at the sectoral adaptation plan produced by the Environment Protection Agency in 2019.

11. Integration of adaptation into sectoral policies

Several sectoral adaptation policies have been updated since 2021. The Adaptation Ordinance requires the above-mentioned 32 agencies and all 21 CABs to initiate, support and evaluate work in climate-change adaptation. Furthermore, all national authorities, municipalities and regions are legally required to carry out a risk and vulnerability analysis.

Integration of adaptation in the forestry sector should be a specific target.

12. Engagement of stakeholders vulnerable to climate change impacts

The SMHI's annual follow-up of the authorities' work on climate adaptation shows, according to the Swedish regulation on climate change, that most authorities involve external stakeholders in their work on climate adaptation. The indigenous Sámi people are considered to be particularly vulnerable to climate change. The importance of existing collaboration with the Sámi is particularly highlighted by one county board and the Sámi parliament. There is otherwise little information on the engagement of vulnerable stakeholders, its extent and its impact on policy and implementation.

13. Engagement of private-sector stakeholders

No progress in engagement of private-sector stakeholders has been reported in 2023, as compared with 2021.

Several climate-change adaptation initiatives, carried out by private-sector stakeholders (e.g., the Swedish Property Federation, Swedish Water and Insurance Sweden) have been reported (e.g. "A changing climate for business" project and the Gradvis Project). These usually involve industry collaborating with public authorities, academia, and NGOs).

Conclusions. Sweden intends to update its NAS in 2023. Climate-change adaptation initiatives, carried out by the Swedish industry in cooperation with public authorities, academia and NGOs,

are reported. The adaptation needs of the Sámi, who are considered to be particularly vulnerable to climate change climate, have been recognised.

Section 4 - Monitoring and evaluation of adaptation actions and processes14. Monitoring mechanisms

14. Monitoring mechanisms

The National Expert Council on Climate Adaptation has been tasked with submitting a report to the government every 5 years as support for the revision of the NAS. This report includes suggestions for the direction of national adaptation; work prioritisation of adaptation action (based on an assessment of risk, cost and benefits); analysis of the impacts of climate change on society; monitoring and evaluation of national adaptation work.

The Expert Council submitted its first report in February 2022. The government is considering a proposal to evaluate and monitor the adaptation work.

15. Implementation of adaptation measures and financing

Sweden has made substantial progress in implementing adaptation actions and plans, especially since 2018, when the NAS was adopted. According to the SMHI's follow-up of climate-adaptation work, the authorities are working on all the prioritised challenges. Most measures relate to flooding, landslides, and erosion. The government is expected to present a new NAS with updated adaptation measures in 2023. Forestry remains a significant problem area. A radical transformation of the forestry sector to make it climate-resilient still needs to take place. There is scope to put climate resilience considerations more to the forefront in Sweden's use of EU support from the common agricultural policy and cohesion policy funding.[107]

16-19. Reducing climate impacts, vulnerabilities, and risks; increasing adaptive capacity; meeting adaptation priorities; and addressing barriers.

A 2021 report from the Swedish Geotechnical Institute and the Swedish Civil Contingencies Agency identified the 10 geographical areas in Sweden that are most vulnerable to landslides, mudslides, erosion, and flooding.

The significant increase in governmental funding for preventive measures related to landslides, flooding and other natural accidents is a good basis for actions to reduce identified risks and vulnerabilities. As a part of their annual reporting, national and regional authorities are asked to describe the barriers to adaptation that they have identified. The answers are analysed in the SMHI's annual report to the government. The first of these annual reports, which was published in 2020, found that the identified barriers were connected to lack of resources, insufficient knowledge, and decision-making support, and insufficient or unclear legislation.

[107] Sweden intends to invest ca 25 million EUR in climate change adaptation from EU cohesion policy funding in 2021-2027 (EU contribution).

20-21. Updating vulnerability and risk assessments; and national adaptation policies

Since the adoption of the Adaptation Ordinance, the number of authorities that have conducted climate and vulnerability analyses has increased from 32 in 2019 to 44 in 2021.

Conclusions. Sweden has made substantial progress in implementing adaptation actions and plans, especially since the adoption of the 2018 NAS. Government funding of preventive measures related to landslides, flooding and other natural accidents has increased.

Section 5 - Cooperation, good practices, synergies with international frameworks, experience and lessons learned in the field of adaptation

22-24. Cooperation, good practices, synergies with international frameworks, experience and lessons learned

Transnational adaptation and EU involvement.

Sweden anticipates that climate-related extreme events could have an impact on the availability of renewable energy.

No information has been provided on 'good practices and lessons learned'.

No new synergies have been identified with other international frameworks and/or conventions compared with 2021.

Sweden participates in various projects and programmes to improve the science behind adaptation. These include the Coupled Model Intercomparison Project and the Coordinated Regional Climate Downscaling Experiment, for which the SMHI hosts the international project office on behalf of WCRP). Swedish researchers and institutes have also provided climate information to international initiatives such as the Copernicus Climate Change Service. Examples of international climate services are climateinformation.org, which the SMHI has developed under the auspices of the Green Climate Fund.

Sweden is also contributing with research through the EU's Horizon programme. The SMHI and Swedish universities are partners in a broad range of climate-related Horizon projects, partly as coordinators.

Conclusions. Sweden participates in various projects and programmes to improve the science behind adaptation. Sweden anticipates potential changes in the availability of renewable energy due to climate-related extreme events.

Section 6 – Subnational level information

Subnational and private-sector adaptation

25. Subnational governance structures for adaptation actions

Adaptation efforts in Sweden are to a large extent decentralised to regional and local levels.

The CABs are tasked with coordinating adaptation at regional level and ensuring that the national targets are achieved. At the local level, the municipalities play an important role in adaptation because they are responsible for physical planning and infrastructure for water, the emergency services, health and social care, schools, and childcare. The Planning and Building Act provides legislative guidance on the role of municipalities.

Several networks in Sweden work on various issues involving climate-change adaptation (e.g. the National Network for Adaptation). At regional level, the CABs work closely together and are also part of the National Network for Adaptation. The CABs in Skåne and Halland, the Swedish Geotechnical Institute and the Geological Survey of Sweden have formed the Regional Coastal Cooperation in Skåne/Halland. The Swedish Association of Local Authorities and Regions (SKR) supports the municipalities' climate-change adaptation work by, for example, participating in various networks.

Many municipalities and regions have reported that they have carried out subnational adaptation measures in conjunction with the NAP/NAS or other adaptation-related programmes. 41% of municipalities had developed adaptation action plans in 2021 (30% in 2017). 67% of municipalities had carried out climate-adaptation measures in 2021 (59% in 2017) and 73% of municipalities planned to carry out climate-adaptation measures in 2021 (62% in 2017). Funding for municipalities for preventive measures against landslides, flooding and other natural events increased between 2021 and 2022.

26-29. Subnational policies and cooperation

In 2022, the SMHI updated the adaptation guidelines for municipalities, which also cover legal points. The SMHI also provides methodological support as part of capacity-building for municipalities.

Several Swedish cities and regions are signatories to the Charter of the EU Mission on Adaptation to Climate Change: Blekinge Region, Gothenburg Metropolitan Area, Kristianstad Municipality Malmö, Stockholm County Administration Board, Umeå Municipality, Värmland County and Västerbotten County.

Conclusions. There is a positive trend regarding climate-adaptation work at regional and local levels, both in terms of adaptation strategies and plans and for the implementation of concrete adaptation measures.

Overview table

KEY	↑	↗	•	Y	P	N	?
	Progress	Partial progress	No progress	Yes	Partially	No	Unclear

	Assessment question	Rating
Section 1 - National circumstances relevant to adaptation actions, climate monitoring and modelling framework, Climate Risk and Vulnerability Assessments	1. Have there been any changes to the climate monitoring and modelling framework since 2021?	↑
	2. Has the Member State considered the following sectors as a key affected sector: agriculture and food, and water management?	Y
	3. Have there been any changes to the reported vulnerabilities and risks since 2021?	↑
	4. Based on the INFORM climate change tool, have all relevant vulnerabilities and risks been identified in their 2023 submission?	Y
	4a. Are heatwaves identified as a future climate hazard by the Member State?	Y
Section 2 - Legal and policy frameworks and institutional arrangements	5. Are there relevant national governance structures in place to support adaptation actions?	P
	6. Have there been any changes to the national governance structures since 2021?	•
Section 3 - Adaptation strategies, policies, plans and goals	7. Are the adaptation priorities, strategies, policies, plans, and efforts taken by the Member State correlated with the vulnerabilities and risks identified? Are they well aimed to reduce these?	Y
	8. Is there a decrease in the 2023 reported challenges, gaps and barriers to adaptation compared to 2021?	•
	9. Are there any new key efforts identified in national strategies, polices and plans? Are these new efforts in line with any new vulnerabilities and risks identified?	•

	10. Are nature-based solutions and ecosystem-based adaptation promoted in national strategies, policies and plans?	N
	11. Has progress been made in integrating climate change adaptation into sectoral policies, plans and programmes?	Y
	12. Has progress been made engaging with stakeholders particularly vulnerable to climate change impacts in relation to adaptation policy?	↑
	13. Has progress been made engaging with private sector stakeholders in relation to adaptation policy?	●
Section 4 - Monitoring and evaluation of adaptation actions and processes	14. Has progress been made in establishing and operationalising monitoring mechanism since 2021?	↑
	15. Has progress been made in the implementation of adaptation measures?	↑
	16. Has progress been made towards reducing climate impacts, vulnerabilities, and risks?	↗
	17. Has progress been made towards increasing adaptive capacity?	↑
	18. Has progress been made in meeting adaptation priorities?	↑
	19. Has progress been made in addressing barriers to adaptation?	↑
	20. Has progress been made in reviewing and updating vulnerability and risk assessments?	↑
	21. Has progress been made in reviewing and updating national adaptation policies, strategies, plans, and measures?	↑
Section 5 - Cooperation, good practices, synergies, experience and lessons learned in the field of adaptation	22. Are there any new 'good practices and lessons learnt' compared to 2021?	●
	23. Are there any new synergies identified with other international frameworks and/or conventions compared to 2021?	●
	24. Has progress been made with regards to cooperation?	↑

Section 6 - Subnational level information	25. Are relevant subnational governance structures in place to support adaptation actions?	Y
	26. Are there any new key efforts identified in sub-national strategies, polices, plans and efforts?	•
	27. Has progress been made in engaging with stakeholders in relation to adaptation policy?	↑
	28. Has progress been made in reviewing and updating subnational adaptation policies, strategies, plans, and measures?	↑
	29. Has progress been made with regards to cooperation at a subnational level?	↑