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Climate Stress and EU Cohesion

Strengthening European Resilience through Climate Adaptation

Ron Stoop and Laura Birkman

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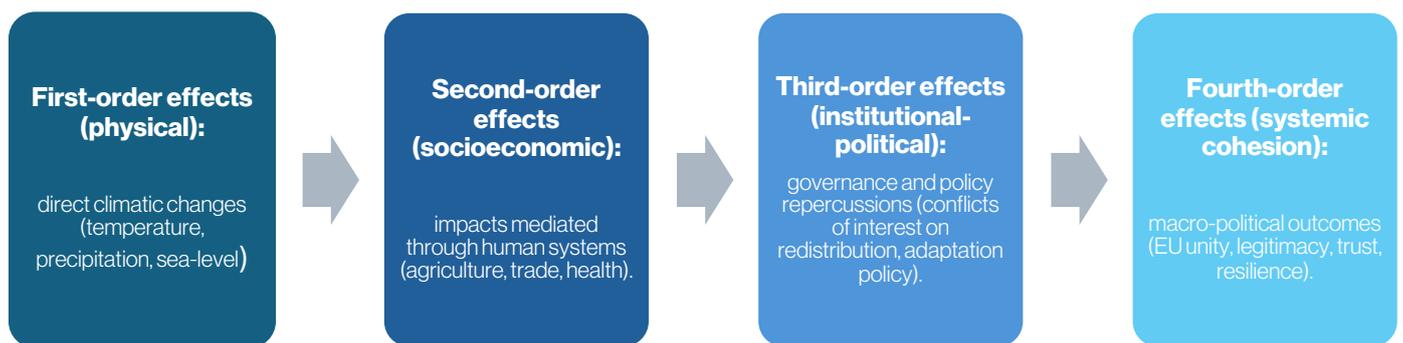
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Executive Summary

As climate change accelerates, societies and economies across the world are experiencing profound impacts. Europe, being the fastest warming continent, is particularly affected by rising temperatures, more frequent and severe drought, sea level rise and unexpected weather patterns.¹ However, the direct and indirect effects of climate change are not evenly distributed across the continent. This uneven impact reinforces existing structural disparities and creates new inequalities within Europe, generating divergent priorities among EU Member States, and straining political cohesion. Over time, such divergence risks weakening the Union's collective preparedness and coordination, thereby undermining Europe's overall security. In the current geopolitical context, this constitutes a strategic vulnerability that must be mitigated.

This study examines how an uneven geographical distribution of the socio-economic impacts of climate change could create conflicts of interest between EU Member States, potentially undermining the Union's political, economic and strategic resilience. It does so by mapping cascading climate impacts across a hierarchy of effects. First-order effects refer to the direct physical impacts of climate change, which cascade into second-order effects: the socio-economic consequences of these climate hazards. These, in turn, may generate third-order effects in the form of political conflicts of interest arising from unequal socio-economic impacts. Over time, such escalating tensions can weaken the systemic political and economic cohesion of the European Union.

Figure 1: Framework for assessing impact of climate change on systemic cohesion in the EU



Analysis of the main climate hazards and their geographical distribution shows that the impacts of heat, drought and wildfires will predominantly affect Southern and Southeastern EU Member States, while the impacts of (coastal) flooding are more widely distributed, also affecting Central and Northern Europe. These climate hazards result in socio-economic impacts across four categories. The food sector is impacted via falling crop and livestock yields. The infrastructure sector is hit through damaged buildings, roads, rail, waterways and energy

¹ World Meteorological Organization, 'European State of the Climate : Extreme Events in Warmest Year on Record', World Meteorological Organization, 14 April 2025, <https://wmo.int/news/media-centre/european-state-of-climate-extreme-events-warmest-year-record>.

systems. The human health sector is affected through increasing heat fatalities, displacement of people, the proliferation of vector-borne diseases and increasing mental health challenges. Finally, lower productivity, disrupted supply chains, falling tourism revenues, and uninsured losses manifest in the broader economy and financial sector. Most of these effects will be felt more acutely in Southern Europe, where climate hazards are generally more pronounced.

In addition to being more severely hit by climate change, Southern EU Member States are also more vulnerable to its socio-economic consequences due to comparatively weaker capacity in economic, social and governance domains than Northern and Western EU Member States. Moreover, a broader gap exists across Europe in effectively addressing climate hazards. States often fail to adequately respond to climate emergencies, exposing weaknesses in emergency response mechanisms. Furthermore, long-term adaptation efforts across Europe fall short of what is required to prevent and manage future climate risks. The unequal socio-economic impacts of climate change amplify conflicts of interest between EU Member States. The *transfer payment conflict* pits wealthier, less-affected states against poorer, more hazard-prone members seeking greater financial support. The *policy priority conflict* reflects diverging national priorities between adaptation funding and other spending priorities, such as direct farmer payments, defence spending or resistance to increased climate spending. Finally, the *status quo versus long-term resilience conflict* highlights the persistent tension between short term 'business as usual' responses to climate hazards and structural adaptation, thereby undermining collective EU coherence and effectiveness. Together, these growing conflicts of interest will complicate EU decision-making, erode political cohesion and, over time, weaken the Union's capacity to respond effectively to civil and military crises.

Figure 2: Emerging EU Conflicts of interest as a result of climate change



Intra-EU financial transfers

1. Conflicts of interest on the size of the EU budget and the size of the EU cohesion funds to offset climate damages.
2. Conflicts of interest over the strictness of EU fiscal policy and the usage of common debt instruments to shoulder economic climate impacts.
3. Conflicts of interest on burden sharing of increasing irregular EU migration and asylum seekers as a result of climate change.
4. Conflicts of interest on the degree of EU-wide disaster relief and insurance as climate change costs mount.

Climate ambition vs. competing policy

5. Conflicts of interest on the direction of the EU Common Agricultural Policy as climate change disrupts the agricultural sector.
6. Conflicts of interest on the degree to which climate policy should be prioritised.
7. Conflicts of interest on the degree to which defence spending should be prioritised over climate spending.

Protecting existing systems vs. investing in long-term resilience

8. Conflicts of interest between local/regional/national actors resisting adaptive practices as climate pressures mount.
9. Conflicts of interest between actors resorting to climate coping practices that harm long-term resilience and the rest of society.
10. Conflicts of interest between actors that retain business-as-usual rebuilding practices after climate hazards and actors pushing for new approaches.

Climate adaptation as a foundation for EU cohesion and stability

Opportunities exist to ease some of these conflicts of interest by reducing the physical and socio-economic impacts of climate change across Europe. Targeted adaptation measures can help vulnerable EU Member States better withstand escalating climate hazards, thereby limiting economic damages and infrastructure disruption and social instability.

By safeguarding critical infrastructure, transport corridors and energy systems, adaptation supports broader EU objectives, including economic security and military readiness. Lower economic losses and fewer supply chain disruptions enhance political cohesion and protect the military-logistic backbone and defence industrial production capacity.

The Netherlands is already engaged in adaptation projects across Europe through initiatives such as SALAD (salt-tolerant crops), SpongeWorks (nature-based water solutions), Delft-FEWS (flood forecasting) and REST-COAST (coastal delta restoration). These projects address climate hazards such as droughts, flash floods, river flooding and coastal erosion. However, a significant gap remains between current efforts and what is required to ensure continent-wide resilience to the effects of climate change. The five areas identified below present the most promising domains in which the Netherlands can contribute at EU level. Building on its established expertise in water management, coastal protection, and climate-resilient agriculture, the Netherlands can scale proven approaches that demonstrably reduce climate risks and strengthen resilience.

- 1. Crop breeding innovation in agriculturally reliant, vulnerable EU-regions.** Europe should expand research and implementation of climate-resilient crop varieties, particularly those adapted to heat, drought and salinisation. This expansion should focus on transferring and implementing existing and newly developed innovations to regions that are both heavily dependent on agriculture and where coping and adaptation capacity are lower, such as Southern and Southeastern Europe. Dutch institutes and businesses are well positioned to support the development of resilient crops and improving local agricultural practices. Dutch research institutions and private partners can help reduce vulnerability to climate-induced yield losses.
- 2. Controlled agriculture and horticulture in regions suffering most from heat and extreme weather.** Europe should promote the wider adoption of controlled-environment agriculture, building on its advanced greenhouse sector. This includes expanding greenhouse automation and resource-saving technologies in areas expected to experience severe heat stress, such as Southern and Southeastern Europe. The Netherlands can expand its role in these efforts. Dutch pilot projects in energy-efficient and water-saving greenhouse systems can serve as a model for sustainable agricultural adaptation, reducing water dependence and stabilising food production yields under increasingly volatile climate conditions.
- 3. Climate-smart livestock practices in vulnerable regions with significant livestock-related income.** Europe should stimulate knowledge exchange and cooperation in creating sustainable livestock systems in countries where livestock is a major part of the economy, and which are strongly affected by climate stress. Cooperation could focus on heat-tolerant breeds and improved animal housing systems. By assisting vulnerable regions, such as Spain and Greece, the Netherlands can help build resilience in this sector.

4. **River and flood system reinforcement in vulnerable regions which suffer from high flood damages.** Europe should expand its implementation of water management to strengthen river and flood systems across Europe. Measures such as floodplain restoration, natural retention areas, and adaptive infrastructure can reduce both fluvial and flash flood risks. By using historical flood data and risk mapping, Dutch experts can help identify and strengthen the most vulnerable river basins and coastal floodplains, especially in countries that have experienced severe flood damage in recent years, such as Germany, Spain, Italy and Greece.
5. **Port and urban adaptation in vulnerable coastal areas with large populations and economic assets.** Europe should increase resilience in its ports and coastal cities. This includes mapping erosion-prone areas and anticipating infrastructural and agricultural risks from sea-level rise and salinisation. The Netherlands could e.g. help to expand the implementation of nature-based solutions across Europe. Strategies include cultivating salt-tolerant crops, redesigning urban drainage and dike systems, and protecting key infrastructure from inundation. Collaborative projects with vulnerable coastal countries can significantly reduce economic losses and enhance long-term resilience across the EU.

Strategic opportunities through the new EU budget

Beyond specific sectoral interventions, stronger and more institutionalised EU coordination on climate adaptation is needed. The proposed 2028 to 2034 EU budget consolidates funding into several large instruments covering cohesion, competitiveness, infrastructure, research, external action, and crisis response. Climate and environmental spending is set at 35% of the roughly €2 trillion framework, amounting to nearly €700 billion, despite the discontinuation of the dedicated LIFE programme.² While substantial, much of this funding is expected to prioritise mitigation linked to industrial competitiveness. Without adequate prioritisation of adaptation, vulnerability to climate impacts will persist, potentially undermining both economic security and mitigation gains.

Despite these challenges, the upcoming EU budget presents a strategic opportunity for the Netherlands to strengthen economic resilience through climate adaptation investment. Across the various programmes, the Netherlands could potentially mobilise €20-30 billion in climate and environmental funding (see Table 1). Although a significant share will go to climate mitigation and nature restoration, part of this envelope could support adaptation-related technologies, particularly in agriculture and water management.

² European Commission, 'Supporting Climate Action through the EU Budget - Climate Action', accessed 12 February 2026, https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/supporting-climate-action-through-eu-budget_en.

Table 1: Opportunities for Dutch adaptation programmes in the 2028-2034 MFF Framework

MFF Fund/ instrument	Climate– Environment share of budget*	Potential Dutch share of allocation**	Access Pathway	Example project types for NL Specialisations
National & Regional Partnership Plans (NRP Fund)	€372 bn	€5–10 bn	Multiannual national plan	<ul style="list-style-type: none"> • River & flood reinforcement. • Port & coastal adaptation. • Deployment of resilient crops, greenhouses & livestock systems
European Competitiveness Fund	€101 bn	€6–8 bn	Project calls	<ul style="list-style-type: none"> • Scaling crop breeding innovation for drought/salinity tolerance. • Greenhouse automation & energy-efficient systems. • Precision livestock technologies. • Industrial water-tech and coastal engineering solutions positioned as strategic clean-tech industries.
Connecting Europe Facility	€57 bn	€2–3 bn	Project calls	<ul style="list-style-type: none"> • Climate-proofing ports and TEN-T corridors. Flood-resilient transport nodes. • Coastal protection of trade hubs. • Reinforcement of energy grids exposed to climate risks.
Research & Innovation (successor to Horizon Europe)	€70 bn	€5–6 bn	Project calls	<ul style="list-style-type: none"> • R&D on heat- and salt-tolerant crops. • Mediterranean greenhouse pilot systems. • Methane-reducing livestock systems. • Digital water modelling, risk mapping, and adaptation analytics.
Civil Protection & Crisis Response	€10.7 bn	€0.4–0.6 bn	Project calls	<ul style="list-style-type: none"> • Flood early-warning systems. • Cross-border river basin coordination. • Risk mapping tools. Emergency flood response capacity building.
External Action ("Global Europe")	€60 bn	Project-based	International tenders / partnerships	<ul style="list-style-type: none"> • Export of Dutch agri-tech, crop breeding support. • Water governance advisory services and coastal adaptation solutions to EU neighbourhood countries.

Source: Policy Department for Transformation, Innovation and Health, Directorate-General for Economy, Transformation and Industry, European Commission³, European Parliament.⁴

* based on climate-environment share of total draft budget⁵

** Dutch share based on average of Dutch share of EU population, GDP and historical budget allocation patterns

³ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Amending Council Regulation (EC) No 1224/2009, and Amending Council Regulations (EC) No 768/2005, (EC) No 1967/2006, (EC) No 1005/2008, and Regulation (EU) No 2016/1139 of the European Parliament and of the Council as Regards Fisheries Control (2018), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52018PC0368>. European Commission, 'REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Establishing the European Competitiveness Fund ('ECF'), Including the Specific Programme for Defence Research and Innovation Activities, Repealing Regulations (EU) 2021/522, (EU) 2021/694, (EU) 2021/697, (EU) 2021/783, Repealing Provisions of Regulations (EU) 2021/696, (EU) 2023/588, and Amending Regulation (EU) [EDIP]', 16 July 2025, <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX-%3A52025PC0555>.

⁴ European Parliament, 'National and regional partnership plans, European territorial cooperation and EU facility 2028-2034 | Think Tank | Parlament Europejski', 16 January 2026, [https://www.europarl.europa.eu/thinktank/pl/document/EPRS_BRI\(2026\)782606](https://www.europarl.europa.eu/thinktank/pl/document/EPRS_BRI(2026)782606). European Parliament, '2028-2034 MFF: Civil Protection, Preparedness and Crisis Response | Think Tank | European Parliament', 15 December 2025, [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2025\)774713](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2025)774713).

⁵ Till Eichler, 'The 2028–2034 EU Long-Term Budget: What's in It for Climate?', Heinrich Böll Stiftung, Heinrich Böll Stiftung, November 2025, <https://eu.boell.org/en/2025/11/20/2028-2034-eu-long-term-budget-whats-it-climate>.

These funds are for the most part not guaranteed but must be obtained via competitive calls. Without pro-active coordination, Dutch stakeholders risk underutilising available resources. A clear funding acquisition strategy should therefore be incorporated into the 2026 update of the Dutch National Adaptation Strategy (NAS). Additionally, it would be valuable to have a single Dutch administrative body that could strengthen coordination and maximise access to EU funding for strategic relevant adaptation technologies.

At EU-level, climate adaptation funding remains fragmented across instruments and allocation shares are not guaranteed. As a result, it is unclear which projects are being implemented, how they are followed up, what outcomes are achieved, and which next steps are planned. Moreover, climate adaptation efforts remain unevenly distributed across the Union, with some countries far more active than others. Repeated calls have therefore been made for a more coherent EU adaptation framework. One option would be to further institutionalise climate adaptation governance, for example by strengthening or expanding a central coordination mechanism to reduce fragmentation, improve strategic direction, and support implementation across EU Member States. The existing EU Mission on Climate Adaptation, with its voluntary cooperation structure and implementation support, makes it a practical foundation and suitable starting point for such institutional strengthening.

1. Introduction

1.1. Context

With Europe as the fastest warming continent, climate change poses significant risks to the economic structure of the EU.⁶ Recent evidence shows that climate extremes are increasing in frequency and severity, and in several cases advancing faster than scientists had anticipated.⁷ Attribution studies confirm the strengthening link between extreme weather events and climate change.⁸ In 2019, the European Parliament declared a climate and environmental emergency.⁹ Since then, the frequency and impact of extreme weather events have increased, the energy transition does not progress as quickly or smoothly as expected, and climate policy has become a polarising issue in European and national elections. Diverging national interests sometimes limit the EU's ability to act swiftly or decisively. Yet the Union's collective strength is vital for its role on the global stage, particularly as geopolitical power becomes increasingly concentrated in the United States and China.¹⁰ For the EU to develop into a significant global actor, it must maintain internal cohesion and the capacity to take timely and effective decisions.

Most economic activities and infrastructure are directly influenced by natural conditions such as temperature, precipitation and other weather events. Although the implications of climate change for the EU economy are well documented, its political consequences remain insufficiently explored. The impacts of climate change are unevenly distributed across regions, sectors and population groups. This uneven distribution can fuel conflicts of interest within the EU, potentially undermining social cohesion and stability across Europe. At the same time, it may also create opportunities for enhanced cooperation among EU Member States.

⁶ 'Climate Change Impacts, Risks and Adaptation', 10 June 2025, <https://www.eea.europa.eu/en/topics/in-depth/climate-change-impacts-risks-and-adaptation>.

⁷ Kai Kornhuber et al., 'Global Emergence of Regional Heatwave Hotspots Outpaces Climate Model Simulations', *Proceedings of the National Academy of Sciences* 121, no. 49 (2024): e2411258121, <https://doi.org/10.1073/pnas.2411258121>.

Piers M. Forster et al., 'Indicators of Global Climate Change 2024: Annual Update of Key Indicators of the State of the Climate System and Human Influence', *Earth System Science Data* 17, no. 6 (2025): 2641–80, <https://doi.org/10.5194/essd-17-2641-2025>.

⁸ Daniel L. Swain et al., 'Attributing Extreme Events to Climate Change: A New Frontier in a Warming World', *One Earth* 2, no. 6 (2020): 522–27, <https://doi.org/10.1016/j.oneear.2020.05.011>.

⁹ European Parliament, 'The European Parliament Declares Climate Emergency', 29 November 2019, <https://www.europarl.europa.eu/news/en/press-room/20191121IPR67110/the-european-parliament-declares-climate-emergency>.

¹⁰ Brookings, 'Balancing Act: Major Powers and the Global Response to US-China Great Power Competition', *Brookings*, July 2020, <https://www.brookings.edu/articles/balancing-act-major-powers-and-the-global-response-to-us-china-great-power-competition/>.

1.2. Research questions and analytical framework

This study examines the relationship between climate change and political cohesion and stability in the EU. These concepts are linked through a series of cascading effects, which are explored throughout the analysis. The study investigates where the impacts of climate change are likely to be felt most strongly, how such asymmetries may shape Member States' preferences, and what this could mean for the Union's capacity to act collectively. Ultimately, the analysis seeks to assess whether climate change is more likely to strengthen or weaken the EU's ability to function as a coherent political entity capable of shaping its own future. It also considers policy options for the Netherlands and Europe to prevent or mitigate these negative consequences through cooperation, particularly in the areas of food and water, where the Netherlands has substantial expertise.

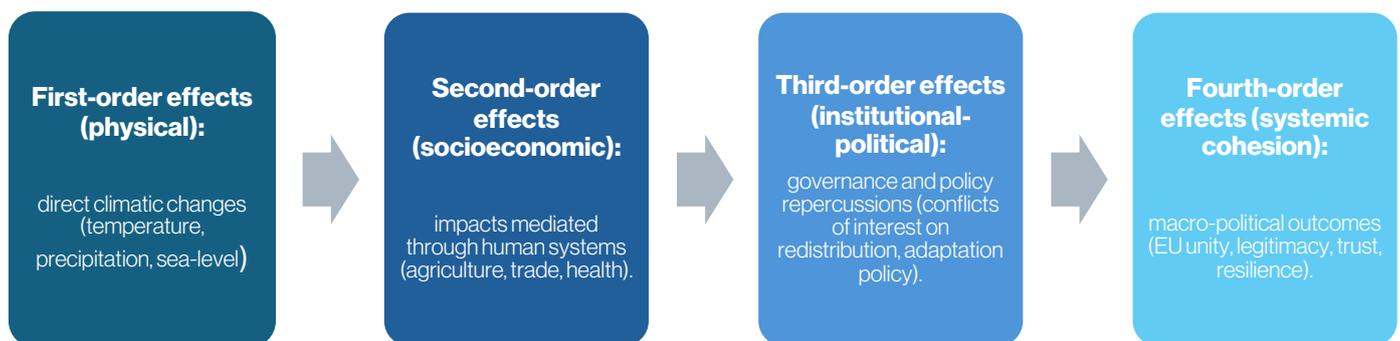
The analysis is structured by the following research questions and approaches:

- 1. Climate effects and geographical distribution.** What are the most important climate risks and impact in Europe? Which regions or EU Member States are affected by specific climate-related risks or impacts, and to what extent?
These questions are dealt with in Chapter 2 through a literature review that maps the most important climate risks. These risks are then further operationalised using a set of variables that act as proxies. This combination of qualitative and quantitative data provides insights into the nature of the climate risks and their geographical distribution.
- 2. Sectoral distribution effects.** How do these geographically uneven climate risks and impacts affect different sectors in the EU?
These questions are dealt with in Chapter 3 through a literature review that identifies the most significant sectoral effects of climate risks in Europe. The analysis augmented by quantitative and qualitative indicators, providing insights into the resilience of EU Member States and their ability to counteract sector-specific climate risks. This approach results in an overview of sectoral climate impacts by country, as well as the ability of each country to adapt to climate change.
- 3. Conflicts of interest.** What (potential) conflicts of interest arise from the uneven distribution of the climate risks and impacts across various sectors, and how might these affect cohesion and stability within the EU?
These questions are dealt with in Chapter 4 through a mapping of the most prominent conflicts of interest at the EU policy level, as well as an analysis of how the identified sectoral climate risks may influence these conflicts of interest.
- 4. Policy options space.** What options exist for the Netherlands and/or Europe to address water availability and food production challenges through enhanced cooperation within the EU?
This research question is dealt with in chapter 5 by mapping potential adaptation pathways to mitigate the effects of climate change. The focus is on Dutch capabilities and on identifying pathways through which the Netherlands can help reduce conflicts of interests within the EU via sector-specific adaptation strategies.

As such, this study applies a 'hierarchy of effects' to explain the impact of climate change on political cohesion in the EU (see also Figure 1):

1. First-order effect (physical): direct climatic changes (temperature, precipitation, sea-level). These effects include both sudden (fast-onset) events like floods and heatwaves, but also gradual (slow-onset) processes such as sea-level rise or shifting climate zones.
2. Second-order effects (socio-economic): the direct physical impacts mediated through human systems (agriculture, trade, health). Examples include reduced agricultural yields, shifts in tourist seasons or disruptions in manufacturing supply chains.
3. Third-order effects (institutional/political): governance and policy repercussions (conflicts of interest such as redistribution disputes, adaptation policy conflicts) as a result of the cascading socio-economic impacts of climate change in the political and institutional domains.
4. Fourth-order effect (systemic cohesion): macro-political outcomes (EU unity, legitimacy, trust). The fourth order effects are conceptualised as the impacts on the political cohesion in the EU as a whole.

Figure 3: Framework for assessing impact of climate change on systemic cohesion in the EU



The literature on measuring the societal impacts of climate change has developed a set of concepts to estimate future impacts. Examples include the World Risk Index and the IPCC framework for assessing impacts.¹¹ For the purposes of this study, the World Risk Index framework is used as a basis, since it better allows for assessing the social and political implications of climate hazards. Additionally, conflict of interest and political cohesion have been defined to identify these concepts in the later part of the study. Based on this framework, the following concepts are used:

¹¹ Joern Birkmann and Torsten Welle, '(PDF) The World Risk Index – An Approach to Assess Risk and Vulnerability on a Global Scale', September 2015, https://www.researchgate.net/publication/283087679_The_World_Risk_Index_-_An_Approach_to_Assess_Risk_and_Vulnerability_on_a_Global_Scale.
IPCC, 'Chapter 1: Point of Departure and Key Concepts', 2022, <https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-1/>.

Table 2: Terms and definitions of concepts

Term	Definition
Hazard	A potentially damaging physical event or climate process (e.g. drought, flood, storm, heatwave).
Exposure	The presence of people, assets, or ecosystems in places that could be adversely affected.
Susceptibility	The structural and socio-economic conditions that increase the likelihood of suffering harm when exposed to a hazard (e.g., poverty, inequality, weak health systems, corruption).
Coping Capacity	The immediate ability of people, organisations, and systems to minimise the impacts of a hazard (e.g., emergency services, early warnings).
Adaptive Capacity	The long-term ability to adjust, learn, and transform in response to climate stressors (e.g., land-use, weather-resistant crops, water management systems).
Conflict of Interest	The divergence of national interests between EU Member States over the strategic direction, policy priority or use of resources within the EU.
Political Cohesion	The long-term consistency and unity of policy actions among EU institutions and EU Member States
Resilience	The ability to anticipate, adapt to and recover from (climate) disruptions while continuing to pursue long-term strategic objectives.

2. Climate hazards and their geographical distribution

Climate hazards are impacting Europe in a variety of ways. Increased heat, drought and weather extremes are already reshaping climate and society in Europe. Because the global climate is a complex system with cascading effects, feedback loops and mutually reinforcing dynamics, climate change will influence future outcomes in ways that are not always predictable. This chapter starts with mapping the first-order effects of climate change: physical climate hazards. It describes the main climate hazards and their geographical impact in the EU.

Climate hazards can manifest as 'slow onset' hazards, such as sea level rise and increasing drought, and 'fast onset' hazards, such as floods, wildfires and storms. Often, the compounding impact of slow onset hazards may culminate in an increased frequency of fast onset hazards.¹² For example, increasing drought makes wildfires more likely, and sea level rise can exacerbate coastal flooding risks. In this chapter, both types of hazards are analysed to arrive at a holistic understanding of the climate hazards most relevant for EU Member States. Alongside the description of the main climate hazards in the EU, an appraisal is made of their geographical distribution and severity. This appraisal is made based on quantitative climatological indicators, supplemented with a qualitative climate literature study.

2.1. Defining climate change hazards

Defining climate hazards means translating a complex interplay of climatological systems into hazard categories. Over the years, several studies have created climate hazard categorisations, for example by institutes such as the International Panel on Climate Change (IPCC) and the European Environment Agency (EEA).

For this study, previous work by the IPCC and EEA serves as a basis to create a basic climate risk framework. This framework is derived from the European Climate Risk Assessment conducted by the European Environment Agency (EEA).¹³ This assessment identifies several Climate Impact Drivers (CIDs), which have been organised into broader hazard categories. Within these categories, specific hazards are detailed in table 2 below. The identified risks were cross-referenced with the IPCC Sixth Assessment Report (Working Group II) to address any gaps related to direct climate impacts.¹⁴ The analysis covers the period up

¹² Nicholas P. Simpson et al., 'Adaptation to Compound Climate Risks: A Systematic Global Stocktake', *iScience* 26, no. 2 (2023): 105926, <https://doi.org/10.1016/j.isci.2023.105926>.

¹³ European Environment Agency, 'European Climate Risk Assessment', 11 March 2024, <https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment>.

¹⁴ Hans-Otto Pörtner et al., eds, *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. (2022).

to 2040, with risk and impact estimates based on future climate projections to that year. An explanation of the study's design choices can be found in Annex A.

Table 3: Climate impact drivers¹⁵



Type of hazard	Hazard description	Indicator
Heat and wildfires	Extreme heat	Heat wave days
	Wildfires	Heat wave days + Consecutive dry days (p. 15)
Extreme cold	Extreme cold	Change in frost days
Wind	Storms	Change in surface wind speed + storm events
Rain and flooding	Pluvial, Fluvial Flooding	Flood events
	Heavy/volatile precipitation patterns	Change in total precipitation + Change in maximum 1 day precipitation
Drought	Droughts	Change in annual maximum consecutive dry days
Marine and coastal	Sea Level rise	Average sea level rise
	Ocean Warming/Acidification	Mean sea temperature + Mean pH
Snow and Ice	Permafrost thaw/Snowfall	Change in snowfall + mean average temperature

These risk types will be analysed and discussed in terms of their severity and geographical (spatial) distribution across Europe, using the same dataset that underpins the EEA European Climate Risk Assessment.

2.2. Climate hazards and their geographical distribution

Climate change is already inflicting serious impacts across Europe, such as more frequent heatwaves, flooding and droughts.¹⁶ However, these impacts are not evenly distributed across Europe. This chapter assesses the geographical distribution of these risks across Europe, using climate projections and supplementary desk research.

2.2.1. Heat and wildfires

Heat is by far the most hazardous climate risk for human health. Between 1980 and 2023, heatwaves caused 95% of weather-related deaths in Europe, with nearly 70,000 deaths in 2022 and 48,000 in 2023 alone.¹⁷ Based on historical data, the frequency and duration of extreme heat have increased between 1950 and 2020.¹⁸ As a result of climate change, it is virtually certain that extreme heat is going to occur more frequently and for longer periods.¹⁹

¹⁵ European Environment Agency, 'European Climate Risk Assessment'.

¹⁶ 'Climate Change Impacts, Risks and Adaptation'.

¹⁷ Climate ADAPT, 'Heat', 14 July 2025, <https://climate-adapt.eea.europa.eu/en/observatory/evidence/health-effects/heat-and-health>.

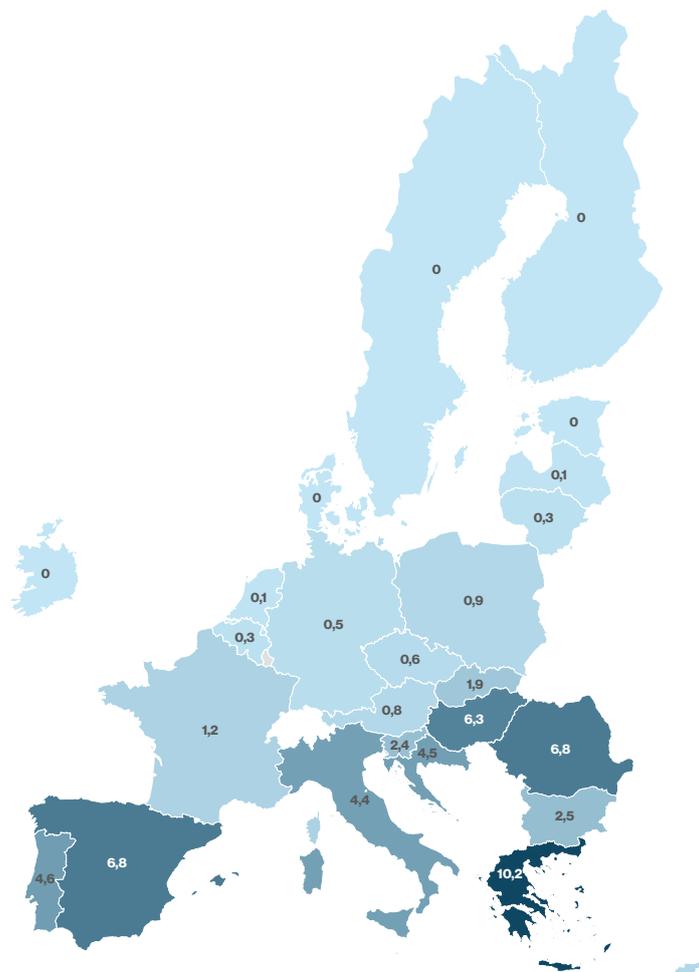
¹⁸ IPCC, 'Chapter 11: Weather and Climate Extreme Events in a Changing Climate', accessed 11 August 2025, <https://www.ipcc.ch/report/ar6/wg1/chapter/chapter-11/>.

¹⁹ IPCC, 'Chapter 11'.

Wildfires originate when a heat source, such as lightning or human activity, ignites dry vegetation under hot, dry, and often windy conditions.²⁰ As a result of climate change, it is highly likely that such fire weather events will occur more frequently in some regions at higher levels of global warming.²¹ The amount of heat wave days plus the consecutive dry days can be used as an indicator to assess the increase in wildfire risk in the near future. The European Climate Assessment index mentions wildfires as an important climate risk impacting human health, mainly through direct fatalities, smoke inhalation and burn injuries.

Southern EU Member States face the largest increase in extreme hot days above 35°C by 2040. Greece, Spain, and parts of Central-Eastern Europe are most affected, with increases of 6 to 10 days. Northern and Western Europe see very limited change, with almost no increase in extreme heat days. The heat and wildfire impacts will thus be highest in Southern Europe. Nevertheless, wildfire risk will likely increase across the whole continent.²²

Figure 1: Increase in number of extreme hot days (+35 degrees) (2021-2040)



²⁰ National Oceanic and Atmospheric Administration, 'Ask the Scientist: How Can the Weather Spark and Spread Wildfires?', 4 September 2018, <https://www.noaa.gov/stories/ask-scientist-how-can-weather-spark-and-spread-wildfires>.

²¹ IPCC, 'Chapter 11', 11.

²² 'Europe Faces up to Tenfold Increase in Extreme Fires in a Warming Climate | Npj Climate and Atmospheric Science', accessed 25 September 2025, <https://www.nature.com/articles/s41612-024-00575-8>.

2.2.2. Extreme Cold

Cold extremes are unusually low temperature events relative to the historical average of that period of the year.²³ Based on current climate trends, the occurrence of cold extremes is expected to decrease in the future.²⁴ The EU Climate Risk Assessment does not include extreme cold in the climate risk drivers that require the most urgent action. Nevertheless, some studies indicate localised cooling in Northern Europe. Melting Arctic ice adds fresh-water to the North Atlantic, changing ocean currents (called Atlantic Meridional Overturning Circulation, or AMOC), leading to colder winter temperatures.²⁵ One study focusing on Sweden and Norway finds an association between AMOC anomalies and colder winters in those regions.²⁶ Other climate effects include rain season patterns in the Pacific (called ENSO, consisting of multi-year cycles of El Niño and La Niña), which influence European winter weather through changes in atmospheric circulation. These effects are complex and not unidirectional.²⁷

Northern and Eastern Europe are projected to see the largest decreases in frost days by 2040. The strongest reductions, up to 18 fewer days, occur in Scandinavia and the Baltic states. Southern and Western Europe experience smaller declines, typically below 7 days. This means cold risks are not a major threat to EU Member States' economies. Cold-related mortality, particularly in Northern Europe, is projected to decline. This reduction is linked to the decreasing frequency of cold events in the coming decades.

2.2.3. Wind

Storms are extreme weather events characterised by strong winds and heavy precipitation. Projected future changes in average wind speed in Europe are more inconclusive, with studies indicating varying effects and geographical patterns, partly depending on the warming scenario.²⁸ Due to these inconclusive findings, storm risks are not included as one of the main climate risks in the EU Climate Risk Assessment report. Nevertheless, storms are characterised as a 'climate hazard' in the report and are considered to compound risks to coastal ecosystems. Moreover, storms are already a current climate hazard, with an estimated €5 billion in annual damages.²⁹

In the near future, mean wind speeds will be mostly stable. Most of Europe is projected to see only very small decreases in mean wind speed by 2040. The largest reductions, around –0.1 m/s, are concentrated in parts of Central and Southeastern Europe. Northern and Western

²³ Sustainability Directory, *Climate Extremes Definition – Term*, n.d., accessed 11 August 2025, <https://climate.sustainability-directory.com/term/climate-extremes-definition/>.

²⁴ IPCC, 'Chapter 11'.

²⁵ ScienceAdvances, 'Climate Impacts of a Weakened Atlantic Meridional Overturning Circulation in a Warming Climate | Science Advances', 26 June 2020, <https://www.science.org/doi/10.1126/sciadv.aaz4876>.

²⁶ 'Climate Impacts of a Weakened Atlantic Meridional Overturning Circulation in a Warming Climate | Science Advances', accessed 30 October 2025, <https://www.science.org/doi/10.1126/sciadv.aaz4876>.

²⁷ Xin Geng et al., 'Future Changes in the Wintertime ENSO-NAO Teleconnection under Greenhouse Warming', *Npj Climate and Atmospheric Science* 7, no. 1 (2024): 81, <https://doi.org/10.1038/s41612-024-00627-z>.

²⁸ IPCC, 'Chapter 11'; European Environment Agency, 'Wind — Mean Wind Speed', European Environment Agency, 19 November 2021, <https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/wind/wind-mean-wind-speed>.

Alexander S. Little et al., 'Future Increased Risk from Extratropical Windstorms in Northern Europe', *Nature Communications* 14, no. 1 (2023): 4434, <https://doi.org/10.1038/s41467-023-40102-6>.

²⁹ Luc Feyen et al., 'Climate Change Impacts and Adaptation in Europe', JRC Publications Repository, 2020, <https://doi.org/10.2760/171121>.

Europe show almost no change. As a result, wind is not among the fastest increasing climate hazards in Europe. Nevertheless, research indicates that the water content of storms has increased in Europe, increasing flood risks.³⁰

2.2.4. Rain and flooding

There are three main types of flooding that can lead to climate hazards: pluvial flooding, fluvial flooding and coastal flooding (discussed in section 6). Pluvial flooding is flooding caused by intense rainfall that overwhelms drainage or infiltration capacity, while fluvial flooding is flooding that occurs when rivers overflow their banks. As a result of increasing climate risks, such as heavy rainfall, 'wet' storms and droughts, Europe will most likely be faced with more frequent flooding events. According to the IPCC, Europe is a region with one of the largest increases in flood risk globally.³¹ By 2030, The European Commission expects a 20% increase in extreme flooding events in Central and Western Europe. Based on the EU Climate Risk Assessment report, the criticality of this climate risk is 'high'.

Flooding is often the result of heavy precipitation.³² Historical and projected rainfall data in Central Europe show that heavy rainfall for prolonged periods of time is becoming more common and will likely increase in frequency and intensity if global warming continues.³³ Heavy rainfall can coincide with storms, leading to compound hazards. An example is Storm Boris, which raged through Central Europe and resulted in record-breaking rainfall totals.³⁴ Future projections expect that for every 1°C rise in temperature, the intensity of heavy downpour will increase by 7% on average. This means that as of 2024, with a global average temperature increase of 1.2°C degrees due to climate change, this has translated to an 8% increase in rainfall intensity.³⁵

Most EU countries remain relatively stable in terms of total precipitation, with slight increases in Northern and Eastern Europe and slight decreases in Southern Europe. Mean daily precipitation reflects long-term shifts in overall rainfall, while maximum one-day precipitation highlights the intensity of extreme events. Based on the projected increase of maximum one-day precipitation, most EU countries will witness more volatility in rainfall patterns. The increase is more pronounced in Northern and Central Europe.

The countries with the largest amount of people affected by floods in 2023 and 2024 were Spain (97,600), Greece (44,120), Germany (42,590) and Italy (16,510).³⁶ Additionally,

³⁰ European Commission, '5 Things You Should Know about Extreme Weather', 9 July 2025, https://climate.ec.europa.eu/news-other-reads/news/5-things-you-should-know-about-extreme-weather-2025-07-09_en.

³¹ IPCC, 'Chapter 13: Europe', accessed 17 September 2025, <https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-13/>.

³² IPCC, *Climate Change Widespread, Rapid, and Intensifying*, 9 August 2021, <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>.

³³ World Weather Attribution, *Climate Change and High Exposure Increased Costs and Disruption to Lives and Livelihoods from Flooding Associated with Exceptionally Heavy Rainfall in Central Europe*, 25 September 2024, <https://www.worldweatherattribution.org/climate-change-and-high-exposure-increased-costs-and-disruption-to-lives-and-livelihoods-from-flooding-associated-with-exceptionally-heavy-rainfall-in-central-europe/>.

³⁴ Kathy Maskell, 'Storm Boris and European Flooding September 2024', Text, *ECMWF* (blog), 23 October 2024, <https://www.ecmwf.int/en/about/media-centre/focus/2024/storm-boris-and-european-flooding-september-2024>.

³⁵ Marjolijn Haasnoot, 'We moeten leren van storm Boris (en andere hoogwatergebeurtenissen)', *H2O/Waternetwerk* (blog), 23 October 2024, <https://www.h2owaternetwerk.nl/h2o-podium/blogs/we-moeten-leren-van-storm-boris-en-andere-hoogwatergebeurtenissen>.

³⁶ Emanuele Isonio, 'The Multiple Impact of the Devastating Floods in Europe', *Re Soil Foundation*, 9 April 2025, <https://resoilfoundation.org/en/investigation/multiple-impact-floods-europe/>.

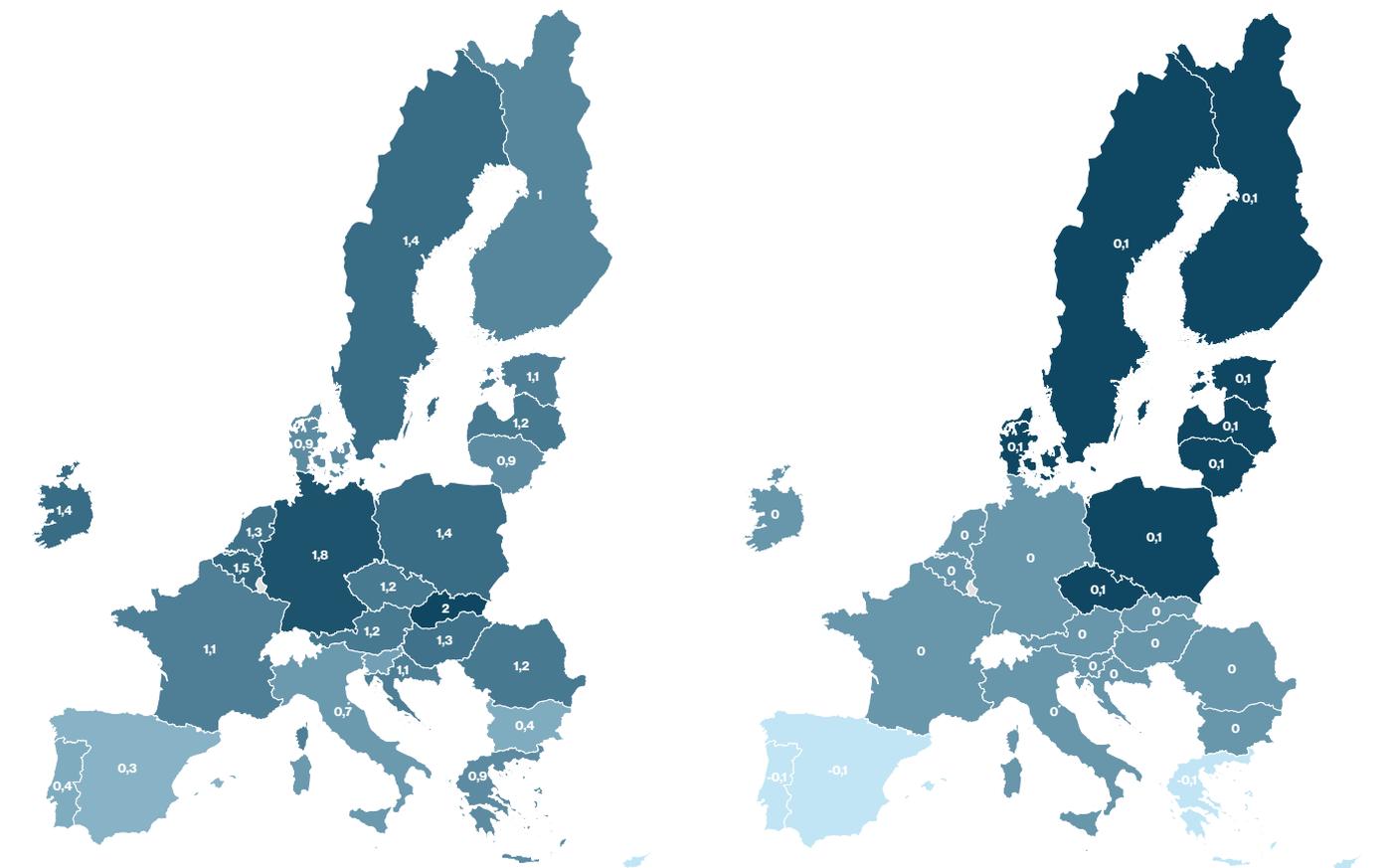
increased flooding events are expected in the basins of the Rhine, Meuse and the Seine, impacting Germany, the Benelux and France.³⁷ Nevertheless, drier conditions in Southern Europe, combined with shorter but heavier rainfall, can increase the lethality of flash floods.³⁸ As a rule, pluvial flooding is expected to increase in Southern Europe, while fluvial flooding will primarily impact Western, Central, and Eastern Europe.

Figure 4



4a: Max. of 1-Day Accumulated Precipitation (2021-2040)

4b: Mean of Daily Accumulated Precipitation (2021-2024)



³⁷ International Commission for the Protection of the Rhine, 'New ICPR Report on the Development of the Discharge of the Rhine under the Influence of Climate Change', 25 July 2024, <https://www.iksr.org/en/press/press-releases/press-releases-individual-presentation/new-icpr-report-on-the-development-of-the-discharge-of-the-rhine-under-the-influence-of-climate-change>.

Flood Risk Management Plan for the Meuse International River Basin District, 2nd Cycle of the Directive on the Assessment and Management of Flood Risks (2022-2027), n.d.

OECD, 'Preventing the Flooding of the Seine in the Paris–Ile de France Region', OECD, 25 January 2018, https://www.oecd.org/en/publications/preventing-the-flooding-of-the-seine-in-the-paris-ile-de-france-region_9789264289932-en.html.

³⁸ IPCC, 'Chapter 13: Europe', accessed 25 September 2025, <https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-13/>.

2.2.5. Droughts

A drought is “an exceptional period of water shortage for existing ecosystems and the human population”.³⁹ Europe has suffered significant droughts in recent years, affecting water availability across the continent. During 2024 droughts, parts of Italy experienced alarmingly low reservoir levels, 45% lower than in 2023, which has resulted in municipalities issuing water-preservation regulations. In 2022, about 34% of EU territory and 41% of the EU population experienced water stress conditions for at least one quarter.⁴⁰ Climate change will increase the likeliness of droughts taking place, which can result in water scarcity across Europe.⁴¹ Based on the EU Climate Risk Assessment report, the criticality of this climate risk is ‘high’.

Future projections of climate change show an increase in maximum consecutive dry days across most of Europe by 2040. The strongest increases are projected for Southern Europe, especially Spain, Portugal, and Greece. Central and Eastern Europe face moderate rises in drought risk. Northern Europe is only marginally affected, with small changes. Overall, the results highlight a clear north–south divide in future drought exposure.

Under a 1.5-degree warming scenario, large parts of Western Europe are projected to experience a one-third increase in drought frequency, whereas Southern Europe could see a two-thirds increase.⁴² In contrast, droughts are expected to decrease in Northern Europe, particularly in the Boreal regions. Regarding water scarcity, the European Commission Joint Research Centre (JRC) published a technical report analysing the impact of climate change on water availability. Overall, a clear North-South divide is evident.

2.2.6. Marine and coastal

Rising sea-levels are perhaps the most well-known climate risk globally. Warming, and the addition of meltwater from glaciers is causing a notable increase in sea levels along European coastlines. The European Climate Risk Assessment projects an average increase of 0.4-0.7 metres during the 21st century.⁴³ Based on the EU Climate Risk Assessment report, the criticality to act on this climate risk is ‘high’.

All indicators (seawater pH, sea-level rise, and sea surface temperature) display only minor or slight increases or decreases up until 2040. seawater pH is set to decrease slightly, sea level is projected to rise modestly, and sea surface temperatures show small but consistent warming. These changes are relatively limited in scale. However, they are expected to intensify substantially in the second half of the century, with sea level rise being especially pronounced in the North Sea. Ocean warming and acidification are taking place in most parts

³⁹ ‘IPCC Glossary Search’, accessed 11 August 2025, <https://apps.ipcc.ch/glossary/>.

⁴⁰ European Environment Agency, ‘Water Scarcity Conditions in Europe’, 17 January 2025, <https://www.eea.europa.eu/en/analysis/indicators/use-of-freshwater-resources-in-europe-1>.

⁴¹ Cammalleri, Naumann, Mentaschi, et al. *Global Warming and Drought Impacts in the EU*. JRC Technical Report. Joint Research Commission, 2020. https://joint-research-centre.ec.europa.eu/system/files/2020-05/pesetaiv_task_7_drought_final_report.pdf.

⁴² Cammalleri, Naumann, Mentaschi, et al. *Global Warming and Drought Impacts in the EU*. JRC Technical Report. Joint Research Commission, 2020. https://joint-research-centre.ec.europa.eu/system/files/2020-05/pesetaiv_task_7_drought_final_report.pdf.

⁴³ IPCC, *Chapter 4: Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities – Special Report on the Ocean and Cryosphere in a Changing Climate*, n.d., accessed 25 September 2025, <https://www.ipcc.ch/srocc/chapter/chapter-4-sea-level-rise-and-implications-for-low-lying-islands-coasts-and-communities/>.

of Europe, and therefore these effects are less distributive than some other climate risks. However, the warming of the Mediterranean is slightly faster than the other seas in Europe, leading to possible heightened risks in Southern Europe.

Overall, coastal climate risks are significant, but in the short to medium term (2025-2040), there are no pronounced distributional effects between EU Member States.

2.2.7. Snow and Ice

Snow and ice risks are generally associated with cold-weather hazards. Examples of possible risks include the effects of snow melt and permafrost thaw. Permafrost thaw is the melting of ground that has remained frozen for at least two consecutive years, driven by rising temperatures.⁴⁴ Warming in the Pyrenees, the Scandinavian Mountains and the Swiss Alps is affecting levels of permafrost.⁴⁵ Furthermore, shorter snowfall seasons and a reduced buildup of snow in winter periods have been observed.⁴⁶ By the end of winter 2022/2023, the snow water equivalent in the Alps was over 50% lower than the historical average.⁴⁷

Most of Europe will witness a general decline in mean daily snowfall across by 2040. Reductions are modest, typically around -0.1 mm/day, with the strongest decreases in the Baltic region. Southern and Western Europe show little or no change, reflecting their already limited snowfall. These snowfall declines align with the earlier analysis of frost days, which also projects marked reductions across Europe. Together, the decline in frost days and reduced snowfall point to two overarching trends. First, a continued contraction of snow- and ice-dependent ecosystems across Europe. Second, a gradual reduction in snow- and ice-related climate risks. This means that the climate hazards related to snow and ice are limited.

2.3. Main findings

This chapter has identified the most urgent climate hazards, as well as their geographic distribution across Europe. Based on the climatic indicators of the EEA and the supplementary literature review, some trends emerge. The most critical risks in the EU are as follows.

Extreme heat and wildfires. Extreme heat and wildfires are among the most significant climate hazards. Extreme heat and wildfires are set to strongly impact Southern and Southeastern Europe, especially Greece, Spain, Italy, Portugal, Romania, Hungary and Croatia. These impacts will be substantial: 95% of climate-related deaths are due to heat-related climate impacts.⁴⁸ Heatwaves and wildfires cause significant damage to the European

⁴⁴ International Permafrost Association, 'What Is Permafrost?', *International Permafrost Association*, n.d., accessed 12 August 2025, <https://www.permafrost.org/what-is-permafrost/>.

⁴⁵ 'Elevation dependent Warming in the Swiss Alps 1981–2017: Features, Forcings and Feedbacks - Rottler - 2019 - International Journal of Climatology - Wiley Online Library', accessed 19 October 2025, <https://onlinelibrary.wiley.com/doi/abs/10.1002/joc.5970>.

⁴⁶ European Environment Agency, 'Snow and Ice — Snow, Glaciers and Ice Sheets', Page, European Environment Agency, 19 November 2021, <https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/snow-and-ice/snow-and-ice-snow>.

⁴⁷ Andrea Toreti et al., 'Drought in Europe June 2023', JRC Publications Repository, 2023, <https://doi.org/10.2760/575433>.

⁴⁸ European Environment Agency, 'Heat | Climate Preparedness 2025', accessed 13 October 2025, <https://discomap.eea.europa.eu/ClimatePreparedness2025/?page=Heat>.

economy, estimated to be about 28% of the total losses.⁴⁹ Despite the stronger regional impact in Southern and Southeastern Europe, the whole European continent will witness increased heat and wildfires. This will likely make it one of the more prominent channels through which climate hazards will have socio-economic effects.

Flooding (pluvial, fluvial or coastal). Flooding is among the most significant climate risks in Europe. In 2023 and 2024 alone, hundreds of thousands of European citizens were affected by flooding. Recent high-profile examples include the 2024 storm Boris in Central and Southern Europe and the 2024 Flash floods in Spain, which resulted in widespread flooding, several fatalities and billions in damages.⁵⁰ Between 1980 and 2017, floods caused more than €170 billion in economic losses to the European economy.⁵¹ In 2021 and 2023, the total costs incurred as a result of flooding in the EU amounted to €48 billion and €28 billion, respectively.⁵² The 2024 flood in Valencia alone resulted in economic damages of €16.5 billion, a significant share of which stemmed from infrastructure damage. This makes flooding the costliest climate risk. Moreover, flooding risk is set to increase in multiple parts of the EU. Fluvial flooding is projected to intensify across Central, Western, and Eastern Europe, with low-lying river basins and densely populated coasts most at risk. Pluvial flooding is emerging as a significant threat in Southern Europe in the form of flash floods after long periods of droughts.

Droughts. Droughts are becoming more frequent and severe across Europe, posing a growing threat to the continent's water resources and ecosystems. Currently, droughts already lead to an annual loss of €9 billion across Europe. Future projections show a strong north-south divide, with Southern Europe facing major increases in drought frequency and duration, while the effect on Northern- and Western Europe is more muted, although certainly not negligible. Drought periods are expected increase the most in Portugal, Spain, Italy, Greece, Bulgaria and Croatia. These trends will most likely worsen water scarcity across much of the continent.

Marine and coastal risks. Marine and coastal hazards rank among the EU's most significant climate risks, with rising sea levels posing an especially potent threat. Sea levels along European coastlines are projected to rise by 0.4 to 0.7 metres over the course of this century, with the North Sea and the Mediterranean warming the fastest and facing the greatest long-term impacts. While short-term projections for 2040 remain relatively moderate, accelerating sea-level rise, ocean warming, and acidification after 2050 will increase coastal flooding risks across much of Europe, particularly for low-lying and densely populated coastal regions such as the Netherlands.

⁴⁹ PreventionWeb, 'Economic Losses from Weather- and Climate-Related Extremes in Europe', 14 October 2024, <https://www.preventionweb.net/news/economic-losses-weather-and-climate-related-extremes-europe-8th-eap>.

⁵⁰ European Civil Protection and Humanitarian Aid Operations, 'Flash Floods in Spain: Joining Forces for Rapid Recovery - European Civil Protection and Humanitarian Aid Operations', accessed 13 October 2025, https://civil-protection-humanitarian-aid.ec.europa.eu/news-stories/stories/flash-floods-spain-joining-forces-rapid-recovery_en.

European Civil Protection and Humanitarian Aid Operations, '2024 Europe Floods', *Center for Disaster Philanthropy*, 31 October 2024, <https://disasterphilanthropy.org/disasters/2024-central-and-eastern-europe-floods/>.

⁵¹ European Environment Agency, 'Wet and Dry — Heavy Precipitation and River Floods', Page, European Environment Agency, 19 November 2021, <https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/wet-and-dry-1/wet-and-dry-heavy>.

⁵² European Environment Agency, 'Economic Losses and Fatalities from Weather- and Climate-Related Extremes', 1 July 2025, <https://www.eea.europa.eu/en/analysis/publications/economic-losses-from-climate-extremes>.

3. Socio-economic impacts of climate hazards

The severity of the impact of climate change is often expressed in terms of its socio-economic effects. Climate hazards impact several domains of human society, such as cities, settlements, infrastructure and human health. Accounting for the total economic costs incurred by climate change is complicated. Nevertheless, estimates of its impact are available. The EEA estimated in October 2025 the total losses from weather- and climate-related extremes between 1980 and 2023 to be €822 billion.⁵³ These losses mainly come from extreme events such as floods, extreme heat and storms. In reality, the total costs of climate change are likely to be higher due to its second- and third-order effects. One category of second-order effects comprises socio-economic impacts, which influence the functioning of society and, by extension, the economy.

The impacts of these socio-economic effects vary across regions, based on their level of exposure to climate hazards and the characteristics of the socio-economic systems at risk. Chapter Three identified the most disruptive climate hazards in the EU and provided a high-level overview of their geographical distribution. These findings will form the basis for a more in-depth analysis of their socio-economic consequences.

An important aspect of analysing socio-economic impacts is what is commonly referred to as a country's 'exposure' to hazards. Exposure to climate hazards refers to the specific characteristics of a country that increase its likelihood of being affected by such hazards. For instance, a country may face a high projected rise in sea level. However, if most of its territory lies well above current sea levels, its overall exposure remains relatively limited. In contrast, a low-lying country with substantial areas near or below sea level would experience significantly greater exposure to the same degree of sea-level rise.

The reviewed literature on the socio-economic impacts of climate hazards uses a variety of taxonomies to describe these effects, but most frameworks centre on broad subsystems such as food, health, ecosystems, infrastructure, and the wider economy.⁵⁴ These domains

⁵³ European Environment Agency, 'Economic Losses from Weather- and Climate-Related Extremes in Europe', 14 October 2025, <https://www.eea.europa.eu/en/analysis/indicators/economic-losses-from-climate-related>.

⁵⁴ IPCC, 'Chapter 5: Food, Fibre and Other Ecosystem Products', accessed 25 September 2025, <https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-5/>; David Dodman et al., 'Cities, Settlements and Key Infrastructure', in *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Hans-Otto Pörtner et al. (Cambridge University Press, 2022); Guéladio Cissé et al., 'Health, Wellbeing and the Changing Structure of Communities', in *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Hans-Otto Pörtner et al. (Cambridge University Press, 2022); Joern Birkmann et al., 'Poverty, Livelihoods and Sustainable Development', in *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Hans-Otto Pörtner et al. (Cambridge University Press, 2022); European Environment Agency, 'European Climate Risk Assessment'.

capture the vast majority of socio-economic and sectoral impacts of climate hazards. The EU Climate Risk Assessment also mentions ecosystems as a separate category. However, as the primary aim of this chapter is to assess socio-economic effects, the impacts of climate hazards on ecosystems are analysed in terms of how they relate to socio-economic outcomes. For example, the impact of climate change on the water ecosystem will be discussed in terms of its potential effects on the food sector or infrastructure in the EU. This approach ensures that the coverage of second-order effects remains comprehensive while maintaining a clear focus on socio-economic outcomes. Other socio-economic factors, such as climate-induced migration, have wide-ranging impacts that span multiple sectors of the economy.⁵⁵

For the purposes of this study, an adapted version of the EU Climate Risk Assessment clustering is used to categorise the second-order socio-economic effects of climate hazards in Europe. This results in four broad categories: food, health, infrastructure, and economy and finance.⁵⁶ These categories provide a comprehensive framework under which most socio-economic effects can be classified.

3.1. Sectoral exposure to climate hazards

The following section provides an overview of the impact of climate hazards on different sector categories. The measurement of socio-economic impacts consists of a mix of past climate hazards and their economic damages and future estimations of cost increases, paired with the level of exposure of countries to climate hazards. The timeframes of the analysed socio-economic impact studies differ, but this study mainly focuses on expected socio-economic impacts between now and the upcoming 10-15 years.

3.1.1. Food

The food sector is one of the sectors that will be hit hardest by climate change. This will generate large economic, social and political upheaval: food production revenues are essential to many EU Member States. The largest impact will come from drought, heat and flooding. Drought accounts for over half of all climate-related risks to agriculture, with the 2022 EU drought alone causing up to €25-30 billion in crop losses. By 2050, annual crop losses are projected to rise by 42-66%, reaching €24.8 billion under a medium-emissions scenario and €28.9 billion under a high-emissions scenario.⁵⁷ Future drought impacts on agriculture in Europe will vary significantly by region. Countries in Southeastern Europe, such as Romania, Greece, Bulgaria, and Cyprus will suffer the most economic damage from droughts.⁵⁸ Related water shortages can also impact production. An example of this is Sicily, where in 2024 a 25% loss in agricultural production was recorded as a result of droughts.⁵⁹

⁵⁵ S. Nazrul Islam et al., eds, *Climate Change and Social Inequality*, DESA Working Paper, no. 152 (UN, Department of Economic and Social Affairs, 2017), <https://digitallibrary.un.org/record/3859027>.

⁵⁶ European Environment Agency, 'European Climate Risk Assessment'.

⁵⁷ FI Compass, 'Insurance and Risk Management Tools for Agriculture in the EU', 23 July 2025, <https://www.fi-compass.eu/library/market-analysis/insurance-and-risk-management-tools-agriculture-eu>.

⁵⁸ Corrado Motta et al., 'Assessing the Economic Impact of Droughts in Europe in a Changing Climate: A Multi-Sectoral Analysis at Regional Scale', *Journal of Hydrology: Regional Studies* 59 (June 2025): 102296, <https://doi.org/10.1016/j.ejrh.2025.102296>.

⁵⁹ European Commission, 'Persistent Droughts: Critical Water Shortages and Crops Threatened', 2 December 2024, https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/persistent-droughts-critical-water-shortages-and-crops-threatened-2024-07-31_en.

Related to drought, heat also has a significant impact on agriculture. There is a negative relationship between temperature anomalies (especially heat) and productivity losses in the agricultural sector.⁶⁰ One study reveals that drought and extreme heat have led to 9-10% in agricultural losses between 1964 and 2007.⁶¹ With drought and extreme heat set to increase in the future, these impacts are likely to increase.⁶² Higher temperatures will lead to increased heat stress and decreased grazing land and fodder crops for livestock in Europe, decreasing yields for farmers.⁶³

Precipitation and flooding can impact crop yield by damaging plants and the soil structure.⁶⁴ The IPCC confirms that heavy precipitation, waterlogging (water saturation in the soil) and floods reduce yields.⁶⁵ In France, extreme rainfall in 2016 reduced wheat yields by 30% compared to 2015.⁶⁶ Other, less common but still significant, impacts include wind and coastal erosion. Wind, in combination with drought, can cause 'wind erosion', which damages soil and can trigger dust storms, such as those observed in Germany in 2011.⁶⁷ Strong winds can also lead to 'lodging' (flattening of crops) and leaf tearing, damaging plants and lowering agricultural yields.⁶⁸ Salinisation of soils and groundwater in coastal areas, such as the Netherlands, is reducing crop yields and contributing to general soil erosion.⁶⁹ The EU countries that rely most on agricultural income (based on agricultural value added per capita) are the Netherlands, Ireland, Greece, Spain, Italy, Iceland and Denmark.⁷⁰ These countries are more exposed to large yield declines than countries that have a smaller agricultural base, such as Slovakia, Estonia and Germany.

3.1.2. Infrastructure

Another sector that is significantly affected by climate change is infrastructure. The main channels through which infrastructure is affected are heat, flooding and drought. Infrastructure can be affected by excessive heat due to material properties changing in different temperatures, rendering them (partially) unfit for the purposes for which they were installed, such as in cables,

⁶⁰ Jessie Ruth Schleypen et al., 'Sharing the Burden: Quantifying Climate Change Spillovers in the European Union under the Paris Agreement', *Spatial Economic Analysis* 17, no. 1 (2022): 67–82, <https://doi.org/10.1080/17421772.2021.1904150>.

⁶¹ Corey Lesk et al., 'Influence of Extreme Weather Disasters on Global Crop Production', *Nature* 529, no. 7584 (2016): 84–87, <https://doi.org/10.1038/nature16467>.

⁶² Matias Heino et al., 'Increased Probability of Hot and Dry Weather Extremes during the Growing Season Threatens Global Crop Yields', *Scientific Reports* 13, no. 1 (2023): 3583, <https://doi.org/10.1038/s41598-023-29378-2>.

⁶³ A. Nardone et al., 'Effects of Climate Changes on Animal Production and Sustainability of Livestock Systems', *Livestock Science*, 10th World Conference on Animal Production (WCAP), vol. 130, no. 1 (2010): 57–69, <https://doi.org/10.1016/j.livsci.2010.02.011>.

⁶⁴ Amna Aslam et al., 'Plant Adaptation to Flooding Stress under Changing Climate Conditions: Ongoing Breakthroughs and Future Challenges', *Plants* 12, no. 22 (2023): 3824, <https://doi.org/10.3390/plants12223824>. David R. Montgomery, 'Soil Erosion and Agricultural Sustainability', *Proceedings of the National Academy of Sciences of the United States of America* 104, no. 33 (2007): 13268–72, <https://doi.org/10.1073/pnas.0611508104>.

⁶⁵ IPCC, 'Chapter 5'.

⁶⁶ France 24, 'France Faces "Catastrophic" 30-Year Low in Wheat Yields', France 24, 9 August 2016, <https://www.france24.com/en/20160809-french-wheat-harvest-catastrophic-30-year-low-economy-agriculture>.

⁶⁷ Bartosz Bartowski et al., 'Wind Erosion in European Agricultural Landscapes: More than Physics', 1 December 2022, <https://besjournals.onlinelibrary.wiley.com/doi/full/10.1002/pan3.10418>.

⁶⁸ H. A. Cleugh et al., 'Direct Mechanical Effects of Wind on Crops', *Agroforestry Systems* 41, no. 1 (1998): 85–112, <https://doi.org/10.1023/A:1006067721039>.

⁶⁹ Sander van den Burg et al., 'Knowledge Gaps on How to Adapt Crop Production under Changing Saline Circumstances in the Netherlands', *Science of The Total Environment* 915 (March 2024): 170118, <https://doi.org/10.1016/j.scitotenv.2024.170118>.

⁷⁰ Eurostat, 'Gross Value Added of the Agricultural Industry - Basic and Producer Prices', accessed 2 November 2025, <https://ec.europa.eu/eurostat/databrowser/view/tag00056/default/table?lang=en>.

roads or rail.⁷¹ Examples include deformation (buckling) of rails and the sagging of overhead power lines. One study estimates an increase of €2.8 billion additional annual maintenance costs for the EU plus the UK in 2100 under a 3-degree warming scenario.⁷² Other heat-related events, such as wildfires, can result in significant damage to electrical cables, buildings, and roads.⁷³ Floods damage roads, rail, power lines, farmland and natural ecosystems. In 2023 and 2024 alone, floods have damaged a total of 4,256.2 km of infrastructure, mostly roads.⁷⁴ In Greece, the 2023 storm Daniel submerged parts of Thessaly, with over 1,100 km² flooded, leading to major road and rail disruption, as well as damage to buildings.⁷⁵ More extreme rainfall patterns can impact underground infrastructure such as subway systems.⁷⁶ Likewise, inland waterways will be affected by longer periods of droughts, hampering inland trade.⁷⁷ The 2022 Po drought in Italy was the worst in two centuries, crippling irrigation and inland water navigation.⁷⁸

The energy sector in Europe is equally vulnerable to climate change. The main channels through which climate change impacts energy are through heat, droughts, floods and wind. In Southern Europe, demand for cooling will increase, leading to higher peak electricity demand. During the 2025 European heatwave, daily power demand rose by as much as 14%.⁷⁹ Furthermore, hydropower installations and thermal power plants will be impacted by droughts and limited water availability.⁸⁰ This can reduce power output and increase energy prices for consumers and businesses. Floods (coastal and inland), storms, and wildfires all have the potential to damage energy systems and can furthermore impact supply security and climate mitigation efforts.⁸¹ Rising sea levels, erosion, and flooding threaten coastal energy facilities such as refineries, gas processing plants, offshore installations, and gas pipelines.⁸²

Across the EU, infrastructure exposure shows a couple of dividing lines. The best performers, such as Slovakia, the Czech Republic, and Hungary, are largely landlocked or high-latitude states with minimal populations living below five metres above sea level. Regarding infrastructure risk, the countries most exposed are the Netherlands, Denmark, and Latvia.⁸³

⁷¹ BSR, 'Infrastructure Breaks Under Extreme Heat', accessed 4 August 2025, <https://www.bsr.org/en/emerging-issues/infrastructure-breaks-under-extreme-heat>.

⁷² Eamonn Mulholland and Luc Feyen, 'Increased Risk of Extreme Heat to European Roads and Railways with Global Warming', *Climate Risk Management* 34 (January 2021): 100365, <https://doi.org/10.1016/j.crm.2021.100365>.

⁷³ European State Forest Association, 'European State Forest Association - Forest Fires in Europe: A Growing Challenge', *European State Forest Association*, n.d., accessed 4 August 2025, <https://eustafor.eu>.

⁷⁴ Isonio, 'The Multiple Impact of the Devastating Floods in Europe'.

⁷⁵ Chris Liakos Edwards Christian, 'More than 800 Rescued after Extreme Flooding in Greece Turns Villages into Lakes', CNN, 7 September 2023, <https://www.cnn.com/2023/09/07/europe/greece-floods-storm-rescue-climate-intl>. Marketa Horpeniakova, 'Greece's Floods Disrupt Rail Services', RAILMARKET.Com, 11 September 2023, <https://railmarket.com/news/passenger-rail/7708-greece-s-worst-floods-in-modern-history-disrupt-rail-services>.

⁷⁶ Roberto Pantoja Porro, '(PDF) The Impact of Climate Change on Underground Transport Infrastructure: A Review', *Geotechnical Research* 12, no. 2 (2025): 85–101, <https://doi.org/10.1680/jgere.24.00047>.

⁷⁷ Juha Schweighofer, 'The Impact of Extreme Weather and Climate Change on Inland Waterway Transport', *Natural Hazards: Journal of the International Society for the Prevention and Mitigation of Natural Hazards* 72, no. 1 (2014): 23–40.

⁷⁸ Beatrice Monteleone and Iolanda Borzi, 'Drought in the Po Valley: Identification, Impacts and Strategies to Manage the Events', *Water* 16, no. 8 (2024): 1187, <https://doi.org/10.3390/w16081187>.

⁷⁹ Ember, 'European Heatwaves Push up Daily Power Demand by up to 14%', *Ember*, 4 July 2025, <https://ember-energy.org/latest-updates/european-heatwaves-push-up-daily-power-demand-by-up-to-14>.

⁸⁰ Michelle T. H. van Vliet et al., 'Impacts of Recent Drought and Warm Years on Water Resources and Electricity Supply Worldwide', *Environmental Research Letters* 11, no. 12 (2016): 124021, <https://doi.org/10.1088/1748-9326/11/12/124021>.

⁸¹ IEA, 'Climate Resilience for Energy Security – Analysis', IEA, 14 November 2022, <https://www.iea.org/reports/climate-resilience-for-energy-security>.

⁸² Abderraouf Hzami et al., 'GIS-Driven Evaluation of Energy Infrastructure Vulnerability to Coastal Inundation in Qatar', *Scientific Reports* 15, no. 1 (2025): 20669, <https://doi.org/10.1038/s41598-025-05968-0>.

⁸³ World Bank Open Data, 'World Bank Open Data', World Bank Open Data, accessed 2 November 2025, <https://data.worldbank.org>.

These countries face sea-level rise and subsequent coastal population exposure. Even wealthy, well-prepared states like the Netherlands have considerable physical exposure to future climate hazards. Finally, Southern European countries are set to be primarily exposed to infrastructure impacts through increased heat, drought, and flooding, stressing infrastructure and energy systems.

3.1.3. Human Health

Human health is also severely impacted by climate change. The main channels through which climate change is impacting human health are through heat, wildfires, floods, and storms.

Heat-related mortality in Europe is projected to triple by 2040–2050 (compared to 2015–2030), with Southern Europe facing the highest increases compared to a lesser increase in Western Europe.⁸⁴ It should be noted that this increase in heat-related deaths (mostly in warmer regions) could be (partially) offset by a larger reduction in cold-related deaths (mostly in colder regions).⁸⁵ This can further increase disparities in health outcomes between Southern and Northern Europe. Heat-related mortality also has significant economic costs. In France, heatwaves caused €25.5 billion in economic losses between 2015 and 2019, with €23.2 billion stemming from mortality alone.⁸⁶ Between 2008 and 2024, internal displacements took place in countries such as Spain (200,000), Italy (199,000), France (127,000), Germany (84,000), Czech Republic (51,000), Romania (24,000) and Portugal (16,000). This was mostly due to wildfires, floods, but also due to storms.⁸⁷

Wildfire health effects in Europe include burns, eye and skin irritations, and an increased risk of respiratory diseases. Moreover, wildfires often lead to internal displacement.⁸⁸ As a result of a wildfire in Greece in 2023, for example, over 19,000 people had to be evacuated from the affected areas.⁸⁹ Climate change is also expanding mosquito and tick habitats in Europe, increasing the spread of diseases such as West Nile virus and dengue.⁹⁰ Southern and Eastern Europe are most affected, but rising temperatures are pushing risks northward. Climate hazards can also have psychological effects.⁹¹ In Europe, extreme events such as floods and storms are associated with increases in PTSD, anxiety, depression and even suicides.⁹²

⁸⁴ Helder Relvas et al., 'Rising Temperatures, Rising Risks: Heat-Related Mortality in Europe Under Climate Change', 10 June 2025, <https://link.springer.com/article/10.1007/s41748-025-00692-1>.

⁸⁵ Pierre Masselot et al., 'Estimating Future Heat-Related and Cold-Related Mortality under Climate Change, Demographic and Adaptation Scenarios in 854 European Cities', *Nature Medicine* 31, no. 4 (2025): 1294–302, <https://doi.org/10.1038/s41591-024-03452-2>.

⁸⁶ Lucie Adélaïde et al., 'Health Effects from Heat Waves in France: An Economic Evaluation', *The European Journal of Health Economics* 23, no. 1 (2022): 119–31, <https://doi.org/10.1007/s10198-021-01357-2>.

⁸⁷ IDMC - Internal Displacement Monitoring Centre, 'Country Profiles', IDMC - Internal Displacement Monitoring Centre, accessed 4 August 2025, <https://www.internal-displacement.org/countries>.

⁸⁸ Climate ADAPT, 'Wildfires', 6 June 2025, <https://climate-adapt.eea.europa.eu/en/observatory/evidence/health-effects/wildfires>.

⁸⁹ Helena Smith and Angelique Chrisafis, 'Greece Carries out Its Biggest Ever Evacuation as Wildfires Rage on Rhodes', World News, *The Guardian*, 23 July 2023, <https://www.theguardian.com/world/2023/jul/23/high-winds-expected-to-impede-fight-wildfires-in-rhodes>.

⁹⁰ The Lancet, 'Climate Change Impacts on Vector-Borne Diseases in Europe: Risks, Predictions and Actions - The Lancet Regional Health – Europe', February 2021, <https://www.thelancet.com/journals/lanep/article/PIIS2666-7762%2820%2930017-X/fulltext>.

⁹¹ World Health Organization, 'Floods in the WHO European Region: Health Effects and Their Prevention', 6 December 2023, <https://www.who.int/publications/i/item/9789289000116>.

⁹² Carsten Butsch et al., 'Health Impacts of Extreme Weather Events – Cascading Risks in a Changing Climate', *Journal of Health Monitoring* 8, no. Suppl 4 (2023): 33–56, <https://doi.org/10.25646/11652>.

Countries warming more rapidly tend to face elevated risks of heat-related fatalities and climate-sensitive diseases.⁹³ These impacts will therefore be more pronounced in Southern Europe. Moreover, countries with less favourable age-dependency profiles (share of care-dependent population aged under 14 or over 65) such as Italy, Greece, Portugal and France, are more exposed to health risks.⁹⁴ Their high proportion of older residents increased their vulnerability to climate-related health impacts.

3.1.4. Economy and Finance

Economy and finance are expected to be negatively affected by climate change. The main channels through which climate change is impacting manufacturing, supply chains, tourism and insurance industries are heat, drought and flooding.

Rising temperatures are found to significantly reduce total factor productivity (TFP), mainly by lowering labour productivity.⁹⁵ The impact is strongest in sectors like agriculture, construction, and manufacturing, and is most pronounced in both temperate (Belgium, Czech Republic, Estonia, Hungary, Romania, and Slovakia) and Mediterranean (Italy, Portugal, and Spain) climates.⁹⁶ Climate change could also have a significant impact on firm output. A recent study of 70,000 Indian factories where severe heat cut output by 3% shows how extreme heat reduces productivity in labour-intensive industries.⁹⁷ Drought-driven water shortages have broad macroeconomic effects, including in manufacturing.⁹⁸ Under high global warming, some regions could face annual drought-induced economic losses of 1-2% of GDP.⁹⁹ Moreover, the 2021 Western Europe floods hit manufacturing by destroying infrastructure and disrupting supply chains.¹⁰⁰ A study about the impact of the 2021-22 flooding in the Netherlands estimated that one day of business interruption due to flooding costs a firm on average 0.5% of its annual revenue.¹⁰¹ Globally, manufacturing operations have been impacted by storms through asset destruction and supply chain disruption.¹⁰² But these effects are more pronounced in storm-prone regions such as the US and Southeast Asia.¹⁰³

⁹³ David Garcia-León et al., 'Temperature-Related Mortality Burden and Projected Change in 1368 European Regions: A Modelling Study', *The Lancet Public Health* 9, no. 9 (2024): e644–53, [https://doi.org/10.1016/S2468-2667\(24\)00179-8](https://doi.org/10.1016/S2468-2667(24)00179-8).

⁹⁴ Landgeist, 'Old-Age Dependency Ratio', *Landgeist*, 19 November 2021, <https://landgeist.com/2021/11/19/old-age-dependency-ratio/>.

⁹⁵ Nicola Gagliardi et al., 'The Productivity Impact of Global Warming: Firm-Level Evidence for Europe', SSRN Scholarly Paper no. 4939153 (Social Science Research Network, 28 August 2024), <https://papers.ssrn.com/abstract=4939153>.

⁹⁶ Gagliardi et al., 'The Productivity Impact of Global Warming'.

⁹⁷ UNEP, *Climate Risks in the Industrials Sector*, n.d., accessed 30 July 2025, <https://www.unepfi.org/themes/climate-change/climate-risks-in-the-industrials-sector/>.

⁹⁸ Iban Ortuzar et al., 'Macroeconomic Impacts of Water Allocation under Droughts. Accounting for Global Supply Chains in a Multiregional Context', *Ecological Economics* 211 (September 2023): 107904, <https://doi.org/10.1016/j.ecolecon.2023.107904>.

⁹⁹ Corrado Motta et al., 'Assessing the Economic Impact of Droughts in Europe in a Changing Climate: A Multi-Sectoral Analysis at Regional Scale', *Journal of Hydrology: Regional Studies* 59 (June 2025): 102296, <https://doi.org/10.1016/j.ejrh.2025.102296>.

¹⁰⁰ Elco E. Koks et al., 'Brief Communication: Critical Infrastructure Impacts of the 2021 Mid-July Western European Flood Event', *Natural Hazards and Earth System Sciences* 22, no. 12 (2022): 3831–38, <https://doi.org/10.5194/nhess-22-3831-2022>.

¹⁰¹ Thijs Endendijk et al., 'Enhancing Resilience: Understanding the Impact of Flood Hazard and Vulnerability on Business Interruption and Losses', *Water Resources and Economics* 46 (April 2024): 100244, <https://doi.org/10.1016/j.wre.2024.100244>.

¹⁰² Aerospace Manufacturing and Design, 'Lessening Storm Impacts on Manufacturing', Aerospace Manufacturing and Design, 14 November 2024, <https://www.aerospacemanufacturinganddesign.com/article/lessening-storm-impacts-on-manufacturing/>.

¹⁰³ L. S. Howard, 'Insured Losses From Natural Disasters Hit \$140B as Climate Change "Shows Its Claws"', *Insurance Journal*, 9 January 2025, <https://www.insurancejournal.com/news/international/2025/01/09/807524.htm>.

Tourism will profoundly change as a result of higher temperatures, especially in Southern Europe. In a 2-degree warming scenario, one study finds that annual tourism is projected to decrease in Italy, Spain, Cyprus and Malta. In contrast, the largest increases in annual tourism would be in Estonia, Netherlands, Denmark and Sweden.¹⁰⁴ A study by the European Commission's Joint Research Centre (JRC) found that coastal regions are among the most affected by climate-related impacts on tourism. Moreover, tourism in Southern Europe is expected to shift away from summer peaks toward greater activity in the spring, fall, and winter seasons. Coastal regions are especially vulnerable, with rising sea levels and erosion threatening popular destinations like Portugal's Algarve and Croatia's Adriatic coast.¹⁰⁵ Over 200 million European citizens live near coastlines.¹⁰⁶ Climate change is also threatening natural tourist attractions such as coral reefs and beaches in the Mediterranean.¹⁰⁷ On the flipside, winter tourism is also impacted by increasing temperatures and weather volatility. Glacial retreat in the Alps can impact tourist activities such as skiing, hiking and beach holidays across Europe.¹⁰⁸

Climate change also poses a formidable challenge to the insurance industry. Research indicates that only about 20% of economic losses from natural catastrophes in the EU are insured, leaving a large insurance gap. This gap is more pronounced in some Southern European economies such as Portugal, Spain, and Italy. Their insurance protection gaps, often exceeding 90% for climate-related losses, mean that their households and public budgets must absorb the bulk of disaster costs.¹⁰⁹ Insurers that do cover climate-related losses might find themselves unable to pay out insurance claims as climate hazards costs increase due to insolvability.¹¹⁰ Some have argued for an EU-level public-private reinsurance scheme and a complementary disaster relief fund to pool risks and incentivise adaptation.¹¹¹

The impact of climate hazards on the tourism sector is likely to be most pronounced in Southern Europe, with Croatia, Greece, Portugal, Spain and Italy, particularly exposed, as tourism constitutes a large share of their GDP. The manufacturing effects of climate change, such as heat stress and supply disruptions, would impact countries such as Ireland, Czech Republic, Slovenia, and Germany, where industrial production is central to economic performance. Meanwhile, Luxembourg, Ireland, Malta, and the Netherlands, face the highest risk of climate-related trade and supply chain disruptions due to their extreme trade openness and dependence on global trade flows.

¹⁰⁴ David Garcia-Leon et al., 'European Tourism Demand in the Face of Climate Change: Asymmetric Impacts, Demand Reallocation, and Deseasonalisation Strategies', 30 January 2025, <https://iopscience.iop.org/article/10.1088/1748-9326/adaa04>.

¹⁰⁵ Skal Europe, 'What Happens to European Tourism If We Do Nothing about Climate Change?', 14 May 2024, <https://www.skaleurope.org/news/what-happens-to-european-tourism-if-we-do-nothing-about-climate-change/>.

¹⁰⁶ Michail Vousdoukas et al., 'Adapting to Rising Coastal Flood Risk in the EU under Climate Change', JRC Publications Repository, 2020, <https://doi.org/10.2760/456870>.

¹⁰⁷ Vera Semeoshenkova and Alice Newton, '(PDF) Overview of Erosion and Beach Quality Issues in Three Southern European Countries: Portugal, Spain and Italy', *ResearchGate*, ahead of print, September 2015, <https://doi.org/10.1016/j.ocecoaman.2015.08.013>.

¹⁰⁸ M. Olefs et al., 'Past and Future Changes of the Austrian Climate – Importance for Tourism', *Journal of Outdoor Recreation and Tourism*, Editorial: Tourism and Climate Change – an integrated look at the Austrian case, vol. 34 (June 2021): 100395, <https://doi.org/10.1016/j.jort.2021.100395>.

European Severe Storms Laboratory, *The Derecho and Hailstorms of 18 August 2022*, 25 August 2022, <https://www.essl.org/cms/the-derecho-and-hailstorms-of-18-august-2022/>.

Martin Beniston and Markus Stoffel, 'Rain-on-Snow Events, Floods and Climate Change in the Alps: Events May Increase with Warming up to 4°C and Decrease Thereafter', *The Science of The Total Environment* 571 (July 2016): 228–36, <https://doi.org/10.1016/j.scitotenv.2016.07.146>.

¹⁰⁹ European Environment Agency, 'Economic Losses and Fatalities from Weather- and Climate-Related Extremes', 1 July 2025, <https://www.eea.europa.eu/en/analysis/publications/economic-losses-from-climate-extremes>.

¹¹⁰ Thomas Frank, 'Climate Change Is Destabilizing Insurance Industry', *Scientific American*, 23 March 2023, <https://www.scientificamerican.com/article/climate-change-is-destabilizing-insurance-industry/>.

¹¹¹ JD Supra, 'The Natural Catastrophe Insurance Gap: Is a Centralised European Backstop the Solution?', JD Supra, 29 July 2025, <https://www.jdsupra.com/legalnews/the-natural-catastrophe-insurance-gap-9081938/>.

3.2. Country vulnerability to climate change

It is important to bear in mind that climate hazards do not generate socio-economic impacts based on exposure alone. Some countries have demonstrated greater resilience to climate change, thanks to better emergency response infrastructure or long-term adaptation planning. Therefore, in the second part of this chapter, the vulnerability of different EU countries is also analysed. Vulnerability is divided into two types: first, the vulnerability of a country to the socio-economic impacts of climate hazards based on its general state capacity (susceptibility); and second, the vulnerability of countries in terms of their capacity to cope with and adapt to specific climate hazards (coping and adapting capacity).¹¹² For example, the quality of political institutions falls under a country's susceptibility, whereas the historical response to floods indicates the coping and adaptive capacity a country may possess in the event of climate hazard events.

Susceptibility is measured by using the 'Readiness index' of the University of Notre Dame Global Adaptation Initiative (ND-GAIN). This index contains a set of Economic, Social and Governance indicators for each EU country and thus provides a proxy for state capacity. The ND Gain readiness index measures this through three dimensions: economic readiness (the business environment, financial depth, and infrastructure quality), governance readiness (regulatory quality, rule of law, and institutional effectiveness), and social readiness (education, digital connectivity, and social inclusion). Countries that perform strongly across these categories tend to manage disaster recovery more efficiently and thus prevent climate hazards from cascading into major fiscal or social crises.

At the top of the European readiness spectrum are the Nordic and Benelux countries, along with Germany, Austria, France, and Ireland. Denmark, Finland, and Sweden rank among Europe's least susceptible countries. Their governance structures are marked by transparent institutions, efficient bureaucracies, and reliable regulatory systems that create a higher level of state capacity, which translates into lower susceptibility.¹¹³ High levels of access to additional public funds (through relatively cheap borrowing operations) and diversified economies create financial buffers for economic losses sustained by climate hazards.¹¹⁴ These countries also possess higher social capital (such as high education levels and trust in institutions) which facilitates community response efficiency and post-crisis regeneration.¹¹⁵

Western and Northern Europe's readiness does not eliminate climate exposure (which in some areas is substantial), but it dampens the possible economic impact. For example, the Netherlands faces extreme physical exposure to sea-level rise, yet its high governance and economic readiness scores indicate it could be well placed to respond to these hazards timely and adequately. Germany, a country that is heavily reliant on river transport and industrial supply chains, has more fiscal capacity and institutional robustness to recover from flood events. These states illustrate how high readiness functions as an economic stabiliser, reducing the duration and scale of climate-related disruption.

¹¹² Femke Remmits et al., *Climate Security Assessment*, n.d.

¹¹³ The Global Economy, 'Government Effectiveness by Country, around the World', TheGlobalEconomy.Com, 2024, https://www.theglobaleconomy.com/rankings/wb_government_effectiveness/.

¹¹⁴ European Commission, 'Do Fundamentals Explain Differences between Euro Area Sovereign Interest Rates? - Economy and Finance', 21 June 2021, https://economy-finance.ec.europa.eu/publications/do-fundamentals-explain-differences-between-euro-area-sovereign-interest-rates_en.

¹¹⁵ Olaf von dem Knesebeck et al., 'Social Capital and Self-Rated Health in 21 European Countries', *GMS Psycho-Social Medicine* 2 (February 2005): Doc02.

By contrast, the countries with lower ND-GAIN readiness scores, primarily in Central–Eastern and Southern Europe, show higher susceptibility to the economic effects of climate hazards. Countries such as Bulgaria, Romania, Hungary, Croatia, Greece, Malta, Cyprus, and Slovakia score below average on this indicator. In these states, governance and economic readiness indicators show structural weaknesses. These countries suffer from more limited administrative capacity, lower regulatory quality, and weaker investment. Social readiness scores are also lower, with higher social inequality, lower education levels and more limited digital access, weakening community readiness. This combination makes these countries more susceptible to climate hazards. Southern European economies such as Portugal, Spain, and Italy demonstrate slightly higher readiness levels than the abovementioned countries. Nevertheless, notable vulnerabilities remain. Italy performs weakly on economic indicators, while Spain scores below the regional average in the social dimension.

In addition to susceptibility, coping and adaptation capacity are also important factors in assessing a country's vulnerability to climate shocks. Coping capacity refers to a country's ability to respond effectively to climate hazards. Assessing this capacity for a country requires evidence from recent, significant events. To evaluate it, the most severe and high-profile climate hazards of the past five years were analysed. For each event, both coping and adaptive capacities were examined to provide an overall assessment of how countries have managed recent climate-related challenges.

The analysed events show that coping capacity was found to be inadequate in a variety of regions in Europe. Germany's 2021 floods exposed early warning and risk area mapping failures.¹¹⁶ By contrast, the 2023 floods in Northern Italy were met by strong emergency response coordination and timely evacuations of affected inhabitants.¹¹⁷ Likewise, Slovenia managed the August 2023 floods well, partly due to well-coordinated EU support.¹¹⁸ Perhaps somewhat counterintuitive, Southern Europe occasionally demonstrates high operational coping for recurrent hazards (wildfire evacuations, drought management), given their frequent exposure and learning curves. Nevertheless, these trends vary by region and hazard and should not be taken as evidence that the overall coping capacity of these countries is higher or even sufficient. Lapses in coping capacity are also observed regularly in Southern Europe. Spain's response to the 2024 Valencia floods, for instance, was widely regarded as inadequate, due to suboptimal alert systems and insufficient coordination.¹¹⁹ Similarly, the 2023 Thessaly floods in Greece exposed weaknesses in local coping capacity and disruptions in WASH (Water, Sanitation and Hygiene) services in affected areas, which are essential for maintaining health and safety following a climate hazard.¹²⁰

For other climate hazards, no clear regional pattern emerges. Spain's Catalonia region has effective drought management plans in place, maintaining water and sanitation continuity

¹¹⁶ The Lancet Regional Health, 'Germany Floods—a Warning for Future Extreme Weather Events', *Europe* 7 (August 2021): 100194, <https://doi.org/10.1016/j.lanepe.2021.100194>.

¹¹⁷ Guy Carpenter, 'Post Event Report: 2023 Mid-May Emilia-Romagna Flood', accessed 14 October 2025, https://www.guycarp.com/insights/2023/06/Italy_Emilias-Romagna_Flood_2023-05.html.

¹¹⁸ European Civil Protection and Humanitarian Aid Operations, 'EU Supports Slovenia in the Aftermath of Devastating Floods', 9 August 2023, https://civil-protection-humanitarian-aid.ec.europa.eu/news-stories/news/eu-supports-slovenia-aftermath-devastating-floods-2023-08-09_en.

¹¹⁹ El País, 'El 112 Recibió Más de 15.000 Llamadas de Socorro Antes de Que El Gobierno de Mazón Enviara La Alerta Por La Dana', 4 May 2025, <https://elpais.com/espana/2025-03-04/el-112-recibio-mas-de-15000-llamadas-de-socorro-antes-de-que-el-govern-enviara-la-alerta-por-la-dana.html>.

¹²⁰ Spyridon Mavroulis et al., 'Impact of the September 2023 Storm Daniel and Subsequent Flooding in Thessaly (Greece) on the Natural and Built Environment and on Infectious Disease Emergence', 2 August 2024, <https://www.mdpi.com/2076-3298/11/8/163>.

through a set of drought rules and the use of desalination.¹²¹ Even within countries, coping responses to climate hazards show case-by-case differences. Greece's Rhodes wildfires in 2023 and 2025 were handled well, exemplified by timely alerts, a high number of successful evacuations, and fast EU coordination.¹²² Nevertheless, the Evros wildfire in 2023 resulted in extensive losses of land and property.¹²³ For storms, Germany and the Netherlands showcased robust early-warning systems that minimised casualties and damage.¹²⁴

Adaptive capacity refers to a country's ability to recover from climate hazards and to prevent or mitigate the impacts of future events. An example of this is the speed of rebuilding destroyed infrastructure after a climate hazard, but also the extent to which that rebuilt infrastructure is 'climate proof'.

With regard to adaptation in Europe, several observations stand out. First, adaptation measures are often implemented reactively. For example, Germany's Ahr floods prompted the introduction of a nationwide cell broadcast warning system, while France's 2022 wildfires led to the adoption of a new wildfire law. Catalonia's drought accelerated the implementation of desalination and water reuse initiatives. This indicates that countries tend to adapt where disasters have already occurred, rather than where future hazards are most likely, revealing gaps in proactive adaptation. Central and Eastern European countries generally have less developed adaptation plans (Poland and Hungary do not have a national Adaptation Plan at all), most likely because of the lower policy priority assigned to climate change compared with Northern and Southern Europe. These countries also score relatively poorly on the Climate Change Performance Index (CCPI), lagging behind in key climate policy areas.¹²⁵

Moreover, the current pace of adaptation is far from sufficient. Despite stronger warning systems and emergency plans, the scale of climate hazard losses in Europe shows that adaptation is lagging behind climate risk. The 2024 heat season alone caused over 62,000 deaths, while losses from floods and drought continue to rise. The European Court of Auditors highlighted in 2024 that adaptation spending is still too fragmented, with short project horizons and limited follow-up on announced initiatives.¹²⁶ This adaptation shortfall is further exacerbated by low insurance coverage for climate-related losses, leaving households and governments to absorb the economic shocks following climate hazards. In many cases, homes and infrastructure are simply rebuilt in high-risk areas, perpetuating vulnerability to future events.

Another weakness in adaptation measures in Europe is the focus on short-term relief and crisis response. Initiatives such as the EU Solidarity Fund and the expansion of the rescEU firefighting fleet strengthen crisis response, but they do little to enhance climate hazard prevention or long-term structural resilience.

¹²¹ Ministry for European Union and Foreign Action, 'Catalonia Declares a Drought Emergency and Activates Measures to Address It', Ministry for European Union and Foreign Action, 2 January 2024, http://exteriors.gencat.cat/en/ambits-dactuacio/afers_exteriors/delegacions_govern/ue/actualitat/not_240201_drought_emergency.

¹²² Jon Henley and Angela Giuffrida, 'Crete Wildfire Forces 5,000 to Evacuate as Europe Heatwave Continues', World News, *The Guardian*, 3 July 2025, <https://www.theguardian.com/world/2025/jul/03/more-than-1500-people-evacuated-in-crete-amid-wildfire-as-europe-heatwave-continues>.

¹²³ The International Association of Wildland Fire, 'Overview 2023: Greece - Lessons Not Learned', *International Association of Wildland Fire*, n.d., accessed 6 November 2025, <https://www.iawfonline.org/article/overview-2023-greece/>.

¹²⁴ Lars Bolle Gasser Max, 'The Flood of the Century: The Storm Surge Night of 20 October 2023 on the Baltic Sea', YACHT - Everything about Sailing, 20 October 2025, <https://www.yacht.de/en/special/distress-at-sea/the-flood-of-the-century-the-storm-surge-night-of-20-october-2023-on-the-baltic-sea/>. KNMI, 'Drielingstorm Dudley, Eunice En Franklin', 21 February 2022, <https://www.knmi.nl/over-het-knmi/nieuws/drielingstorm-dudley-eunice-en-franklin>.

¹²⁵ CCPI, *Ranking | Climate Change Performance Index*, 20 November 2024, <https://ccpi.org/ranking/>.

¹²⁶ European Court of Auditors, 'Special Report 15/2024: Climate Adaptation in the EU', European Court of Auditors, 16 October 2024, <http://www.eca.europa.eu/en/publications/sr-2024-15>.

3.3. Main findings

This chapter has analysed the sectoral impacts of climate hazards across the EU, as well as the country exposure, country susceptibility and their respective coping and adaptive capabilities. The main findings are as follows.

Food is Europe's most affected sector, with Southern Europe highly exposed and facing severe yield and GDP losses from drought, heat, and floods. Northern Europe may experience limited short-term gains but is also expected to suffer increasing flood-related damage.

Infrastructure and energy systems are vulnerable to heat, droughts, floods, and sea-level rise. Some lower lying countries, such as the Netherlands, Belgium, Malta, and Cyprus are most exposed to long term infrastructure risk due to sea level rise, threatening vast portions of infrastructure. Furthermore, heat and drought are set to impact rail, road, water and energy infrastructure, increasing climate hazard costs across Europe but especially in faster heating regions such as Southern Europe.

Human health impacts are highest in Southern and Southeastern Europe, where heat, drought and wildfires cause fatalities and internal displacement. Heat-related mortality is also amplified by weaker healthcare and aging societies.

Economy and finance are impacted on multiple fronts. Heat lowers productivity, impacting manufacturing regions in Europe. Droughts and floods can disrupt supply chains, which impact highly open economies such as Luxembourg, Ireland, Malta, and the Netherlands. Tourism losses are expected to hit Southern Europe hardest, due to their larger dependence on tourism as a percentage of GDP.

Susceptibility to climate hazards depends on a country's economic strength, governance quality, and social capacity. Northern and Western EU Member States such as the Nordics, Benelux states, Germany, and Austria score highest due to strong institutions, diverse economies, and high social trust. Central and Eastern Europe (and to a lesser extent Southern Europe) show weaker governance and higher inequality, making them more susceptible to climate impacts.

The ability to cope with climate hazards in Europe is uneven, and examples of coping failures are found in both Northern and Southern Europe. While emergency responses are generally competent, weaknesses persist in early warning systems and risk mapping. Major events such as the 2021 Germany floods, the 2023 Evros wildfire, and the 2024 Valencia floods revealed critical shortfalls in disaster responses.

Adaptation remains reactive and insufficient. Adaptation measures are often triggered by disasters rather than anticipation. Central and Eastern Europe are lagging most in planning and policy. Fragmented funding and a focus on short-term crisis response leave Europe underprepared for escalating climate hazards.

4. Increasing conflicts of interests and implications for cohesion

Understanding the political dynamics in the EU is essential for assessing how climate change may influence EU cohesion and stability. The previous chapters outlined a framework for analysing the first- and second-order effects of climate change in Europe, with particular attention to their socio-economic dimensions. These effects in turn give rise to third-order consequences, notably the political implications of climate change within the European Union. In this study, the cohesion of EU decision-making is conceptualised as the extent to which EU Member States can bridge divergent conflicts of interest and implement effective collective policies.

This chapter examines whether climate change intensifies existing tensions among EU Member States or generates new ones through its socio-economic impacts. It follows the assumption that climate change functions as a 'burden multiplier', amplifying pre-existing divisions within the EU and, in doing so, posing potential challenges for political cohesion. The EU policy-making process is built on consensus, which makes decisive policymaking in areas of competing national priorities complicated. Topics such as EU-wide fiscal and budgetary rules, agricultural policy, and migration policy, have long been contentious within the EU, often resulting in political deadlock or incoherent compromises. The challenge of climate change adds yet another layer to this complex web of competing interests and priorities.

The socio-economic effects of climate change shape EU politics in numerous ways, most of which can be understood through three main conflict dimensions. The first dimension relates to the uneven distribution of climate hazards and adaptation efforts, which may trigger disputes over financial transfers to more climate-vulnerable EU Member States. Uneven economic impacts of climate change can increase the need for intra-EU fiscal transfers, potentially creating political conflicts of interest.

The second dimension involves sector-specific socio-economic impacts that can generate issue-based conflicts of interest. For example, climate change effects on agriculture may directly influence the design of EU agricultural policy, creating tensions between countries seeking to 'climate-proof' the Common Agricultural Policy (CAP) and those preferring to relax climate requirements in favour of direct farmer support.

The third dimension concerns broader disagreements that may arise between actors that want to preserve existing socio-economic structures (e.g., in agriculture or construction) and those advocating for a transition toward a climate-oriented socio-economic model. Such divergences could result in political stalemates or a gradual fragmentation of EU Member States' policy preferences and interests.

To assess how sectoral dynamics may affect the EU's political cohesion, it is important to identify which policy areas fall under shared competences between the EU and its Member States, i.e., areas where responsibilities are divided across both levels of governance. Climate, energy, migration and commercial policies are key examples of such shared competences.¹²⁷ Socio-economic impacts in these areas directly influence EU-policymaking, as the Union holds substantial authority in shaping policy responses.

In contrast, sectors such as health, industry and tourism, fall primarily under national competence, where the EU's authority is limited to supporting, coordinating, or complementing national actions without the ability to harmonise policies.¹²⁸ Consequently, socio-economic shocks in these sectors may still create political frictions, but primarily by amplifying conflicts of interest in other domains, such as budgetary or fiscal policy, where collective EU level decisions are required.

This chapter examines three main areas of conflict that are expected to become more polarised among EU Member States: intra-EU financial transfers, policy priorities, and business as usual vs. pursuing long-term climate adaptation.

4.1. Conflicts of interest over intra-EU financial transfers

The EU regards the promotion of balanced and equitable development among its EU Member States as one of its core principles. Article 3(3) of the Treaty on European Union (TEU) states that the Union “*shall promote economic, social and territorial cohesion, and solidarity among Member States.*”¹²⁹ One of the key instruments through which the EU pursues this objective is through its *cohesion policy*, which is directly supported by several funds financed through the EU budget.¹³⁰ In addition, other EU policies indirectly support cohesion by incorporating solidarity mechanisms or granting country-specific rule exceptions.

Within the EU framework, numerous solidarity mechanisms are explicitly or implicitly embedded. As climate change increasingly affects the EU economy, these mechanisms may also come under strain. More vulnerable EU Member States may seek greater support from existing solidarity mechanisms to offset the economic impacts of climate change. In turn, this could increase the pressure on those EU Member States that already are net contributors to the EU budget.

The following section provides an overview of the direct and indirect impacts of the most salient EU-level conflicts of interest and considers how climate change may influence them.

¹²⁷ European Union, 'Division of Competences within the European Union', accessed 16 October 2025, <https://eur-lex.europa.eu/EN/legal-content/summary/division-of-competences-within-the-european-union.html>.

¹²⁸ European Union, 'Division of Competences within the European Union'.

¹²⁹ European Union, 'EUR-Lex - 12008M003 - EN', text/html; charset=UTF-8, Official Journal 115 , 09/05/2008 P. 0017 - 0017; OPOCE, 9 May 2008, https://eur-lex.europa.eu/eli/treaty/teu_2008/art_3/oj/eng.

¹³⁰ European Commission, 'Inforegio - European Regional Development Fund', accessed 17 October 2025, https://ec.europa.eu/regional_policy/funding/erdf_en.

European Commission, 'Cohesion Fund (CF)', accessed 17 October 2025, https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/cohesion-fund-cf_en.

4.1.1. EU Budget

The EU budget is the financial plan through which the European Union funds its priorities and policies. The strategic priorities underpinning the budget, also known as the Multiannual Financial Framework (MFF), are periodically renegotiated by the EU Member States. The budget is funded by EU Member States' contributions. Overall, wealthier countries contribute more than they receive (net contributors), while less wealthy countries receive more from the budget than they contribute (net recipients).¹³¹

Unsurprisingly, this reality has political implications. Generally, net contributors (countries such as the Netherlands, Germany, and Sweden) prefer to limit increases in the budget, as higher budgets correspond to higher net contributions for them.¹³² Net beneficiaries of the EU budget (mostly Southern and Eastern EU Member States) receive more than they contribute, and therefore generally support higher budgets. During the negotiations of the new MFF in 2020, net beneficiary countries united under the 'The Friends of Cohesion' group.¹³³ This group includes Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Spain, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Hungary and Italy.¹³⁴ These countries pushed back against cuts to the EU cohesion budget, stressing the importance of European 'cohesion' in the form of available funds for less wealthy EU Member States.¹³⁵ Countries that did not support higher budgets were part of the 'Frugals' (Austria, Denmark, Netherlands and Sweden). This group sought to keep the EU budget capped at 1% of GNI. In the end, a compromise was reached in the form of a €1.074 trillion MFF for 2021-2027, paired with a €750 billion recovery fund (NextGenerationEU), including €390 billion in grants and €360 billion in loans.¹³⁶

The increasing socio-economic strain on less wealthy EU countries as a result of climate change will likely necessitate higher transfer payments through the budget allocation mechanism, creating a further rift between net contributors and net recipients. Therefore, this conflict of interest is likely to intensify.

4.1.2. EU Fiscal policy

All EU members states are required to adhere to a set of fiscal rules called the Stability and Growth Pact (SGP). The SGP establishes limits for national budgetary policy, including a maximum budget deficit of 3% of GDP a maximum debt-to-GDP ratio of 60%.¹³⁷ Not all EU Member States have consistently remained within these limits, making them subject to EU disciplinary mechanisms. The precise nature of these mechanisms is subject to political

¹³¹ 'EU Budget: Who Pays the Most into the EU, and Who Gains the Most? | Euronews', accessed 20 August 2025, <https://www.euronews.com/business/2024/12/09/eu-budget-who-pays-the-most-into-the-eu-and-who-gains-the-most>.

¹³² Reuters, 'Explainer - Frugal Four vs Friends of Cohesion: The EU's Baffling Budget Battle', 20 February 2020, <https://www.reuters.com/article/business/explainer-frugal-four-vs-friends-of-cohesion-the-eus-baffling-budget-battle-idUSKBN20E1NJ/>.

¹³³ Reuters, 'Explainer - Frugal Four vs Friends of Cohesion: The EU's Baffling Budget Battle'.

¹³⁴ Ministry of Development Funds and Regional Policy, 'Friends of Cohesion Summit in Portugal - Ministry of Development Funds and Regional Policy', Ministry of Development Funds and Regional Policy, 3 February 2020, <https://www.gov.pl/web/funds-regional-policy/friends-of-cohesion-summit-in-portugal>.

¹³⁵ Government of the Czech Republic, 'Government of the Czech Republic', 5 November 2019, <https://vlada.gov.cz/en/media-centrum/aktualne/friends-of-cohesion-joint-declaration-on-the-multiannual-financial-framework-2021-2027-177497>.

¹³⁶ 'EU Budget, Spending | European Union', accessed 20 August 2025, https://european-union.europa.eu/institutions-law-budget/budget/how-eu-budget-spent_en.

¹³⁷ Consilium, 'Excessive Deficit Procedure', Consilium, accessed 17 October 2025, <https://www.consilium.europa.eu/en/policies/excessive-deficit-procedure/>.

debate. Some EU Member States favour the strict enforcement of debt and deficit controls, while others advocate a more flexible, country-specific approach.

Some countries, such as Spain, Italy and France, have advocated for a more flexible and gradual mechanism for countries that fail to meet SGP targets.¹³⁸ By contrast, the so-called 'strict countries', comprising Austria, Denmark, Latvia, Slovakia, the Czech Republic, Finland, the Netherlands, and Sweden, jointly issued a position paper rejecting proposals from Southern EU Member States to relax the bloc's deficit rules in response to pandemic-related debt.¹³⁹

In recent years, the fiscal debate has moved toward compromise, combining fiscal discipline with pragmatism. Despite initial opposition, the EU issued joint debt in 2022 under the 'SURE' program.¹⁴⁰ While technically these bonds are backstopped by the EU budget rather than EU Member States, this represented a clear step toward greater fiscal burden sharing in the Union. Moreover, the 2024 reforms of the SGP granted Southern and high-debt EU Member States, such as Italy, Spain, France, Greece, and Portugal, more time and autonomy in debt reduction.¹⁴¹ Germany, once a fiscal hardliner, changed course in 2025 and now plays a bridging role, facilitating compromise between stricter and more flexible fiscal camps.¹⁴²

Despite this compromise, the increasing socio-economic impact of climate change on debt-ridden EU Member States will likely necessitate more debt flexibility or direct financial support from other EU Member States. Among more affluent EU Member States, the perception that high-debt countries have "lived on borrowed money" is widespread and often surfaces in political debate. A notable example occurred in 2017, when then-Eurogroup President Jeroen Dijsselbloem controversially remarked that Southern EU Member States had "spent their money on women and alcohol", a statement widely interpreted as referring to countries such as Italy, Spain, Greece and Portugal.¹⁴³ Understandably, the response of these countries was indignant, further straining relations and complicating the policy-making process.¹⁴⁴

4.1.3. EU Migration

EU Member States' positions on migration burden-sharing reveal a clear split between supporters and opponents. A significant group backs solidarity mechanisms, particularly Southern and Western EU Member States most directly exposed to migration pressures.¹⁴⁵

¹³⁸ Reuters, 'Germany, France Clash over Reform of EU Fiscal Rules, Deal Seen by End-2023', 16 June 2023, <https://www.reuters.com/markets/us/germany-france-clash-over-reform-eu-fiscal-rules-deal-seen-by-end-2023-2023-06-16/>; AP News, 'EU Countries Agree on Compromise for Overhaul of Bloc's Fiscal Rules', AP News, 20 December 2023, <https://apnews.com/article/eu-finance-fiscal-rules-reform-b069d514207421d97a6cbff7e4ae50e2>; Angelo Amante, 'Italy's Meloni Calls for More Lenient EU Stability Pact', Europe, *Reuters*, 25 October 2023, <https://www.reuters.com/world/europe/italys-meloni-calls-more-lenient-eu-stability-pact-2023-10-25/>.

¹³⁹ European Parliament, 'Budgetary Outlook for the European Union 2025', 31 March 2025, [https://www.europarl.europa.eu/thinktank/en/document/EPRS_STU\(2025\)769563](https://www.europarl.europa.eu/thinktank/en/document/EPRS_STU(2025)769563).

¹⁴⁰ European Commission, 'SURE - Economy and Finance - European Commission', 2 June 2023, https://economy-finance.ec.europa.eu/eu-financial-assistance/sure_en.

¹⁴¹ 'EU's Wobbly Budget Rules Can Bolster Shaky Economy | Reuters', accessed 20 August 2025, <https://www.reuters.com/breakingviews/eus-wobbly-budget-rules-can-bolster-shaky-economy-2024-06-03/>.

¹⁴² 'Germany's Push to Loosen EU Fiscal Rules Is Gathering Momentum - Bloomberg', accessed 20 August 2025, <https://www.bloomberg.com/news/articles/2025-03-06/germany-s-push-to-loosen-eu-fiscal-rules-is-gathering-momentum>.

¹⁴³ Euronews, 'Calls for Eurogroup President to Resign after "drinks and Women" Outrage', Euronews, 12:53:01 +01:00, 77000, <http://www.euronews.com/2017/03/22/calls-for-eurogroup-president-jeroen-dijsselbloem-to-resign-after-drinks-and>.

¹⁴⁴ Euractiv, 'Indignation Grows over Eurogroup Chief's "Drinks and Women" Remarks', *Euractiv*, 23 March 2017, <https://www.euractiv.com/news/indignation-grows-over-eurogroup-chiefs-sex-and-women-remarks/>.

¹⁴⁵ European Parliament, 'Solidarity in EU Asylum Policy | Think Tank | European Parliament', 2 September 2024, [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2020\)649344](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2020)649344).

Strong supporters of burden-sharing include Greece, Italy, Spain, Cyprus, Malta, and Portugal, which serve as entry points of migratory flows from other continents and therefore advocate for the distribution of responsibilities among all EU Member States. Larger EU Member States such as France and Germany also lean towards collective responsibility.

Central and Eastern EU Member States such as Bulgaria, Croatia, Romania, Slovenia, Lithuania, and the Czech Republic have indicated at least some willingness to partake in burden-sharing, along with Ireland, Finland, Belgium, and the Netherlands. Nevertheless, a 'hardline' group of countries continues to oppose burden-sharing. This group includes Austria, Denmark, Estonia, Hungary, Poland, Slovakia, and Latvia. These countries reject the redistribution of asylum seekers (and their associated costs), instead emphasising national sovereignty and security concerns.

While a majority of EU members support or lean towards migration burden-sharing, a vocal minority remains opposed. These divisions have hampered the progress in reforming EU migration and asylum policy. Given that climate change is likely to act as a multiplier for current migration patterns, the pressure on EU 'border states' will most likely increase. These pressures could spark calls for intensified burden sharing mechanisms, which are unlikely to be received favourably in some EU countries.

4.1.4. EU Disaster relief and insurance

Recent disasters have stretched the EU Solidarity Fund, a natural disaster relief fund, which ran out of budget in both 2021 and 2022.¹⁴⁶ Experts argue that the current relief budget is insufficient to address emerging climate risks.¹⁴⁷ Moreover, an increasing portion of European infrastructure is becoming 'uninsurable' due to high climate risks.¹⁴⁸ EU watchdogs have urged to increase the funding of the EU-wide disaster-relief fund and the establishment of a public-private reinsurance scheme to close this growing insurance gap.¹⁴⁹

These initiatives would require additional transfers of funds to regions most prone to climate hazards, often areas that are already net recipients of EU funds. Several EU Member States, such as Austria and France, maintain national disaster funds and may therefore be hesitant to share such costs at the EU level.¹⁵⁰ The debate on joint disaster financing and insurance pooling is relatively new and has gained momentum only in recent years, explaining why most EU Member States have not taken any clear positions. However, as climate-related losses continue to rise, differing national interests are likely to become more pronounced.

¹⁴⁶ Reuters, 'EU's Disaster Response Fund at Limit as Climate Crises Mount | Reuters', 12 September 2023, <https://www.reuters.com/world/europe/eus-disaster-response-fund-limit-climate-crises-mount-2023-09-12/>.

¹⁴⁷ Bruegel, 'Better Braced for Disaster: Upgrading EU Support Mechanisms', 3 September 2025, <https://www.bruegel.org/first-glance/better-braced-disaster-upgrading-eu-support-mechanisms>.

¹⁴⁸ Moriah Costa, 'Insurance Losses from Climate Change Could Impact Wider Economy, ECB Warns', *Green Central Banking*, 9 June 2025, <https://greencentralbanking.com/2025/06/09/insurance-losses-from-climate-change-could-impact-wider-economy-ecb-warns/>.

¹⁴⁹ Martin Arnold, 'EU Watchdogs Call for Disaster-Relief Fund in Wake of Valencia Floods', *Financial Times*, 18 December 2024.

¹⁵⁰ Pierre-Elliott PHELPS, 'Climate Change and Real Estate in France: How a Reform of the "CatNat" Insurance Scheme Addresses the Shrink-Swell Phenomenon.', Callendar, 18 October 2024, <https://www.callendar.tech/en/post/shrink-swell-insurance-france>; KDZ, 'Katastrophenfonds in Österreich: Wie Er Funktioniert Und Wer Davon Profitiert', KDZ - Zentrum Für Verwaltungsforschung, 5 November 2025, <https://www.kdz.eu/de/aktuelles/blog/katastrophenfonds-oesterreich-wie-er-funktioniert-und-wer-davon-profitiert>.

4.2. Balancing climate ambition and competing policy

Due to the structure of the EU, some sectoral policies are (partly) decided at the EU level, which can give rise to conflicting interests and policy priorities among EU Member States. Differences in development levels or exposure to security threats often result in divergent policy priorities. The socio-economic effects of climate change can directly influence these policy conflicts, either by shaping EU Member States' policy preferences or by complicating the implementation of EU policies. The following section provides an overview of the most significant conflicts of interest in prioritising and implementing EU sectoral policy.

4.2.1. EU Common Agricultural Policy (CAP)

The conflicts of interest within the EU's Common Agricultural Policy (CAP) are becoming more pronounced under the pressure of climate change. Initially, the CAP was designed to ensure post-war food security. However, climate change has introduced new issues into the policy debate, including emissions, farming practices and climate adaptation.

Southern states such as Spain and Italy argue for stronger support to deal with heat, drought, and water scarcity issues. These countries propose that CAP funds be redirected toward climate adaptation measures.¹⁵¹ Northern and Western EU Member States (France, Germany, the Netherlands) acknowledge the need for sustainability but currently face significant political sensitivities regarding sustainable agricultural policies.¹⁵² They often stress the impact of climate policy on competitiveness and productivity and are especially hesitant about climate policies that might provoke farmer unrest.¹⁵³ Meanwhile, Central and Eastern EU Member States, such as Poland, emphasise the importance of income support and flexibility over accelerating the energy transition. For example, Poland allocated a third of its CAP funding to Pillar I (direct farmer support), reflecting a preference for direct compensation over longer-term climate or structural measures.¹⁵⁴

These developments create distinct conflicts of interest between the north, south, and east. Climate change is amplifying these tensions. In Southern EU Member States, where agriculture constitutes a larger share of GDP, yield losses are expected to contribute more to inflation than in countries where agriculture plays a smaller role, such as most Northern EU Member States.¹⁵⁵ This will likely lead Southern Europe to demand greater adaptation spending. However, this conflicts with the Northern European push to maintain productivity and moderate green agricultural policies, as well as the Central and Eastern European emphasis on prioritising farmer support over climate adjustments.

¹⁵¹ Institute of European Environmental Policy, 'Environment and Climate Assessment of Spain's CAP Strategic Plan', *IEEP AISBL*, 27 February 2023, <https://ieep.eu/publications/environment-and-climate-assessment-of-spains-cap-strategic-plan/>.

European Commission, 'Italy – CAP Strategic Plan', 19 September 2025, https://agriculture.ec.europa.eu/cap-my-country/cap-strategic-plans/italy_en.

¹⁵² Robert Finger et al., 'Farmer Protests in Europe 2023–2024', *EuroChoices* 23, no. 3 (2024): 59–63, <https://doi.org/10.1111/1746-692X.12452>.

¹⁵³ European Commission, 'Italy – CAP Strategic Plan'.

¹⁵⁴ Institute of European Environmental Policy, 'Environment and Climate Assessment of Poland's CAP Strategic Plan', *IEEP AISBL*, 27 February 2023, <https://ieep.eu/publications/environment-and-climate-assessment-of-polands-cap-strategic-plan/>.

¹⁵⁵ Gheorghita Dincă et al., 'Analyzing EU's Agricultural Sector and Public Spending under Climate Change', 2024, <https://www.mdpi.com/2071-1050/16/1/72>.

4.2.2. Climate Priorities in the EU

Nearly 75% of EU citizens recognise the need to adapt their lifestyles due to climate change, with climate ranked as the second most pressing national concern after the cost of living. However, priorities vary sharply across the Union: over 60% of people in Southern EU Member States like Greece and Spain consider climate a top concern, whereas in Central and Baltic EU Member States, this urgency is not shared, with only 16% of people in Estonia seeing it as the top concern.¹⁵⁶ As of 2023, only 16 EU Member States have active national climate adaptation plans. Countries like Romania, Hungary, and Estonia previously had such plans but have since discontinued them. Even fewer have adopted sector-specific adaptation strategies, with only Bulgaria, Ireland, Spain, Italy, Portugal, Finland, and Sweden having done so.¹⁵⁷

There is also competition over EU-wide funds. For example, in 2020, Poland advocated for more EU carbon market funds to be directed to poorer states to support their green transition, funds that could also go to climate adaptation in Southern EU Member States.¹⁵⁸ In early 2025, Spain requested EU approval to redirect over €1 billion in recovery funds to enhance climate resilience in Valencia following the 2024 floods.¹⁵⁹

Finally, countries like Italy, the Czech Republic, and Poland have also pushed to weaken or delay certain climate policies.¹⁶⁰ For instance, in 2023, Poland asked the EU Court of Justice to annul three climate laws due to their concerns over their potential negative effects on the national economy and energy system.¹⁶¹

These trends highlight increasing conflicts of interests between countries that prioritise climate adaptation spending and those that either don't see climate change policy as a top concern or actively seek to weaken certain climate measures.

4.2.3. EU Defence vs. Climate Priorities

EU Member States differ strongly in their defence spending priorities and can be roughly grouped into four categories. The EU Defence 'Vanguard' group, which includes Poland, the Baltic states, Finland, Greece, and Estonia, prioritises high defence investment, most likely due to their proximity to Russia. The upper-middle cohort, consisting of France, Germany, Denmark, the Netherlands, Portugal and Romania, also invests significantly in defence (above 2% in 2024) and has committed to increase defence spending to reach the NATO norm of 5%. However, not all countries share the same level of commitment to strengthening European defence.

¹⁵⁶ BNE Intellinews, 'Central European Countries Least Likely in the EU to Prioritise Climate Change', 18 November 2024, <https://www.intellinews.com/central-european-countries-least-likely-in-the-eu-to-prioritise-climate-change-353742/>.

¹⁵⁷ European Parliament, 'Regional and Local Adaptation to Climate Change: Gaps, Challenges and Opportunities', 9 January 2024, [https://www.europarl.europa.eu/thinktank/en/document/EPRS_IDA\(2024\)757589](https://www.europarl.europa.eu/thinktank/en/document/EPRS_IDA(2024)757589).

¹⁵⁸ Kate Abnett, 'Poland Seeks Extra Carbon Market Cash for Green Shift', Energy, *Reuters*, 20 October 2020, <https://www.reuters.com/article/business/energy/poland-seeks-extra-carbon-market-cash-for-green-shift-idUSL4N2HB2QN/>.

¹⁵⁹ Reuters, 'Valencia Floods Prompt Race for Funds to Boost Spain's Climate Resilience', 6 February 2025, <https://www.reuters.com/sustainability/sustainable-finance-reporting/valencia-floods-prompt-race-funds-boost-spains-climate-resilience-2025-02-06/>.

¹⁶⁰ Reuters, 'EU under Pressure to Weaken More Climate Policies, Denmark Says', 17 December 2024, <https://www.reuters.com/business/environment/eu-under-pressure-weaken-more-climate-policies-denmark-says-2024-12-17/>.

¹⁶¹ Kate Abnett and Kate Abnett, 'Poland Asks EU's Top Court to Cancel Three Climate Policies', Europe, *Reuters*, 28 August 2023, <https://www.reuters.com/world/europe/poland-asks-eus-top-court-cancel-three-climate-policies-2023-08-28/>.

States such as Italy, Hungary, Croatia, Belgium, and Slovakia adopt a more cautious approach to defence spending and to meeting the 5% NATO target. Finally, laggards like Spain and Slovenia, along with non-NATO sceptics including Austria, Ireland, Cyprus, and Malta, allocate comparatively less to defence.

Even though climate resilience and territorial safety are tightly interlinked, the increased focus on defence spending could come at the cost of climate policy.¹⁶² For example, The 2023 mid-term budget review allowed cohesion funds to be redirected to defence, creating the possibility of crowding out climate adaptation spending.¹⁶³ Poland has even suggested using EU recovery funds for arms production, in tension with the Recovery and Resilience Facility (RRF) requirement that a minimum of 37% of funds be allocated to climate-related spending.¹⁶⁴ In Germany, defence received special budget treatment while climate spending programmes faced cuts following the constitutional court's 'debt brake' ruling in 2023.¹⁶⁵ Cutting climate adaptation spending in favour of defence risks undermining both goals through greater infrastructural and societal disruption, ultimately weakening defence readiness.

Southern EU Member States, already strained by high debt and severe climate risks like droughts, wildfires, and migration pressures, may prioritise climate adaptation and disaster relief over expanding defence budgets.¹⁶⁶ In contrast, Eastern and Northern "Vanguard" EU Member States facing direct security threats from Russia, are likely to continue pushing for higher defence spending. These divergences could create a deadlock in both domains, further exacerbating differences in climate and defence policies across Europe.

4.3. Protecting existing systems versus investing in long-term resilience

Both governments and private actors are beginning to prepare for climate hazards, but their approaches differ, and not all are geared toward long-term adaptation. Measures designed to shield from direct climate impacts can, overall, exacerbate climate-related issues. For example, some French farmers have started preparing for possible drought periods by installing large water basins to store needed water. However, these so-called 'megabasins' are fueling domestic conflicts in France by pitting large irrigators against smaller farmers and

¹⁶² Balázs Markó, 'The Green Peace Dividend: The Effects of Militarization on Emissions and the Green Transition', arXiv:2408.16419, preprint, arXiv, 10 February 2025, <https://doi.org/10.48550/arXiv.2408.16419>.

¹⁶³ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Amending Regulations (EU) 2021/1058 and (EU) 2021/1056 as Regards Specific Measures to Address Strategic Challenges in the Context of the Mid-Term Review (2025), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52025PC0123>.

¹⁶⁴ Reuters, 'Poland Aims to Use EU Recovery Funds for Defence Sector', Europe, *Reuters*, 21 February 2025, <https://www.reuters.com/world/europe/defence-spending-will-remain-top-priority-poland-says-finance-minister-2025-02-21/>; European Commission, 'Recovery and Resilience Facility', 12 February 2021, https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en.

¹⁶⁵ Clean Energy Wire, 'Q&A – What the German Top Court's "Debt Brake" Ruling Means for Climate Policy', Clean Energy Wire, 16 November 2023, <https://www.cleanenergywire.org/factsheets/qa-what-german-top-courts-debt-brake-ruling-means-climate-policy/>; Noerr, 'German Bundestag Approves Exemption from the Debt Brake for Defence Spending and Special Funds for Investments in Infrastructure and Climate Protection', 21 March 2025, <https://www.noerr.com/en/insights/bundestag-approves-exemption-from-the-debt-brake-for-defence-spending-and-special-funds-for-investments-in-infrastructure-and-climate-protection>.

¹⁶⁶ Georgia Pane, 'Budgeting for War: The Climate-Security Trade-off and Profiles of Responsibility in International Law', *QIL QDI*, 30 September 2025, <https://www.qil-qdi.org/budgeting-for-war-the-climate-security-trade-off-and-profiles-of-responsibility-in-international-law/>.

communities competing for limited water. These basins offer short-term drought relief but risk weakening long-term resilience by promoting unsustainable water use and dependency.¹⁶⁷

Farmers in the EU may also oppose adaptation policies at local, national or EU-level. Spanish farmers protested government plans to reduce irrigation water, viewing it as a threat to their livelihoods. Nevertheless, EU policymakers argue that such limits are needed to ensure long-term climate resilience and sustainable water management.¹⁶⁸ Similarly, some farmers perceive the ecosystem approach of the EU Green Deal as increasing operating costs and reducing income in the short term.¹⁶⁹ The easing of 'green requirements' under the CAP could spark conflicts between EU Member States favouring short-term income support and those prioritising long-term climate adaptation, as looser standards may divert funds from building resilience toward immediate relief.¹⁷⁰

The EU Buildings Directive aims to make housing more energy-efficient and climate-resilient but has sparked conflict among EU Member States. Wealthier Northern countries support strict renovation rules, while Southern and Eastern EU Member States warn of unaffordable costs and limited local capacity. Critics in Italy call it an "economic disaster," arguing that it imposes unrealistic upgrades without sufficient EU support.¹⁷¹ These tensions expose a divide between short-term affordability concerns and long-term adaptation goals.

This tension between short-term and long-term orientation is also evident in the broader climate adaptation domain. In the aftermath of major climate hazards, the conflict becomes particularly apparent. Reconstruction in Germany after the flood in the Ahr Valley included some adaptive measures such as updated flood maps and stronger infrastructure. However, most rebuilding followed pre-disaster 'business-as-usual' patterns, with limited adaptive location planning.¹⁷² Similarly, a study of post-flood reconstruction in Thessaly, Greece, following the 2023 floods found that rebuilding largely adhered to conventional land-use patterns rather than integrating adaptive planning principles.¹⁷³

These short-term vs. long-term conflicts will be exacerbated by increasing and unevenly spread climate hazards, as more hazard prone regions risk getting stuck in short-term response loops, while less affected regions will have the capability to plan long-term, further undermining political cohesion.

¹⁶⁷ Euronews, 'Megabasins: Solution or "Insane" Response to Drought?', Euronews, 8 June 2023, 1200000, <http://www.euronews.com/2023/06/08/megabasins-solution-or-insane-response-to-drought>.

¹⁶⁸ Reuters, 'Spanish Farmers Protest against Plans to Curb Water Supply for Irrigation', Europe, *Reuters*, 11 January 2023, <https://www.reuters.com/world/europe/spanish-farmers-protest-against-plans-curb-water-supply-irrigation-2023-01-11/>.

¹⁶⁹ European Parliament, 'Research for the AGRI Committee - The Green Deal and the CAP: Policy Implications to Adapt Farming Practices and to Preserve the EU's Natural Resources', 23 November 2020, [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2020\)629214](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2020)629214).

¹⁷⁰ Kate Abnett and Kate Abnett, 'EU Proposes Curbing More Green Rules on Farming Subsidies', *Climate & Energy, Reuters*, 14 May 2025, <https://www.reuters.com/sustainability/climate-energy/eu-proposes-curbing-more-green-rules-farming-subsidies-2025-05-14/>.

¹⁷¹ ECR Group in the European Committee of the Regions, 'EU Buildings Directive Represents Economic Disaster for Italy', ECR Group in the European Committee of the Regions, 15 February 2023, <https://www.ecrcor.eu/news/532-eu-buildings-directive-represents-economic-disaster-for-italy>.

¹⁷² AS+P, 'AS+P's Publication in the 14th Biennale Catalogue: Focus on Sustainability in the Reconstruction of the Ahr Valley', 2 July 2024, <https://www.as-p.com/update/as-p-s-publication-in-the-14th-biennale-catalogue-482>; Wicher Carolina, 'Land Rheinland-Pfalz stellt neue Sturzflutgefahrenkarten vor | Kreisverwaltung Ahrweiler', *Kreisverwaltung Ahrweiler | Infos und Angebote der Kreisverwaltung Ahrweiler*, 1 December 2023, <https://kreis-ahrweiler.de/land-rheinland-pfalz-stellt-neue-sturzflutgefahrenkarten-vor/>.

¹⁷³ Apostolos Lagarias, 'Climate Change as Spatial Change: Repercussions of the Disastrous Daniel Flood in Thessaly Region on Its Territorial Future', *GeoJournal* 90, no. 4 (2025): 154, <https://doi.org/10.1007/s10708-025-11407-4>.

4.4. Main findings

It can be concluded that the uneven, sectoral distribution of climate impacts across EU Member States is likely to exacerbate existing conflicts of interest. Debates over budgets, fiscal rules, migration, agriculture, and energy are expected to intensify and sharpen. Southern and poorer EU Member States will face higher adaptation costs, while Northern and wealthier EU Member States will prioritise fiscal restraint and competitiveness. Central and Eastern EU Member States are more likely to continue to emphasise defence, energy security, and farmer protection over intensified climate adaptation and mitigation. These escalating conflicts of interest increase the likelihood of political deadlock and reduced cohesion within the EU, making consensus increasingly difficult. The emerging conflicts of interest due to climate change can be grouped into three main categories.

Transfer payment conflict. The existing solidarity conflict between net recipients and net contributors to the EU is intensified by additional demands from climate hazard-prone, less resilient EU Member States. This skews the financial incentives of EU membership, potentially strengthening resistance among net contributor states. Existing reluctance in countries like the Netherlands to support Southern EU Member States is likely to be amplified by new climate-related demands on the most resilient EU Member States.

Decision-making conflict. Climate change is intensifying policy priority conflicts within the EU, reinforcing regional divisions over agriculture, climate ambition, defence, and infrastructure. Southern EU Member States call for increased adaptation funding to address droughts and heat, while Northern and Eastern EU Member States focus on productivity, energy security, and direct farmer support. Competing priorities, such as defence spending versus climate policy, risk fragmenting EU policy coherence and weakening both collective climate resilience and security.

Status quo protection vs. long-term resilience conflict. EU Member States often prioritise status quo protection over long-term adaptation. Examples such as France's mega-basins and non-adaptive post-flood reconstruction in Germany and Greece demonstrate how some policy measures can provide temporary relief while perpetuating unsustainable or outdated practices. This imbalance between short term relief and long-term adaptation risks undermining Europe's overall coherence, as climate costs continue to accumulate over time.

The conflicts of interest already visible within the EU are likely to deepen as climate change intensifies. Uneven exposure to environmental risks, differing fiscal capacities and varying adaptive strengths will amplify existing divisions between EU Member States. The growing conflicts of national interests across budgetary, fiscal, agricultural, defence and climate domains signal a deepening fragmentation of EU policymaking. If left unaddressed, these tensions could erode the Union's political cohesion and weaken solidarity mechanisms and ultimately impede the EU's ability to act collectively in the face of escalating climate and security challenges. Without deliberate efforts to bridge these divides, climate change will not only strain national systems but also pose a serious threat to the cohesion and long-term political unity of the European Union.

Figure 4: Emerging EU Conflicts of interest as a result of climate change**Intra-EU
financial
transfers**

1. Conflicts of interest on the size of the EU budget and the size of the EU cohesion funds to offset climate damages.
2. Conflicts of interest over the strictness of EU fiscal policy and the usage of common debt instruments to shoulder economic climate impacts.
3. Conflicts of interest on burden sharing of increasing irregular EU migration and asylum seekers as a result of climate change.
4. Conflicts of interest on the degree of EU-wide disaster relief and insurance as climate change costs mount.

**Climate ambition
vs. competing
policy**

5. Conflicts of interest on the direction of the EU Common Agricultural Policy as climate change disrupts the agricultural sector.
6. Conflicts of interest on the degree to which climate policy should be prioritised.
7. Conflicts of interest on the degree to which defence spending should be prioritised over climate spending.

**Protecting
existing systems
vs. investing in
long-term
resilience**

8. Conflicts of interest between local/regional/national actors resisting adaptive practices as climate pressures mount.
9. Conflicts of interest between actors resorting to climate coping practices that harm long-term resilience and the rest of society.
10. Conflicts of interest between actors that retain business-as-usual rebuilding practices after climate hazards and actors pushing for new approaches.

5. Leveraging climate adaptation for strategic resilience

This chapter outlines potential pathways for climate adaptation within the European Union that build upon the strengths and capacities of its Member States. The necessity for adaptation arises from the fact that certain climate effects are already locked in and will occur regardless of how quickly global emissions will be reduced.¹⁷⁴ These unavoidable climatic and weather-related impacts call for proactive measures to lessen their socio-economic consequences.

Benefits and Strategic Importance of Adaptation

Effective adaptation can significantly reduce the economic impact of climate hazards.¹⁷⁵ For example, improved spatial planning for buildings and enhanced water management systems can prevent severe infrastructure damage and limit agricultural losses. Some measures, like nature-based solutions, also bring added benefits for mitigation, such as the improvement of biodiversity and carbon sequestration.¹⁷⁶ Adaptation policies can also generate economic benefits. Climate adaptation investments generate over \$10 return per dollar spent, with average returns of 27%.¹⁷⁷

Adaptation is especially urgent for vulnerable regions that have less capacity to manage climate hazards. It helps buy time, build resilience, and is often easier to tailor to local conditions.¹⁷⁸ Without strong adaptation, the costs of climate change will escalate, and existing inequalities may deepen.¹⁷⁹

As discussed in Chapter 4, socio-economic disruptions act as burden multipliers, intensifying conflicts of interest between EU Member States. Climate adaptation, therefore, serves not only as an environmental necessity, but also as a key mechanism for supporting political and social stability. By mitigating the socio-economic disruptions caused by climate change, it helps prevent widening disparities within the EU and reduces potential conflicts of interest between EU Member States.

¹⁷⁴ IPCC, 'AR6 Synthesis Report: Climate Change 2023', accessed 22 September 2025, <https://www.ipcc.ch/report/ar6/syr/>.

¹⁷⁵ Rafiq Dossani, *Adaptation vs. Mitigation of Climate Change: What Do Developing Countries Need?* (2024), <https://www.rand.org/pubs/commentary/2024/11/adaptation-vs-mitigation-of-climate-change-what-do.html>.

¹⁷⁶ UK Universities Climate Network, 'Co-Benefits of Climate Change Mitigation and Adaptation Actions', accessed 22 September 2025, https://uucn.ac.uk/uucn_briefings/co-benefits-of-climate-change-mitigation-and-adaptation-actions/.

¹⁷⁷ World Resources Institute, *RELEASE: WRI Study Finds Climate Adaptation Investments Yield Massive Returns – Over \$10 for Every \$1 Spent*, 6 March 2025, <https://www.wri.org/news/release-wri-study-finds-climate-adaptation-investments-yield-massive-returns>.

¹⁷⁸ Siri Eriksen et al., 'Adaptation Interventions and Their Effect on Vulnerability in Developing Countries: Help, Hindrance or Irrelevance?', *World Development* 141 (May 2021): 105383, <https://doi.org/10.1016/j.worlddev.2020.105383>.

¹⁷⁹ John Tarpey et al., *Costs of Adaptation vs Costs of Inaction*, Report (Ramboll Management Consulting, Belgium, 2022), <https://www.ecologic.eu/19650>.

Opportunities for the Netherlands and EU-wide resilience

From a strategic perspective, advancing adaptation strengthens the overall resilience and stability of the European Union. For countries such as the Netherlands, investing in adaptation presents opportunities to develop expertise and technologies that can be exported, enhancing both its economic position and strategic influence. It is important that climate adaptation is implemented swiftly, as accelerating climate impacts may undermine adaptive capacity over time.¹⁸⁰

The analysis in this chapter explores how climate adaptation can mitigate socio-economic impacts of climate risks within the EU. By identifying key adaptation opportunities, it shows how strengthening EU Member States' resilience can ease growing conflicts of interest and support cohesion.

Sectoral Adaptation Methods

In the food sector, climate-resilient agriculture includes drought- and heat-tolerant crops, efficient water management and improved soil practices to reduce vulnerability. In infrastructure, combining nature-based and engineered solutions enhances flood protection, urban cooling, and resilience to weather extremes. In the health sector, measures such as flood control and heat-health systems reduce exposure to risks and improve public health. In the economic and financial domain, climate-proofing manufacturing facilities and integrating climate risk into business planning and investment strengthen long-term stability.

EU Coordination and Implementation

An important adaptation mechanism that supports cohesion is the EU Mission on Climate Adaptation.¹⁸¹ This initiative is designed to stimulate adaptation efforts through EU-regional cooperation, with a focus on less-developed EU regions. Dutch institutions such as Deltares, Climate Adaptation Services (CAS), Vrije Universiteit Amsterdam (VU), Instituut voor Veiligheid & Milieu (IVM) and Climate-KIC play a prominent role in supporting regional authorities with risk assessments, climate services, and adaptation planning.¹⁸²

EU climate adaptation is financed through multiple instruments. These include Cohesion Policy funds, CAP, LIFE, Horizon Europe, InvestEU and the Recovery and Resilience Facility.¹⁸³ However, financial flows and policy priorities are fragmented. This means

¹⁸⁰ Christopher W. Callahan, 'Present and Future Limits to Climate Change Adaptation', *Nature Sustainability* 8, no. 4 (2025): 336–42, <https://doi.org/10.1038/s41893-025-01519-7>.

¹⁸¹ European Commission, 'Adaptation to Climate Change - Research and Innovation', 10 November 2025, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/adaptation-climate-change_en.

¹⁸² Expert interview.

¹⁸³ Policy Department for Structural and Cohesion Policies, 'Climate Adaptation Using Cohesion Policy', EU Agenda, October 2024, <https://euagenda.eu/publications/climate-adaptation-using-cohesion-policy>. European Commission, 'CAP Funds - Agriculture and Rural Development - European Commission', 11 December 2025, https://agriculture.ec.europa.eu/common-agricultural-policy/financing-cap/cap-funds_en. European Commission, 'LIFE Climate Change Mitigation and Adaptation', accessed 15 December 2025, https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/life-climate-change-mitigation-and-adaptation_en. Climate ADAPT, 'Horizon Europe', accessed 15 December 2025, <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/funding/horizon-europe>. Climate ADAPT, 'EU Funding of Adaptation', accessed 15 December 2025, <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/funding>. IEECP, 'Lessons Learnt and Insights for the Funding of Climate Resilience in National and Regional Adaptation Plans from the European Budget', *IEECP*, October 2023, <https://ieecp.org/publications/lessons-learnt-and-insights-for-the-funding-of-climate-resilience-in-national-and-regional-adaptation-plans-from-the-european-budget/>.

adaptation initiatives are subject to different rules, objectives and timelines. Funding is spread across instruments with limited strategic steering. Monitoring focuses more on spending than on resilience outcomes. Adaptive capacity varies widely between EU Member States and regions. As a result, the implementation of adaptation policy is uneven. Some countries translate risk assessments into investments, while other countries lag behind. Moreover, cross-border risks are not adequately addressed.

EU institutions are increasingly acknowledging these challenges.¹⁸⁴ The European Court of Auditors calls for stronger EU-level steering and monitoring.¹⁸⁵ The European Climate Risk Assessment frames many risks as transboundary that should be co-owned.¹⁸⁶ Researchers from Wageningen University argue for permanent EU coordination capacity.¹⁸⁷ Bruegel highlights a similar lack of coherence in mitigation and adaptation policy in the EU.¹⁸⁸ Climate adaptation in the EU could benefit from a more coordinated and institutionalised approach. The EU Mission on Climate Adaptation, through its voluntary cooperation structure, already coordinates regions, access to funding and provides implementation support across the EU. This could make it a suitable starting point for institutionalising climate adaptation.

Adaptation Options Across Europe

Table 1 presents an overview of the main climate adaptation options by sector, with detailed descriptions provided in Annex C. Several regions in Europe have developed notable climate adaptation expertise. Examples include water-reuse innovations in Spain and fire management practices in Greece.¹⁸⁹ These experiences are increasingly shared across EU Member States, such as Dutch firefighters visiting Spain to learn from forest fire management practices.¹⁹⁰ However, this study primarily focuses on adaptation options that are most closely aligned with Dutch capabilities.

¹⁸⁴ European Commission. Joint Research Centre., *The Implementation of the 'Do No Significant Harm' Principle in Selected EU Instruments: A Comparative Analysis*. (Publications Office, 2023), <https://data.europa.eu/doi/10.2760/18850>.

¹⁸⁵ European Court of Auditors, 'Special Report 15/2024: Climate Adaptation in the EU', European Court of Auditors, 16 October 2024, <http://www.eca.europa.eu/en/publications/sr-2024-15>.

¹⁸⁶ Climate ADAPT, 'European Climate Risk Assessment', 11 March 2024, <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/key-eu-actions/european-climate-risk-assessment>.

¹⁸⁷ Parveen Kumar et al., 'Uncovering Fragmentation in Nature-Based Solutions for Climate Adaptation: A Territorial Knowledge Synthesis for Climate-Resilient Planning in Europe', *Proceedings* 131, no. 1 (2025): 71, <https://doi.org/10.3390/proceedings2025131071>.

¹⁸⁸ Zsolt Darvas and Kamil Sekut, 'Greening the EU Budget: Why Climate Mainstreaming Needs Reform', Bruegel | The Brussels-Based Economic Think Tank, 4 December 2025, <https://www.bruegel.org/analysis/greening-eu-budget-why-climate-mainstreaming-needs-reform>.

¹⁸⁹ Kemira, 'Spain's Way out of the Water Crisis: Water Reuse', *Kemira*, n.d., accessed 19 December 2025, <https://www.kemira.com/stories/spains-way-out-water-crisis-water-reuse/>. European Forest Institute, 'Wildfire Risk Planning and Prevention: Innovations in the Mediterranean and Beyond', 1 March 2024, <https://efi.int/news/wildfire-risk-planning-and-prevention-innovations-mediterranean-and-beyond-2024-03-01>.

¹⁹⁰ Agroberichten Buitenland, 'More than hoses and helicopters: What Galicia taught Dutch firefighters on wildfires', 29 July 2025, <https://www.agroberichtenbuitenland.nl/actueel/nieuws/2025/07/29/more-than-hoses-and-helicopters-what-galicia-taught-dutch-firefighters-on-wildfires>.

Figure 5: Main climate adaptation options by sector

Domain	Adaptation Measures	Examples the Netherlands
Food	<ul style="list-style-type: none"> Climate-resilient cropping: drought/heat-tolerant varieties, diversified rotations, adjusted sowing dates Efficient water management: irrigation buffers, precision/deficit irrigation, soil and water conservation Soil and microclimate management: conservation tillage, residue retention, mulching, shading, covers Breeding and adopting heat/drought-tolerant cultivars Integrated support: combined practices, incentives, training, and knowledge transfer 	<ul style="list-style-type: none"> Strip cultivation and crop diversification (e.g. Farm of the Future) Advanced carbon farming Soil and water systems Rotterdam Floating Dairy Farm
Infrastructure	<ul style="list-style-type: none"> Nature-based and engineered flood protection: Green and Blue Infrastructure (GBI), Sustainable Drainage Systems (SDS), hard defences, coastal zone management Urban cooling and water reuse: green roofs, permeable surfaces, bioretention ponds, rainwater tanks, linear parks/aeration corridors Climate-resilient building design: insulation, passive shading, waterproof membranes Afforestation and carbon sequestration policies; laws and incentives steering public/private actors 	<ul style="list-style-type: none"> "Delta Programme" "Wide Green Dike" "Room for the River" Roadsides adapted for rainfall/heat Greenification River widening projects
Human Health	<ul style="list-style-type: none"> Urban greening: green/white roof programmes, greening school grounds, wetland restoration, agro-silvo-pastoral systems Flood and water quality measures: enhanced flood defences, new river locks, overflow tanks to stop sewage entering bathing waters Heat-health systems: Heat-Health Watch Warning System; built-environment adaptation (insulation, shade, green spaces) to cut indoor heat exposure Knowledge and research: projects on heat impact anticipation and measures • Air quality management around airports. 	Urban greening and health-focused adaptation research
Economy and Finance	<ul style="list-style-type: none"> Climate-proof facilities: flood-resistant buildings, waterproofed machinery, water recycling and storage Operational adaptation: flexible shifts, revised maintenance, diversified supply chains, redesigned goods/packaging for new conditions Low-carbon, resource-efficient technologies and energy systems Integrating climate risk into enterprise planning, insurance, and training; stakeholder collaboration Climate-resilient urban design: vegetated buildings/sidewalks, Sustainable Urban Drainage Systems (SUDS), expansion of green spaces, floodable parks Anti-pollution measures and storage tanks Integrated urban planning and adaptation plans Public-private reinsurance schemes 	<ul style="list-style-type: none"> TNO Shared Innovation Programme VoltaChem Transition from fossil fuels to sustainable energy and energy re-use

5.1. Dutch expertise in climate adaptation

This section highlights the main areas where the Netherlands has a comparative advantage in climate adaptation. The country is particularly strong in crop breeding, greenhouse agriculture, livestock systems, water management, and urban and port design. These capabilities provide opportunities to advance adaptation policies across the EU.

5.1.1. Crop breeding

Crop breeding is a clear area of Dutch expertise. Dutch breeders in vegetables and potatoes are global leaders.¹⁹¹ Many are family-owned companies that value food security over

¹⁹¹ Visserij Ministerie van Landbouw, 'The Netherlands, No. 1 in Seed for Food and Nutrition Security - Publicatie - Agroberichten Buitenland', publicatie, Ministerie van Landbouw, Visserij, Voedselzekerheid en Natuur, 9 February 2018, <https://www.agroberichtenbuitenland.nl/documenten/publicaties/2018/02/09/no.-1-in-seed-for-food-and-nutrition>.

shareholder profit. Climate change, however, is advancing faster than conventional breeding can innovate, even though such innovation is essential for climate change-resistant crops.¹⁹² Other continents are moving ahead with gene-editing tools such as CRISPR-CAS.¹⁹³ In Europe these techniques remain restricted.¹⁹⁴ The Netherlands could play a decisive role if the EU creates space for faster innovation. Alternative agro-ecological practices such as strip cropping, crop diversification, cover crops, and no-tillage could also play a role in adaptation. These measures enhance resilience to droughts, floods, and heat waves while supporting more sustainable agricultural practices.¹⁹⁵

5.1.2. Greenhouse agriculture

Agriculture in controlled environments is another area in which Dutch companies hold significant expertise.¹⁹⁶ The greenhouse sector can help maintain food yields under varying climate conditions. Protected cultivation also supports rapid technological progress in sensors, robotics, and water and nutrient cycles.¹⁹⁷ Methods used in controlled environments more over tend to spill over into open-field farming and create solutions for regions worldwide with harsher climates.¹⁹⁸ Dutch companies and knowledge institutes (such as Wageningen University) have already set international benchmarks in terms of Greenhouse agriculture, and there is still a lot of potential for further innovation.¹⁹⁹

5.1.3. Livestock farming

Livestock systems are highly exposed to climate risks such as heat stress, water scarcity, and new diseases.²⁰⁰ The Netherlands develops climate-controlled farm designs to protect animal welfare during heatwaves.²⁰¹ Breeding programmes can also help to develop livestock

¹⁹² Gary N. Atlin et al., 'Rapid Breeding and Varietal Replacement Are Critical to Adaptation of Cropping Systems in the Developing World to Climate Change', *Global Food Security* 12 (March 2017): 31–37, <https://doi.org/10.1016/j.gfs.2017.01.008>.

¹⁹³ Neil E. Hoffman, 'Revisions to USDA Biotechnology Regulations: The SECURE Rule', *Proceedings of the National Academy of Sciences of the United States of America* 118, no. 22 (2021): e2004841118, <https://doi.org/10.1073/pnas.2004841118>; Reuters, 'China Approves First Gene-Edited Wheat in Step to Open up GM Tech to Food Crops', 08 2024, <https://www.reuters.com/markets/commodities/china-approves-first-gene-edited-wheat-step-open-up-gm-tech-food-crops-2024-05-08/>.

¹⁹⁴ Thomas Gabrielczyk, 'Parliament Halts Trilogue Talks on New Genomic Breeding Techniques', *European Biotechnology Magazine*, 30 June 2025, <https://european-biotechnology.com/latest-news/parliament-halts-trilogue-talks-on-new-genomic-breeding-techniques/>.

¹⁹⁵ Euroseeds, 'Climate Change Threatens Future of Farming in Europe', 11 September 2019, <https://euroseeds.eu/news/climate-change-threatens-future-of-farming-in-europe/>.

¹⁹⁶ DutchGreenhouses, 'Approach', DutchGreenhouses, accessed 20 October 2025, <https://dutchgreenhouses.com/en/approach>.

¹⁹⁷ WUR, 'Vision + Robotics', WUR, 13 November 2023, <https://www.wur.nl/en/research-results/research-institutes/plant-research/vision-robotics-3.htm>.

¹⁹⁸ International Society for Horticultural Science, 'Combination of Greenhouse and Open-Field Crop Fertigation Can Increase Sustainability of Horticultural Crops in the Mediterranean Region', 2017, http://www.actahort.org/books/1170/1170_78.htm.

¹⁹⁹ Abby Narishkin Orwig David Valerio, Jessica, 'See How a Country the Size of Maryland Became the World's Second-Largest Agricultural Exporter', *Business Insider*, 27 September 2025, <https://www.businessinsider.com/photos-show-how-tiny-country-became-second-largest-agricultural-exporter-2025-9>.

²⁰⁰ WUR, 'Animal Health in a Changing World: The Relationship between Animals, Humans and the Environment', WUR, 27 August 2025, <https://www.wur.nl/en/show-longread/animal-health-in-a-changing-world-the-relationship-between-animals-humans-and-the-environment.htm>.

²⁰¹ WUR, 'Climate Smart Livestock Farming', WUR, 8 January 2019, <https://www.wur.nl/en/research-results/research-institutes/livestock-research/themes/climatesmartlivestockfarming.htm>.

robustness against climate extremes.²⁰² Moreover, strong veterinary capacity and biosecurity expertise in the Netherlands help address pests and diseases that can emerge as a result of climate change.²⁰³

5.1.4. Water management

The Netherlands globally holds a unique position in water management. The Netherlands is a recognised leader in early-warning systems, room-for-the-river approaches and a broad range of nature-based solutions, although other EU Member States have developed strong capabilities in these areas as well. The most famous example is the 'Delta Programme', a long-term national strategy that combines annual climate risk assessments with a dedicated Delta Fund to secure flood protection, freshwater supply, and geographic adaptation up to 2100.²⁰⁴ However, also in The Netherlands climate change is delivering new challenges for flood protections, drought control and water quality management. A shift from 'fighting against water' to 'living with water' is developing. A recent long term vision for a more nature-based approach for The Netherlands in 2120 developed by Wageningen University & Research inspired the water management sector to scale and invest in nature-based adaptation solutions where possible, and civil engineering solutions where needed.²⁰⁵ Other types of water management, such as 'nature-based engineering' are also pioneered by the Netherlands. One example is the 'Sand Motor', a large artificial sand peninsula along the Dutch coast that uses wind and waves to naturally replenish coastal sand.²⁰⁶ Other aspects of water management, such as freshwater retention, are ensured through the COASTAR project, which stores excess rainwater for use during droughts.²⁰⁷ Digital systems also help predict and manage floods, such as Delft-FEWS, a flood forecasting system that is in use in over 60 countries.²⁰⁸ The Netherlands also has a unique position due to its structured model for climate adaptation cooperation. This model is built on long-term collaboration between government, research institutes and market actors. The Dutch Delta Programme is seen as a leading model for climate adaptation.²⁰⁹ It is legally anchored through the Delta Act, which provides long-term implementation stability.²¹⁰ A dedicated Delta Fund ensures predictable and sustained financing. Local authorities must conduct stress tests and develop adaptation strategies. Shared data and tools support decisions across governments, research institutes and private partners, creating a coherent national system.

²⁰² WUR, 'Breeding for Climate-Friendly Livestock', WUR, 19 October 2018, <https://www.wur.nl/en/article/breeding-for-climate-friendly-livestock.htm>.

²⁰³ Ministerie van Algemene Zaken, 'National Action Plan for the Strengthening of the Zoonotic Disease Policy - Report - Government.NL', rapport, Ministerie van Algemene Zaken, 6 July 2022, <https://www.government.nl/documents/reports/2022/07/06/national-action-plan-for-the-strengthening-of-the-zoonotic-disease-policy>.

²⁰⁴ '2024 Delta Programme | Delta Programme', accessed 29 October 2025, <https://english.deltaprogramma.nl/delta-programme/2024-delta-programme>.

²⁰⁵ Martin Baptist et al., *A Nature-Based Future for the Netherlands in 2120*, December 2019, <https://doi.org/10.18174/512277>.

²⁰⁶ Ministerie van Infrastructuur en Waterstaat, 'Zandmotor: natuurlijke kustbescherming', webpagina, accessed 1 November 2025, <https://www.rijkswaterstaat.nl/water/waterbeheer/bescherming-tegen-het-water/maatregelen-om-overstromingen-te-voorkomen/zandmotor>.

²⁰⁷ KWR, 'COASTAR: Saline at Bay, Fresh on Hand', *KWR*, 1 February 2022, <https://www.kwrwater.nl/en/projecten/coastar-saline-at-bay-fresh-on-hand/>.

²⁰⁸ 'Delft-FEWS', Deltares, accessed 29 September 2025, <https://www.deltares.nl/en/software-and-data/products/delft-fews-platform>.

²⁰⁹ National Delta Programme, 'What Is the National Delta Programme? | Delta Programme', accessed 28 November 2025, <https://english.deltaprogramma.nl/delta-programme/what-is-the-delta-programme>.

²¹⁰ Climate ADAPT, 'Delta Act and Delta Programme of the Netherlands', 7 June 2016, <https://climate-adapt.eea.europa.eu/en/metadata/publications/delta-act-and-delta-programme-the-netherlands>.

5.1.5. Urban and Port adaptation design

The Netherlands holds a strong position in Urban and Port adaptation through several internationally recognised projects. Rotterdam's Resilience Strategy combines flood safety, spatial planning, and crisis management to 'climate-proof' the city.²¹¹ For example, the city's Water Square at Benthemplein demonstrates how stormwater storage can be integrated with public life.²¹² In Amsterdam, the AMS Institute's Climate Resilient Cities programme is involved in climate adaptation solutions such green roofs, stormwater buffering and urban cooling.²¹³ In Rotterdam, there is also a port-specific adaptation strategy in place. The Port of Rotterdam Adaptation Strategy shows how the port is preparing for sea-level rise and extreme weather, making sure businesses can continue operating in this new environment.²¹⁴ Many of these projects are internationally renowned, and highlight the strong position of the Netherlands in Urban & Port Adaptation Design.

These Dutch adaptation strengths offer a unique opportunity to turn both knowledge and expertise into strategic tools for European cohesion and global strategic positioning. Based on the geographical and sectoral distribution of climate hazards, specific adaptation opportunities across Europe can be identified. The following section will highlight a selection of high-potential adaptation areas for the Netherlands.

5.2. Focus areas for strategic Dutch adaptation strategies

Building on the Netherlands' unique strengths, the next step is to identify specific climate adaptation pathways that can deliver the greatest impact within the European Union. This section provides a partial overview of these potential pathways and explores how their implementation could help reduce conflicts of interest among EU Member States, thereby strengthening overall cohesion and stability.

5.2.1. Crop breeding, horticulture and livestock practices against drought impacts in South(eastern) Europe.

Farmers across the Mediterranean face longer droughts, higher temperatures, and saltier water. Harvests are set to fall in the future, and several countries have partially relied on EU support to offset the economic impacts.²¹⁵

²¹¹ Gemeente Rotterdam, 'Rotterdam Resilience Strategy-Ready for the 21st Century', May 2016, <https://www.scirp.org/reference/referencespapers?referenceid=2238033>.

²¹² Rijkswaterstaat, 'Rotterdam Water Squares - Rainwater Makes Playing Outside on the Square in Rotterdam Great Fun', Climate Adaptation Platform Netherlands, Rijkswaterstaat, accessed 22 September 2025, <https://klimaatadaptatienederland.nl/en/@297382/rotterdam-water-squares-rainwater-makes-playing/>.
Silvana Ilgen et al., 'City-To-City Learning for Urban Resilience: The Case of Water Squares in Rotterdam and Mexico City', *Water* 11, no. 5 (2019): 983, <https://doi.org/10.3390/w11050983>.

²¹³ Fabrique, 'Climate Resilient Cities', AMS, accessed 22 September 2025, <https://www.ams-institute.org/urban-challenges/resilient-cities/>.

²¹⁴ Climate ADAPT, 'Rotterdam Port Adaptation Strategy for Climate Resilient Transport and Business Activities', accessed 22 September 2025, <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/rotterdam-port-adaptation-strategy-for-climate-resilient-transport-and-business-activities>.

²¹⁵ Hortidaily, 'EU Approves €98.6 Million Aid for Farmers in Spain, Croatia, Cyprus, Latvia, and Hungary after Climate Disasters', 21 February 2025, <https://www.hortidaily.com/article/9707493/eu-approves-eur98-6-million-aid-for-farmers-in-spain-croatia-cyprus-latvia-and-hungary-after-climate-disasters/>; Elena Georgopoulou et al., 'Climate Change Risks for the Mediterranean Agri-Food Sector: The Case of Greece', *Agriculture* 14, no. 5 (2024): 770, <https://doi.org/10.3390/agriculture14050770>.

The Netherlands can help change this. Dutch breeders are world leaders in vegetables and potatoes, using advanced tools to create crops that thrive in tough conditions.²¹⁶ Working with Mediterranean cooperatives and researchers, they could focus on heat-tolerant tomatoes and peppers, drought-resistant potatoes, and crops that use less water.²¹⁷ For example, the SALAD initiative brings together Dutch expertise and Mediterranean field sites to test and scale salt-tolerant crops and sustainable farming systems for areas facing salinisation and water scarcity.²¹⁸ An example of intra-EU adaptation cooperation in horticulture is the Westland and Greenport West-Holland cooperation with horticultural clusters in Almería and El Ejido in Spain. The goal is to introduce a closed-loop horticultural system that maximises the efficiency of water use.²¹⁹ Moreover, Dutch Wageningen University & Research (WUR) projects on heat stress in dairy cows informs cooling and ventilation strategies for barns, which is adopted by partners across Europe.²²⁰

These initiatives can help keep yields steady even in dry years and other weather extremes. Stronger harvests mean fewer emergency payments to farmers and less strain on EU budgets. Furthermore, it will help farmers embrace modern climate technologies and long-term adaptation perspectives. This will lessen future conflicts of interest on climate policies and trade-offs between short term relief and long-term adaptation, strengthening EU cohesion.

5.2.2. Managing Water and Flash Floods in Southern and Southeastern Europe

Countries in Southern- and Southeastern Europe are experiencing increasing occurrences of flash floods and droughts. Dry periods are followed by heavy rain, destroying crops, homes and infrastructure. Each disaster brings new calls for EU relief funds, keeping some regions locked in dependence.²²¹ Calls are made for a larger EU Solidarity Fund, adding pressure to EU budgets.²²²

The Netherlands can help shift this pattern. Across the Mediterranean, Dutch expertise is actively shaping flood resilience and smarter water management. In Greece's Pinios River basin, Dutch institute Deltares leads "SpongeWorks" projects that turn farmland into temporary flood buffers and wetland 'sponges' to capture stormwater and sustain crops in dry

²¹⁶ Government of the Netherlands, 'Agriculture and Horticulture | Agriculture | Government.NL', accessed 1 November 2025, <https://www.government.nl/topics/agriculture/agriculture-and-horticulture>; J. P. van Loon et al., 'The History of Dutch Potato Breeding 1888–2018: From Hobby to Industry', *Potato Research* 67, no. 3 (2024): 861–99, <https://doi.org/10.1007/s11540-023-09661-5>.

²¹⁷ CPVO, 'Transforming Agriculture - The Revolutionary Smart Data Breeding Technology of CropXR', accessed 1 November 2025, <https://cpvo.europa.eu/en/news-and-events/news/transforming-agriculture-revolutionary-smart-data-breeding-technology-cropxr>; European Commission, 'Solutions for Improving Agroecosystem and Crop Efficiency for Water and Nutrient Use', CORDIS | European Commission, accessed 1 November 2025, <https://cordis.europa.eu/project/id/727247>.

²¹⁸ Vrije Universiteit Amsterdam, 'Saline Agriculture for Adaptation', Vrije Universiteit Amsterdam, accessed 1 November 2025, <https://research.vu.nl/en/projects/saline-agriculture-for-adaptation/>.

²¹⁹ Hortidaily, 'Dutch Horticultural Sector Seeks Structural Collaboration with Almería', 17 July 2025, <https://www.hortidaily.com/article/9751654/dutch-horticultural-sector-seeks-structural-collaboration-with-almeria/>.

²²⁰ Mengting Zhou, *Heat Stress in Dairy Cows: Measuring and Modelling the Effects of Environmental Conditions on Thermoregulatory Responses*, 17 October 2022, <https://doi.org/10.18174/574098>.

²²¹ DevelopmentAid, 'EU Gives Spain €1.6bn to Recover from Valencia Floods', DevelopmentAid, 6 October 2025, <https://www.developmentaid.org/news-stream/post/200754/eu-spain-e1-6-billion-valencia-floods-recovery-funds>.

²²² Euronews, 'Why Disaster Relief in Europe Often Comes Too Late', Euronews, 1 November 2024, <http://www.euronews.com/my-europe/2024/11/01/eu-solidarity-fund-why-disaster-relief-in-europe-often-comes-too-late>.

spells.²²³ Meanwhile in Spain's Valencia region, Dutch flood-forecasting software Delft-FEWS is used in early-warning systems that help local authorities anticipate flash floods.²²⁴

Despite these promising initiatives, the potential for integrated management of floods and droughts in Europe remains largely untapped.²²⁵ This opens up possibilities for further efforts in this domain. Strengthening water management systems can reduce the frequency of emergencies and the need for future EU financial support. It also helps protect farmers, who may become more supportive of proactive climate policies and long-term adaptation strategies.

5.2.3. Flood-Resilient Crop Breeding in Northern and Western Europe

Northern and Western Europe are seeing heavier rains and waterlogged soils. Flooded fields reduce yields and damage soil structure. Damages resulting from heavy rainfall and flooding are significant. Between 1980 and 2024, floods accounted for 47% of total weather- and climate-related economic losses in the EU.²²⁶

Across Northern and Western Europe, several initiatives are helping farms adapt to heavier rainfall and waterlogged soils. The Climate Adaptive Drainage project in the Netherlands enables farmers to actively manage drainage and water storage, preventing both flooding and drought stress.²²⁷ The COUSIN project screens wild crop relatives to breed cereals and legumes with better tolerance to waterlogging and flooding.²²⁸ In Germany, the Tolerance to Waterlogging and Flooding of Rapeseed programme identifies genes that improve oilseed survival in wet circumstances.²²⁹

With better crop and soil protection, yields become more stable and Northern and Western European regions will rely less on emergency support, leaving more funds to support vulnerable regions such as Southern Europe. Reducing emergency spending also frees up more space for long-term adaptation investments, thereby reducing potential conflicts of interest between competing claims on public resources.

²²³ Deltares, 'Nature-Based "Sponge" Solutions for Climate Resilience', 9 September 2024, <https://www.deltares.nl/en/news/nature-based-sponge-solutions-for-climate-resilience>.

²²⁴ Copernicus, 'European Flood Awareness System', accessed 1 November 2025, <https://www.copernicus.eu/en/european-flood-awareness-system>.

²²⁵ Deltares, 'New Framework for Synergistic Management Floods and Droughts', 25 August 2025, <https://www.deltares.nl/en/news/new-transformational-governance-framework-for-the-synergistic-management-of-floods-and-droughts>.

²²⁶ European Environment Agency, 'Economic Losses from Weather- and Climate-Related Extremes in Europe'.

²²⁷ Future Water, 'Climate Adaptive Drainage – FutureWater', accessed 1 November 2025, <https://www.futurewater.eu/projects/climate-adaptive-drainage/>.

²²⁸ Chiara Degl'Innocenti, *Unlocking the Potential of Wild Crops: New Progress in the COUSIN Project* | *Cousin Project*, 20 September 2025, <https://cousinproject.eu/news/unlocking-the-potential-of-wild-crops-new-progress-in-the-cousin-project/>.

²²⁹ Mark Fleischhauer, 'Tolerance to Waterlogging and Flooding of Rapeseed', Text, Umweltbundesamt, Umweltbundesamt, 23 April 2019, <https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/adaptation-tools/projects-studys/tolerance-to-waterlogging-flooding-of-rape-seed>.

5.2.4. Water and Flood Management in River Systems in Northwestern and Eastern Europe

Rivers across Northern and Western Europe now flood more often as precipitation patterns become more volatile. Buildings, farms, and transport routes along rivers like the Rhine and Meuse face increasing losses. Each additional flood in Europe eats into the EU budget through disaster aid disbursements, such as in Germany after the Ahr floods.²³⁰

The Netherlands has shown that nature-based solutions hold high potential for water management. It also hosts one of Europe's largest research and innovation programmes focused on scaling these solutions, guided by the Netherlands 2120 vision.²³¹ The programme develops knowledge on large-scale implementation within the Netherlands, with insights that can be transferred to other European countries facing similar climate adaptation challenges. Projects within this vision include the "Room for the River" approach, which focuses on widening riverbeds, restoring floodplains, and giving high water more space to move into controlled buffers. This lowers flood peaks and makes surrounding areas less vulnerable to unwanted flooding.²³²

Across Europe, Dutch expertise is central to several new river-management collaborations. JCAR-ATRACE links Dutch and Central European institutes to improve cross-border flood and drought forecasting and coordination.²³³ "SpongeWorks" introduces Dutch-led, nature-based retention measures in river basins across Germany, France, Greece, and the Netherlands to manage extreme water flows.²³⁴ Other regions also cooperate with the Netherlands. In Romania, the Dutch Water Authorities are cooperating with local authorities to introduce decision-support systems and flood risk management tools for river systems.²³⁵ Despite successes and further potential, flood risk reduction measures remain underutilised across Europe.²³⁶ This calls for a further expansion of flood prevention and management efforts.

By reducing flood damage before it happens, Europe can avoid repeated emergency transfers and invest in long-term resilience instead. Each river made safer through shared Dutch expertise strengthens local economies and political cohesion across the EU.

²³⁰ Consilium, 'European Union Solidarity Fund: Council Agrees to €116 Million in Disaster Relief Aid for Germany and Italy', Consilium, 18 November 2024, <https://www.consilium.europa.eu/en/press/press-releases/2024/11/18/european-union-solidarity-fund-council-agrees-to-116-million-in-disaster-relief-aid-for-germany-and-italy/>.

²³¹ NL2120, 'NL2120 - Elevating Nature-Based Solutions.', NL2120, accessed 11 December 2025, <https://www.nl2120.nl/en/>.

²³² Ministerie van Infrastructuur en Waterstaat, 'Ruimte voor de rivier: Nederland wordt voorbereid op toekomstig hoog- en laagwater - Nieuwsbericht - Rijksoverheid.nl', nieuwsbericht, Ministerie van Algemene Zaken, 3 April 2025, <https://www.rijksoverheid.nl/actueel/nieuws/2025/04/03/ruimte-voor-de-rivier-nederland-wordt-voorbereid-op-toekomstig-hoog--en-laagwater>.

²³³ Editorial Team, 'JCAR-ATRACE for Transboundary Water Management • Water News Europe', *Water News Europe*, 28 March 2025, <https://www.waternewseurope.com/jcar-atrace-for-transboundary-water-management/>.

²³⁴ Deltares, 'Nature-Based "Sponge" Solutions for Climate Resilience'.

²³⁵ Floor Toxopeus, 'From Plan to Practice: Romania and the Netherlands Strengthen Water Management with Smart Tools', *Dutch Water Authorities*, 1 July 2025, <https://dutchwaterauthorities.com/news/from-plan-to-practice-romania-and-the-netherlands-strengthen-water-management-with-smart-tools/>. JBA Global Resilience, 'A Collaborative Approach to Flood Risk Management in Romania', *Jbagr.Com*, n.d., accessed 1 November 2025, <https://jbagr.com/projects/a-collaborative-approach-to-flood-risk-management-in-romania/>.

²³⁶ Francesco Dottori et al., 'Cost-Effective Adaptation Strategies to Rising River Flood Risk in Europe', *NATURE CLIMATE CHANGE*, ahead of print, 2023, <https://doi.org/10.1038/s41558-022-01540-0-0>.

5.2.5. Coastal and Port Management Across Europe

Europe's coasts are facing rising sea levels, extreme weather and increasing erosion. Ports and coastal towns are critical for local economies. However, many are now exposed to flooding and salinisation. These risks are set to generate large economic losses in both the present and the future.²³⁷

Across Europe, Dutch expertise is driving coastal adaptation and sea-level resilience. In REST-COAST, Deltares and EcoShape help restore deltas like the Ebro (Spain), the Rhône (France) and the Vistula (Poland) through sediment (e.g. sand) and wetland-based (e.g. marshes) flooding and erosion defences.²³⁸ The Building with Nature, North Sea Region programme applies Dutch nature-based engineering to create dunes, vegetation, and adaptive barriers protecting ports and towns.²³⁹ Through CoCliCo, Deltares develops Europe's first sea-level risk platform to help resilient coastal and port infrastructure planning.²⁴⁰ Dutch researchers also contribute to climate-resilient ports and waterways, advising on port layouts and flood-proof logistics.²⁴¹

Dutch expertise could support coastal cities and port authorities across Europe with preparing for higher sea levels. By investing early in protective and adaptive coastlines, Europe can prevent the repeated losses that drive future intra-EU transfer payments. Safer ports mean stable trade, stronger regional economies, and ultimately more economic and political cohesion.

5.3. Financing adaptation

Climate adaptation projects can be financed through national budgets, but the EU budget has historically played a central role. Changes in the upcoming multiannual financial framework will both affect climate adaptation funding and create new opportunities.

The new EU Multiannual Financial Framework (MFF) for 2028-2034 is organised around a few large instruments. The National and Regional Partnership Plans (NRP) consolidate cohesion, agriculture and related spending into multiannual country plans linked to specific milestones. The European Competitiveness Fund (ECF) finances strategic industries, clean technologies, and industrial decarbonisation. The Connecting Europe Facility (CEF) supports projects related to cross-border energy, transport and digital infrastructure. Horizon Europe's successor continues to fund research and innovation, while Global Europe covers external action. Civil protection instruments strengthen preparedness and crisis response.

Notably, the next Multiannual Financial Framework will not create a single dedicated climate fund, such as existed in the 2021-2027 MFF through the LIFE programme. LIFE has been

²³⁷ Michail Vousdoukas et al., 'Adapting to Rising Coastal Flood Risk in the EU under Climate Change', JRC Publications Repository, 2020, <https://doi.org/10.2760/456870>.

²³⁸ Rest-Coast, 'Pilots', accessed 1 November 2025, <https://rest-coast.eu/pilots>.

²³⁹ Interreg North Sea Region, 'Building with Nature, Interreg VB North Sea Region Programme', accessed 1 November 2025, <https://northsearegion.eu/building-with-nature/index.html>.

²⁴⁰ Deltares, 'CoCliCo: A Digital Leap Forward in Coastal Safety | Deltares', 13 October 2025, <https://www.deltares.nl/en/stories/coclico-a-digital-leap-forward-in-coastal-safety>.

²⁴¹ Deltares, 'Climate-Proof Ports & Waterways', accessed 1 November 2025, <https://www.deltares.nl/en/expertise/areas-of-expertise/future-proof-infrastructure/ports-and-waterways/climate-resilient-ports-and-waterways>.

discontinued and replaced by the ECF and the NRP Fund, a move criticised by the European Parliament, which had called for stronger, more directly managed support for climate and biodiversity.²⁴² Nevertheless, climate and environment spending targets are specified at 35% of the total MFF budget of approximately €2 trillion.²⁴³ This amounts to nearly €700 billion earmarked for climate and environment in the 2028-2034 period.²⁴⁴

Much of this funding could prioritise climate mitigation over climate adaptation. Climate mitigation is tied closely to competitiveness and economic security through the deployment of clean technologies and the growth of green industries. This may lead to a relative deprioritisation of climate adaptation within the overall funding framework. Without adequate climate adaptation, mitigation measures risk being less effective. For example, building additional cross-border grid interconnections (mitigation) will not prevent electricity outages if adequate measures against flooding or droughts (climate adaptation) are not in place.

Some intervention categories within the proposed climate-environment tracking framework are defined broadly, creating a risk that spending with limited environmental benefit may count toward the 35% target. Parliamentary analysis has highlighted cases such as airport infrastructure, which can in certain instances be partially classified as contributing to climate or adaptation objectives, raising concerns about potential overestimation of green spending.²⁴⁵

Climate adaptation spending could also be crowded out by other priorities. All EU Member States support higher defence spending, putting pressure on green industrial funding, particularly through the proposed Competitiveness Fund for clean technologies and strategic industries.²⁴⁶

5.3.1. Strategic opportunities for the Netherlands

Despite these challenges, the new MFF creates a strategic window for the Netherlands to leverage climate adaptation as a driver of economic resilience. The National and Regional Partnership Plans alone mobilise roughly €372 billion in climate and environment spending. Historically, the Netherlands receives a lower share of cohesion funding due to its wealth. Nevertheless, there are concrete examples of cohesion-funded adaptation projects in which Dutch partners have participated, such as flood protection and transnational risk management through Interreg programmes.²⁴⁷ A realistic Dutch climate-environment share could range between €5 and €10 billion, based on its share of EU population and GDP per capita. While part of this money would go to climate mitigation, the multiannual national plans could make adaptation a structural investment priority, supporting river reinforcement, floodplain restoration and adaptive dikes, while simultaneously building Dutch delta expertise.

²⁴² European Parliament, 'Impacts of the 2028-2034 MFF Proposals on the Climate and the Environment - Mapping of the Commission Proposals', 10 December 2025, [https://www.europarl.europa.eu/thinktank/en/document/ECTI_IDA\(2025\)780410](https://www.europarl.europa.eu/thinktank/en/document/ECTI_IDA(2025)780410).

²⁴³ European Parliament, 'Impacts of the 2028-2034 MFF Proposals on the Climate and the Environment - Mapping of the Commission Proposals'.

²⁴⁴ European Commission, 'Supporting Climate Action through the EU Budget - Climate Action'.

²⁴⁵ Eichler, 'The 2028–2034 EU Long-Term Budget'.

²⁴⁶ Mats Engström, 'It's Not Easy Being Green: Breaking Europe's Climate Spending Deadlock – European Council on Foreign Relations', *ECFR*, 21 October 2025, <https://ecfr.eu/publication/its-not-easy-being-green-breaking-europes-climate-spending-deadlock/>.

²⁴⁷ Keep.eu, 'Project - Co-Adapt: Climate Adaptation through Co-Creation', Keep.Eu, 17 December 2024, <https://keep.eu/projects/21667/Co-Adapt-Climate-adaptation-EN/>.

The European Competitiveness Fund offers a second lever for climate adaptation, with around €101 billion in climate-related funding. A Dutch share of €4 to €6 billion could support projects such as crop breeding for drought and salinity tolerance, greenhouse automation and precision livestock systems. These can be framed as strategic food security technologies. Water technology and coastal engineering could also shift from public resilience tools to clean-tech industries.

Infrastructure integration could also be used to leverage climate adaptation spending. The Connecting Europe Facility directs about €57 billion toward climate-relevant infrastructure, of which the Netherlands could access €2 to €3.5 billion through targeted calls. Projects could include climate-proofing ports, adapting transport corridors and improvement of energy grids.

The successor to Horizon Europe, the name of which has yet to be confirmed, channels around €70 billion into research, providing opportunities for funding adaptation-related R&D. Historically, the Netherlands performs strongly in research and innovation calls.²⁴⁸ This could add €5 to €6 billion in potential funding for Dutch projects such as heat-resistant crops, methane-reducing livestock and digital flood modelling in cross-border consortia. Finally, civil protection funding, focused on prevention, preparedness and response, can support Dutch early warning systems and modelling. Under both civil protection and cohesion mechanisms, Dutch institutes can join projects to enhance preparedness and adaptation via competitive calls.²⁴⁹

²⁴⁸ John van Ginkel, 'subsidies', *LINK*, 1 June 2024, <https://linkmagazine.nl/eu-subsidies-in-frankrijk-en-duitsland-naar-landbouw-nederland-investeert-het-meeste-geld-in-onderzoek-en-innovatie/>.
Statistics Netherlands, 'Most EU Funding Received by the Netherlands Is for Research and Innovation', webpage, Statistics Netherlands, 31 May 2024, <https://www.cbs.nl/en-gb/news/2024/22/most-eu-funding-received-by-the-netherlands-is-for-research-and-innovation>.

²⁴⁹ European Commission, 'Protecting People and Building Preparedness and Resilience - European Commission', accessed 14 February 2026, https://commission.europa.eu/topics/budget/eu-budget-2028-2034-explained/protecting-people-and-building-preparedness-and-resilience_en.

Table 6: Opportunities for Dutch adaptation programmes in the 2028-2034 MFF Framework



MFF Fund/ instrument	Climate– Environment share of budget*	Potential Dutch share of allocation**	Access Pathway	Potentially relevant Project Types for NL Specialisations
National & Regional Partnership Plans (NRP Fund)	€372 bn	€5–10 bn	Multiannual national plan	<ul style="list-style-type: none"> • River & flood reinforcement. • Port & coastal adaptation. • Deployment of resilient crops, greenhouses & livestock systems
European Competitiveness Fund	€101 bn	€6–8 bn	Project calls	<ul style="list-style-type: none"> • Scaling crop breeding innovation for drought/salinity tolerance. • Greenhouse automation & energy-efficient systems. • Precision livestock technologies. • Industrial water-tech and coastal engineering solutions positioned as strategic clean-tech industries.
Connecting Europe Facility	€57 bn	€2–3 bn	Project calls	<ul style="list-style-type: none"> • Climate-proofing ports and TEN-T corridors. Flood-resilient transport nodes. • Coastal protection of trade hubs. • Reinforcement of energy grids exposed to climate risks.
Research & Innovation (successor to Horizon Europe)	€70 bn	€5–6 bn	Project calls	<ul style="list-style-type: none"> • R&D on heat- and salt-tolerant crops. • Mediterranean greenhouse pilot systems. • Methane-reducing livestock systems. • Digital water modelling, risk mapping, and adaptation analytics.
Civil Protection & Crisis Response	€10.7 bn	€0.4–0.6 bn	Project calls	<ul style="list-style-type: none"> • Flood early-warning systems. • Cross-border river basin coordination. • Risk mapping tools. Emergency flood response capacity building.
External Action (“Global Europe”)	€64.5 bn	Project-based	International tenders / partnerships	<ul style="list-style-type: none"> • Export of Dutch agri-tech, crop breeding support. • Water governance advisory services and coastal adaptation solutions to EU neighbourhood countries.

Source: Policy Department for Transformation, Innovation and Health, Directorate-General for Economy, Transformation and Industry, European Commission²⁵⁰, European Parliament.²⁵¹

* based on climate-environment share of total draft budget²⁵²

** Dutch share based on average of Dutch share of EU population, GDP and historical budget allocation patterns

²⁵⁰ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Amending Council Regulation (EC) No 1224/2009, and Amending Council Regulations (EC) No 768/2005, (EC) No 1967/2006, (EC) No 1005/2008, and Regulation (EU) No 2016/1139 of the European Parliament and of the Council as Regards Fisheries Control.

European Commission, ‘REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Establishing the European Competitiveness Fund (‘ECF’), Including the Specific Programme for Defence Research and Innovation Activities, Repealing Regulations (EU) 2021/522, (EU) 2021/694, (EU) 2021/697, (EU) 2021/783, Repealing Provisions of Regulations (EU) 2021/696, (EU) 2023/588, and Amending Regulation (EU) [EDIP]’.

²⁵¹ European Parliament, ‘National and regional partnership plans, European territorial cooperation and EU facility 2028-2034 | Think Tank | Parlement Europejski’. European Parliament, ‘2028-2034 MFF’.

²⁵² Eichler, ‘The 2028–2034 EU Long-Term Budget’.

5.4. Main findings

The Netherlands is ideally positioned to translate its proven climate expertise into a broader European advantage. By leveraging its leading positions in water management, coastal engineering, and climate-resilient agriculture, the country can help shape regional adaptation strategies that reduce the socio-economic impacts of climate change across Europe. Implementing Dutch approaches, such as *Room for the River*, *Building with Nature* and advanced climate-smart breeding, would not only protect vulnerable regions from floods, droughts, and sea-level rise but also alleviate the financial burden of repeated recovery efforts on the EU budget.

Such cooperation directly addresses the tensions and inequalities discussed in Chapter 5, fostering greater cohesion and solidarity within the Union. In doing so, the Netherlands can transform adaptation into a shared European strength, turning risk into resilience. The Netherlands already cooperates with a multitude of EU countries on a range of climate adaptation initiatives. By exporting its innovations, the Netherlands would reinforce the EU's political cohesion, increase its security, and at the same time increase its own strategic influence within Europe and beyond. In short, adaptation leadership in climate resilience can yield both environmental security and geopolitical advantage.

6. Conclusion and recommendations

Climate change poses a complex and uneven threat to the European Union. The analysis of climate hazards revealed that extreme heat, wildfires, floods, droughts, and coastal risks are the most urgent challenges. Southern and Southeastern Europe are particularly exposed to heat, drought and wildfires; while flooding and coastal risks increasingly affect Central, Western and low-lying Northern regions. These hazards are already imposing significant human, environmental and economic costs, which are expected to rise as climate-induced risks intensify.

The sectoral analysis shows that agriculture, infrastructure, energy systems, public health and the broader economy are all highly vulnerable to climate impacts. Agriculture in Southern Europe is most severely affected, while infrastructure and energy systems are under increasing pressure from floods, droughts and sea-level rise. Health impacts are concentrated in Southern and Southeastern Europe. Economic disruptions are spreading across the continent through reduced productivity, damaged supply chains and declining tourism revenues. Differences in governance quality, institutional capacity and social resilience further influence how countries experience and manage these challenges, with Southern Europe facing the dual burden of high exposure and high vulnerability.

These uneven impacts increase the risk of diverging national priorities and rising political tensions. Climate change is already intensifying conflicts over fiscal solidarity, decision-making, and the balance between short-term relief and long-term adaptation. Southern and poorer EU Member States call for stronger financial and technical support for adaptation, while wealthier Northern EU Member States tend to prioritise fiscal stability and competitiveness. Central and Eastern EU Member States, meanwhile, focus on defence and energy security, often at the expense of climate ambition. If these divisions deepen, the EU could face greater political fragmentation and a diminished capacity for collective action, ultimately undermining its political cohesion.

However, this outcome is not inevitable. Climate adaptation offers an opportunity to strengthen, rather than weaken, cohesion. Coordinated adaptation measures that reduce regional disparities in vulnerability can help mitigate future conflicts of interest. Shared investment in resilience, supported by equitable funding mechanisms, could transform climate risk into a source of collective strength.

Effective implementation of adaptation strategies across Europe would reduce the need for transfer payments and help ease fiscal tensions among EU Member States. Similarly, the effective implementation of sustainable agricultural and infrastructural practices could increase the alignment on climate policies between EU Member States, encouraging a longer-term perspective on adaptation. Together, these efforts would help preserve the EU's political cohesion by turning shared vulnerability into shared resilience.

The five most promising areas of adaptation where the Netherlands can support the rest of the EU Member States are listed below. The Netherlands can build on its established expertise and adaptation initiatives by scaling up programmes in water management, coastal protection, and climate-resilient agriculture that have already demonstrated measurable benefits in mitigating climate impacts and strengthening resilience.

- 1. Crop breeding innovation in agriculturally reliant, vulnerable EU-regions.** Europe should expand research and implementation of climate-resilient crop varieties, particularly those adapted to heat, drought and salinisation. This expansion should focus on transferring and implementing existing and newly developed innovations to regions that are both heavily dependent on agriculture and where coping and adaptation capacity are lower, such as Southern and Southeastern Europe. By supporting the development of resilient crops and improving local agricultural practices, Dutch research institutions and private partners can help reduce vulnerability to climate-induced yield losses. Adjacent to this, innovations for better soil protection and management can be implemented.
- 2. Controlled agriculture and horticulture in regions suffering most from heat and extreme weather.** Europe should promote the wider adoption of controlled-environment agriculture, building on its advanced greenhouse sector. This includes expanding greenhouse automation and resource-saving technologies in areas expected to experience severe heat stress, such as Southern and Southeastern Europe. Existing Dutch pilot projects in energy-efficient and water-saving greenhouse systems can serve as a model for sustainable agricultural adaptation, reducing water dependence and stabilising food production yields under increasingly volatile climate conditions.
- 3. Climate-smart livestock practices in vulnerable regions with significant livestock-related income.** Europe should stimulate knowledge exchange and cooperation in creating sustainable livestock systems in countries where livestock is a major part of the economy, and which are strongly affected by climate stress. Cooperation could focus on heat-tolerant breeds and improved animal housing systems. By assisting vulnerable regions, such as Spain and Greece, the Netherlands can help build resilience in this sector.
- 4. River and flood system reinforcement in vulnerable regions which suffer from high flood damages.** Europe should expand its implementation of water management to strengthen river and flood systems across Europe. Measures such as floodplain restoration, natural retention areas, and adaptive infrastructure can reduce both fluvial and flash flood risks. By using historical flood data and risk mapping, Dutch experts can help identify and strengthen the most vulnerable river basins and coastal floodplains, especially in countries that have experienced severe flood damage in recent years, such as Germany, Spain, Italy and Greece.
- 5. Port and urban adaptation in vulnerable coastal areas with large populations and economic assets.** Europe should increase resilience in its ports and coastal cities. This includes mapping erosion-prone areas and anticipating infrastructural and agricultural risks from sea-level rise and salinisation. For example, the Netherlands could help expand the implementation of nature-based solutions across Europe. Strategies include cultivating salt-tolerant crops, redesigning urban drainage and dike systems, and protecting key infrastructure from inundation. Collaborative projects with vulnerable coastal countries can significantly reduce economic losses and enhance long-term resilience across the EU.

Finally, besides specific interventions that can be made, there is a need for stronger and more institutionalised EU coordination on climate adaptation. Currently, climate adaptation efforts are being carried out by several institutes through multiple funding mechanisms. However, this situation creates a lack of clarity regarding which projects are being implemented, how follow-up is conducted, what results are achieved, and which next steps emerge from these efforts. Moreover, geographical climate adaptation coverage is still uneven, with some countries more active than others. As a result, there have been repeated calls for a more coherent climate adaptation mechanism within the EU. One option could be to consider the creation of a more institutionalised climate adaptation agency that would centralise funding and strategic direction, and support more thorough implementation of climate adaptation across the EU. The EU Mission on Climate Adaptation, through its voluntary cooperation structure, already coordinates regions, access to funding, and provides implementation support across the EU. This makes it a suitable starting point for institutionalising climate adaptation.

Annex A:

Description of indicators

A brief description of the risks and the indicators used is provided below.

The occurrence of future extreme heat is measured by the projected rise in the number of heatwave days in each EU member state. A larger increase in heatwave days indicates a greater likelihood of extreme heat events. Wildfires typically occur under combined conditions of heat and dryness. Accordingly, wildfire risk is measured by the projected increase in heatwave days together with the rise in consecutive dry days in each member state.

The occurrence of extreme cold is measured by the increase in the number of frost days in each EU member state.

The occurrence of wind related risks will be measured by two indicators. The first indicator will measure the average surface wind speed in EU Member States. Since storms are extreme weather events, they will not always be captured by average wind speeds. Therefore, a second indicator, measuring extreme wind days is added.

For 'Wet' risks, heavy and volatile precipitation is assessed by the projected change in total annual precipitation together with the change in maximum one-day precipitation. These indicators capture both overall shifts in rainfall volumes and the intensity of extreme precipitation events. Future flood risks are assessed using the Historical Analysis of Natural Hazards in Europe (HANZE) database, which provides records of historical flood patterns.

Drought risk is assessed by the projected change in the annual maximum number of consecutive dry days. This indicator reflects the likelihood of prolonged periods without rainfall.

Marine and coastal risks are measured with a combination of indicators. Sea-level rise is assessed by the projected average increase in sea level. This indicator provides an estimate of the extent to which coastal and low-lying areas will be exposed to flooding and erosion risks. Ocean warming and acidification are assessed by the projected change in mean sea surface temperature and mean pH. These indicators together capture the risks to the ocean ecosystems.

Permafrost thaw and snowfall changes are assessed by the projected change in annual snowfall. This indicator reflects both the change in total snowfall and the potential decline in seasonal snow cover, including permafrost. Additionally, mean annual temperature is included because rising air temperatures are a primary driver of permafrost thaw.²⁵³

²⁵³ Erwin Rottler et al., 'Elevation-Dependent Warming in the Swiss Alps 1981–2017: Features, Forcings and Feedbacks', *International Journal of Climatology* 39, no. 5 (2019): 2556–68, <https://doi.org/10.1002/joc.5970>.

Together, these indicators form the basis for analysing climate risks on a country-by-country level across all EU Member States. Combined with historical occurrences and supplementary desk research, they provide a framework for assessing climate risks in each member state.

The indicators to measure the country-level risks are also taken from the EEA report. These indicators are part of the Climate Impact Driver Information for Europe (EUCRA Shiny App) database.²⁵⁴ This database contains country-level data on climate indicators listed in table 1. These indicators act as a proxy for the risk levels in each EU member state. The risk assessments for each country are enhanced by examining historical climate events and their socio-economic impacts across the EU.

The categories are Heat, Cold, Wind, Wet, Dry, Marine and Coastal and Snow and Ice.

The risk assessments for each EU member state are based on CMIP6 multi-model ensemble projections for 2040 under the SSP5-8.5 scenario. CMIP6 provides the most up-to-date climate models, and using an ensemble reduces dependence on the biases of any single model. SSP5-8.5 is widely used in impact studies.

²⁵⁴ BSC, 'Climate Impact Driver Information for Europe (EUCRA Shiny App)', BSC-CNS, accessed 29 July 2025, <https://www.bsc.es/research-and-development/software-and-apps/software-list/climate-impact-driver-information-europe/downloads>.

Annex B:

Sectoral impacts of climate change

Table B1: Sectoral impacts of climate change based on climate risk driver



	Food	Infrastructure		Economy		Health	
	Agriculture	Infrastructure	Energy	Manufacturing	Tourism	Human Health	Displacement/Migration
Heat	Lower crop yields, fodder/ grazing land loss	Material fatigue, deformation	Increased peak electricity demand	Lower worker productivity	Tourism decrease in warmer countries	Heat-related deaths, Wildfire-related deaths	
Cold	Damage to blossoms and orchards	Buildings, roads damage due to freezing	Power lines damage			Cold-related mortality	
Wind	Storm damage	Windstorm damage	Lower turbine speeds due to wind droughts	Storm impact on manufacturing operations	Flight cancellations, property destruction		Storm-related displacement
Wet	Flooding/Heavy rainfall plant and soil damage	Inland waterway damage, flooding damage (roads, subways)	Flooding damage to energy systems	Factory/site flooding, Supply chain disruption	Hotel-accommodation flooding, landmark flooding	Flooding fatalities	
Dry	Water shortages, Lower crop yields, fodder/ grazing land loss	Inland waterway water shortage	limited water availability (cooling/hydro)	Process water scarcity, waterway supply chain disruption	Water restriction, outdoor curtailment (wildfires), landscape erosion		Drought-related displacement
Marine and coastal	Saltwater intrusion, loss of coastal farmland, aquaculture damage	Coastal infrastructure damage due to coastal erosion and sea level rise	Coastal flooding damage to energy systems	Coastal factory/site flooding, port supply chain disruption	Erosion of coastal tourism destinations		Displacement of people near coastlines
Snow and ice	Meltwater shortage for irrigation, Freeze/thaw, spring frost damage	Permafrost thaw-induced flooding, soil erosion	Glacial lake outburst flood (GLOF) impact on hydro energy	Factory/plant damage, supply chain disruption	Decrease of winter tourism	Avalanche, landslide injuries	

Annex C:

Selection of climate adaptation options by sector

6.4.1. Food

In the food sector, farmers have developed a range of strategies to adapt to the effects of climate change on agriculture. In France and Spain, many have shifted to crops that are more resilient to heat and drought.²⁵⁵ Others have adopted new cultivars designed to withstand higher temperatures or lower rainfall.²⁵⁶ Farmers are also adjusting sowing dates to avoid periods of extreme weather.²⁵⁷ Technological innovation has improved water management through precision irrigation systems that help maintain soil moisture levels.²⁵⁸ Some farms use shade nets to reduce evaporation losses and protect crops from heat stress.

6.4.2. Infrastructure

Infrastructure plays a crucial role in adapting societies to climate change, as it underpins economic and social efficiency. Governments and local authorities must strengthen existing systems while developing new, climate-resilient projects. Integrated land-use planning helps reduce risks from flooding and drought, as demonstrated by the Netherlands' Delta Programme, which reinforces dikes and creates space for rivers to manage water more effectively.²⁵⁹ In Germany, "Green and Blue Infrastructure" initiatives — such as green roofs, bioretention ponds, and urban water tanks — support cooling, flood control, and climate awareness.²⁶⁰ Projects like Stuttgart's green roofs and the "Rainy Biberland" playground combine mitigation with public education. Infrastructure adaptation also includes technical measures for transport systems. For railways, these range from flood diversion channels and

²⁵⁵ Magali Willaume et al., 'Farmers in Southwestern France Think That Their Arable Cropping Systems Are Already Adapted to Face Climate Change', *Regional Environmental Change* 14, no. 1 (2014): 333–45, <https://doi.org/10.1007/s10113-013-0496-5>.

²⁵⁶ Alejandro del Pozo et al., 'Climate Change Impacts and Adaptation Strategies of Agriculture in Mediterranean-Climate Regions (MCRs)', *Sustainability* 11, no. 10 (2019): 2769, <https://doi.org/10.3390/su11102769>.

²⁵⁷ del Pozo et al., 'Climate Change Impacts and Adaptation Strategies of Agriculture in Mediterranean-Climate Regions (MCRs)'.

²⁵⁸ del Pozo et al., 'Climate Change Impacts and Adaptation Strategies of Agriculture in Mediterranean-Climate Regions (MCRs)'.

²⁵⁹ '2024 Delta Programme | Delta Programme'.

²⁶⁰ Jeremy G. Carter, 'Climate Change Adaptation in European Cities', *Current Opinion in Environmental Sustainability* 3, no. 3 (2011): 193–98, <https://doi.org/10.1016/j.cosust.2010.12.015>.

²⁶¹ Kornelia Przestrzelska et al., 'Climate Resilient Cities: A Review of Blue-Green Solutions Worldwide', *Water Resources Management* 38, no. 15 (2024): 5885–910, <https://doi.org/10.1007/s11269-024-03950-5>.

white-painted rails to portable flood barriers for rapid recovery.²⁶² Roads can be made more resilient through reflective materials, permeable pavements, improved drainage, and hydrophobic coatings that protect surfaces from heat and moisture damage.²⁶³ Additionally, to cover uninsured losses, some have suggested to start a public-private reinsurance scheme to extend coverage on infrastructure vulnerable to climate hazards.²⁶⁴

6.4.3. Health

Across Europe, regions are implementing measures to cushion the health effects of climate change.²⁶⁵ In Flanders, Belgium, new river locks along the Albert Canal reduce flood risks and prevent waterborne diseases.²⁶⁶ Italy has built overflow tanks in Rimini to stop sewage from entering bathing waters.²⁶⁷ In Portugal's Alentejo region, farmers use agro-silvo-pastoral systems to retain soil moisture and strengthen food security.²⁶⁸ Urban greening also supports health protection. Hamburg and Basel promote green and white roofs to reduce urban heat and related illnesses.²⁶⁹ Freiburg's Land Use Plan 2020 creates "cool air corridors" for relief during heatwaves, while Spanish schools are greening grounds to shield children from rising temperatures.²⁷⁰ Southern EU Member States are expanding heat-warning systems to reduce illness and mortality.²⁷¹ Italy's Heat-Health Watch Warning System, Portugal's ÍCARO program, and Spain's iso-climatic risk mapping aid early interventions.²⁷² North Macedonia and Slovenia also contribute to the European early-warning network, improving preparedness for heatwaves.²⁷³

²⁶² 'Climate Adaptation Strategies to Safeguard Rail Infrastructure - Climate Adaptation Platform', accessed 29 October 2025, <https://climateadaptationplatform.com/climate-adaptation-strategies-to-safeguard-rail-infrastructure/>.

²⁶³ 'Climate Change and Road Safety', *iRAP*, n.d., accessed 29 October 2025, <https://irap.org/climate-change-and-road-safety/>.

²⁶⁴ European Central Bank, *The Climate Insurance Protection Gap*, 18 December 2024, <https://www.ecb.europa.eu/ecb/climate/climate/html/index.en.html>.

²⁶⁵ 'New Locks in the Albert Canal in Flanders, Belgium', accessed 19 September 2025, <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/new-locks-in-albertkanaal-in-flanders-belgium>.

²⁶⁶ Jan C. Semenza and Shlomit Paz, 'Climate Change and Infectious Disease in Europe: Impact, Projection and Adaptation', *The Lancet Regional Health - Europe* 9 (October 2021): 100230, <https://doi.org/10.1016/j.lanepe.2021.100230>.

²⁶⁷ 'Protecting Bathing Water Quality from Sewage Overflow in Rimini, Italy', accessed 19 September 2025, <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/protecting-bathing-water-quality-from-sewage-overflow-in-rimini-italy>.

²⁶⁸ 'Autonomous Adaptation to Droughts in an Agro-Silvo-Pastoral System in Alentejo', accessed 19 September 2025, <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/autonomous-adaptation-to-droughts-in-an-agro-silvo-pastoral-system-in-alentejo>.

²⁶⁹ 'Four Pillars to Hamburg's Green Roof Strategy: Financial Incentive, Dialogue, Regulation, and Science', accessed 19 September 2025, <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/four-pillars-to-hamburg2019s-green-roof-strategy-financial-incentive-dialogue-regulation-and-science>; 'Green Roofs in Basel, Switzerland: Combining Mitigation and Adaptation Measures', accessed 19 September 2025, <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/green-roofs-in-basel-switzerland-combining-mitigation-and-adaptation-measures-1>.

²⁷⁰ Marta Sanz-Mas et al., 'Evaluating the Effect of Green, Blue, and Gray Measures for Climate Change Adaptation on Children's Well-Being in Schoolyards in Barcelona', *Landscape and Urban Planning* 253 (January 2025): 105206, <https://doi.org/10.1016/j.landurbplan.2024.105206>.

²⁷¹ 'Italian Heat Health Watch Warning System (HHWW Systems)', accessed 19 September 2025, <https://www.deplazio.net/en/national-system-hhww>.

²⁷² A. Leite et al., 'Assessing the Use and Understanding of the Portuguese Heat-Health Warning System (ÍCARO)', *Journal of Public Health (Oxford, England)* 42, no. 2 (2020): 395–402, <https://doi.org/10.1093/pubmed/fdaa029>.

²⁷³ <https://www.earlywarningeurope.eu/>

6.4.4. Economy and Finance

For economy and finance, climate adaptation includes flood-proofing buildings, protecting machinery through waterproofing or elevation, and improving insulation for efficient cooling and renewable energy use.²⁷⁴ Water recycling systems and low-carbon technologies are increasingly adopted. Operational measures such as supplier diversification, enhanced maintenance, and adjusted shift schedules during heatwaves strengthen resilience and worker safety.²⁷⁵ Risk management and staff training for extreme weather are becoming standard practice.²⁷⁶ Product design is also adapting, with temperature-resistant packaging extending food shelf life and reducing vulnerability to shortages.²⁷⁷ In tourism, Spain's adaptation efforts protect major destinations from climate impacts.²⁷⁸ The National Plan for Adaptation promotes green infrastructure and less land sealing. Benidorm's Climate Adaptation Plan and Alicante's floodable parks, like La Marjal, integrate water management, recreation, and storm-water control. Sustainable Urban Drainage Systems (SUDS) further prevent flooding and reduce coastal water pollution.

²⁷⁴ Martina K. Linnenluecke et al., 'Firm and Industry Adaptation to Climate Change: A Review of Climate Adaptation Studies in the Business and Management Field', *WIREs Climate Change* 4, no. 5 (2013): 397–416, <https://doi.org/10.1002/wcc.214>.

²⁷⁵ Linnenluecke et al., 'Firm and Industry Adaptation to Climate Change'.

²⁷⁶ Linnenluecke et al., 'Firm and Industry Adaptation to Climate Change'.

²⁷⁷ Linnenluecke et al., 'Firm and Industry Adaptation to Climate Change'.

²⁷⁸ Esther Sánchez-Almodóvar et al., 'Floods and Adaptation to Climate Change in Tourist Areas: Management Experiences on the Coast of the Province of Alicante (Spain)', *Water* 15, no. 4 (2023): 807, <https://doi.org/10.3390/w15040807>.

Annex D: Positions of EU Member States on a selection of topics

Country	MFF – EU cohesion	SGP Reform (April 2024)	Defence Spending attitude	EU Migration Stance	Climate ambition	Climate adaptation plan in place	Total % ODA spent on environment (split out adaptation vs mitigation)
Austria	'Frugals' MFF Under 1% GNI	Fiscal conservative block in 2023 ²⁷⁹	Non-NATO, skeptical	Oppose burden sharing ²⁸⁰	Ranked 23rd in the Climate Change Performance Index (CCPI). Foreign aid	Yes	36% (19.1% / 26.5%)
Belgium	Leaning towards no.	Moderate, balancing discipline with room for investment. ²⁸¹	Middle Group ²⁸²	Leaning towards burden sharing ²⁸³	Ranked 35th in the Climate Change Performance Index (CCPI). Foreign aid	No	40.1% (39.7% / 32.8%)
Bulgaria	'Friends of Cohesion' coalition ²⁸⁴	No clear public position	Upper middle cohort ²⁸⁵	Leaning towards burden sharing ²⁸⁶	Ranked 50th in the Climate Change Performance Index (CCPI). Foreign aid	Yes	Non-OECD

²⁷⁹ POLITICO, 'Franco-German Disagreement Stalls EU Fiscal Rules Reform', POLITICO, 17 October 2023, <https://www.politico.eu/article/france-germany-disagreement-european-commission-fiscal-rules-reform-stability-growth-pact/>.

²⁸⁰ Reuters, 'Austria's Coalition Agreement: What Are Main Policies in the Parties' Joint Programme?', 27 February 2025, <https://www.reuters.com/world/europe/key-policies-austrias-new-coalition-government-agreement-2025-02-27/>.

²⁸¹ Consilium, 'Economic Governance Review: Council and Parliament Strike Deal on Reform of Fiscal Rules', Consilium, 10 February 2024, <https://www.consilium.europa.eu/en/press/press-releases/2024/02/10/economic-governance-review-vcouncil-and-parliament-strike-deal-on-reform-of-fiscal-rules/>.

²⁸² Atlantic Council, 'NATO Defense Spending Tracker', *Atlantic Council*, 20 June 2025, <https://www.atlantic-council.org/commentary/trackers-and-data-visualizations/nato-defense-spending-tracker/>; Belga News Agency, 'Belgium Resigned to Accepting NATO's 5 per Cent Defence Spending Goal', *Belganewsagency.Eu*, 16 June 2025, <https://www.belganewsagency.eu/belgian-government-resigned-to-accept-natos-5-percent-defence-spending-goal>.

²⁸³ Barbara Moens and Laura Dubois, 'EU Should Use Trade Deals to Send Back Migrants, Says Belgian Minister', *Financial Times*, 23 June 2025; Charlotte Van Campenhout, 'Belgium Announces Border Checks in Migration Clampdown', *World, Reuters*, 20 June 2025, <https://www.reuters.com/world/belgium-announces-border-checks-migration-clampdown-2025-06-20/>; European Parliament, 'Solidarity in EU Asylum Policy | Think Tank | European Parliament'.

²⁸⁴ Ministry of Development Funds and Regional Policy, Republic of Poland, 'Friends of Cohesion Summit in Portugal - Ministry of Development Funds and Regional Policy - Gov.Pl Website', Ministry of Development Funds and Regional Policy, 3 February 2020, <https://www.gov.pl/web/funds-regional-policy/friends-of-cohesion-summit-in-portugal>.

²⁸⁵ Atlantic Council, 'NATO Defense Spending Tracker'; Bulgarian News Agency, 'After NATO Summit, PM Zhelyazkov Reaffirms Bulgaria's Commitment to Increasing Defence Spending to 5% of GDP by 2035', 25 May 2025, <https://www.bta.bg/en/news/world/918175-after-nato-summit-pm-zhelyazkov-reaffirms-bulgaria-s-commitment-to-increasing-d>.

²⁸⁶ European Parliament, 'Solidarity in EU Asylum Policy | Think Tank | European Parliament'.

Country	MFF – EU cohesion	SGP Reform (April 2024)	Defence Spending attitude	EU Migration Stance	Climate ambition	Climate adaptation plan in place	Total % ODA spent on environment (split out adaptation vs mitigation)
Croatia	'Friends of Cohesion' coalition	No clear public position	Middle Group ²⁸⁷	Leaning towards burden sharing ²⁸⁸	Ranked 40th in the Climate Change Performance Index (CCPI). Foreign aid	No	3.5% (2.1% / 2.1%)
Cyprus	'Friends of Cohesion' coalition	Supportive of fiscal discipline ²⁸⁹	Non-NATO, Laggard ²⁹⁰	Supports burden sharing ²⁹¹	Ranked 44th in the Climate Change Performance Index (CCPI). Foreign aid	No	Non-OECD
Czech Republic	'Friends of Cohesion' coalition	Fiscal conservative block in 2023	Middle group ²⁹²	Leaning towards burden sharing ²⁹³	Ranked 49th in the Climate Change Performance Index (CCPI). Foreign aid	Yes	16.6% (7.9% / 5%)
Denmark	'Frugals' MFF Under 1% GNI, however leans yes. ²⁹⁴	Part of 'frugal bloc' until June 2025, left to prioritise defence spending. ²⁹⁵	Upper middle cohort ²⁹⁶	Oppose burden sharing ²⁹⁷	Ranked 4th in the Climate Change Performance Index (CCPI). Foreign aid	Yes	34.1% (28.5% / 22.2%)
Estonia	'Friends of Cohesion' coalition	Seen as more frugal. Part of 'frugal states' coalition in 2018 position paper. ²⁹⁸ Exemptions for defence spending	Vanguard ²⁹⁹	Historically Opposed burden sharing ³⁰⁰	Ranked 14th in the Climate Change Performance Index (CCPI). Foreign aid	Yes	10.6% (11.9% / 13.7%)

²⁸⁷ Atlantic Council, 'NATO Defense Spending Tracker'; Croatia Week, 'Croatia Ready to Reach 5% Defence Spending', News, *Croatia Week*, 25 June 2025, <https://www.croatiaweek.com/croatia-ready-to-reach-5-defence-spending/>.

²⁸⁸ Heinrich Böll Stiftung, 'The European Refugee Crisis - the Croatian View', 26 May 2016, <https://eu.boell.org/en/2016/05/26/european-refugee-crisis-croatian-view>.

²⁸⁹ AP News, 'Cyprus Says No Let-up to Fiscal Discipline Course as S&P Raises Country's Credit Rating to BBB+', AP News, 15 June 2024, <https://apnews.com/article/cyprus-standard-poors-rating-upgrade-49946dcf-7fe972cc68e921381bf32c3a>.

²⁹⁰ Cyprus Mail, 'Defence Ministry Aims at 2 per Cent GDP for Army by 2028', 22 November 2024, <https://cyprus-mail.com/2024/11/22/defence-ministry-aims-at-2-per-cent-gdp-for-army-by-2028>.

²⁹¹ European Parliament, 'Solidarity in EU Asylum Policy | Think Tank | European Parliament'. Web KNEWS, 'Cyprus Formally Asks EU to Share Burden', *Knews.Com.Cy*, 6 August 2019, <https://knews.kathimerini.com.cy/en/news/cyprus-formally-asks-eu-to-share-burden>.

²⁹² Atlantic Council, 'NATO Defense Spending Tracker'; Brno Daily, 'Czech Republic Is Ready To Raise Defence Spending To 5% of GDP, Says Fiala', 25 June 2025, <https://brnodaily.com/2025/06/25/news/politics/czech-republic-is-ready-to-raise-defence-spending-to-5-of-gdp-says-fiala/>.

²⁹³ European Parliament, 'Solidarity in EU Asylum Policy | Think Tank | European Parliament'.

²⁹⁴ Jacob Wulff Wold and Nikolaus J. Kurmayer, 'Money Talks: What the EU-27 Want from the next Budget', *Euractiv*, 14 July 2025, <https://www.euractiv.com/section/economy-jobs/news/what-the-eu-27-wants-from-the-next-budget/>.

²⁹⁵ Anadolou Ageancy, 'Denmark to Leave EU Frugal Four Group to Focus on Rearming Europe', 3 June 2025, <https://www.aa.com.tr/en/europe/denmark-to-leave-eu-frugal-four-group-to-focus-on-rearming-europe/3588103>.

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³⁰⁰ Viljar Veebel, 'Balancing Between Solidarity and Responsibility: Estonia in the EU Refugee Crisis', *Journal on Baltic Security* 1, no. 2 (2015): 28–61, <https://doi.org/10.1515/jobs-2016-0020>.

Country	MFF – EU cohesion	SGP Reform (April 2024)	Defence Spending attitude	EU Migration Stance	Climate ambition	Climate adaptation plan in place	Total % ODA spent on environment (split out adaptation vs mitigation)
Finland	Leaning no ³⁰¹	Generally part of frugal four. ³⁰² Fiscal conservative block in 2023	Vanguard ³⁰³	Leaning towards burden sharing ³⁰⁴	Ranked 37th in the Climate Change Performance Index (CCPI). Foreign aid	Yes	31% (20.3% / 20.2%)
France	Traditionally supportive of cohesion beneficiaries, but middle ground	More lenient, country-specific flexibility. ³⁰⁵	Upper middle cohort ³⁰⁶	Leaning towards burden sharing ³⁰⁷	Ranked 25th in the Climate Change Performance Index (CCPI). Foreign aid	Yes	58.4% (67% / 72.3%)
Germany	Traditionally supportive of frugal group, but middle ground	Fiscal conservative, recently more flexible on (defence) spending ³⁰⁸	Upper middle cohort ³⁰⁹	Leaning towards burden sharing ³¹⁰	Ranked 16th in the Climate Change Performance Index (CCPI). Foreign aid	Yes	53.5% (26.6% / 35.9%)
Greece	'Friends of Cohesion' coalition	No clear public stance	Vanguard ³¹¹	Support burden sharing ³¹²	Ranked 22th in the Climate Change Performance Index (CCPI).	No	Not a significant donor due to crisis
Hungary	'Friends of Cohesion' coalition	No clear public stance	Middle group ³¹³	Oppose burden sharing ³¹⁴	Ranked 45th in the Climate Change Performance Index (CCPI). Pushback on climate policy. ³¹⁵	No	3.1% (0.8% / 0.1%)

³⁰¹ Jacob Wulff Wold and Nikolaus J. Kurmayer, 'Money Talks: What the EU-27 Want from the next Budget', *Euractiv*, 14 July 2025, <https://www.euractiv.com/section/economy-jobs/news/what-the-eu-27-wants-from-the-next-budget/>.

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³¹⁴ European Parliament, 'Solidarity in EU Asylum Policy | Think Tank | European Parliament'.

³¹⁵ Sam Jones, 'Political Cowardice Hindering Europe's Climate Efforts, Says EU's Green Chief', *World News, The Guardian*, 2 July 2025, <https://www.theguardian.com/world/2025/jul/02/political-cowardice-hindering-europe-climate-efforts-eu-green-chief-teresa-ribera>.

Country	MFF – EU cohesion	SGP Reform (April 2024)	Defence Spending attitude	EU Migration Stance	Climate ambition	Climate adaptation plan in place	Total % ODA spent on environment (split out adaptation vs mitigation)
Ireland	Undeclared	Seen as more frugal. Part of 'frugal states' coalition in 2018 position paper. ³¹⁶	Non-NATO, skeptical ³¹⁷	Leaning towards burden sharing ³¹⁸	Ranked 29th in the Climate Change Performance Index (CCPI).	Yes	33.4% (28.8% / 10.9%)
Italy	'Friends of Cohesion' coalition	More lenient ³¹⁹ , Exemptions for defence spending ³²⁰	Middle Group ³²¹	Supports burden sharing ³²²	Ranked 43 rd in the Climate Change Performance Index (CCPI).	Yes	22.9% (21.8% / 18.9%)
Latvia	'Friends of Cohesion' coalition	Seen as more frugal. Constitutional rule under fiscal compact. Exemptions for defence spending ³²³	Vanguard ³²⁴	Oppose burden sharing ³²⁵	Ranked 36th in the Climate Change Performance Index (CCPI). Passive participant EU mitigation strategy, slightly higher focus on adaptation, fossil-fuel phase out underway ³²⁶	Yes	1% (0.6% / 0.2%)
Lithuania	'Friends of Cohesion' coalition	Seen as more frugal. Fiscal conservative block in 2023. Exemptions for defence spending	Vanguard ³²⁷	Leaning towards burden sharing ³²⁸	Ranked 18th in the Climate Change Performance Index (CCPI).	Yes	21.2% (8% / 3.6%)
Malta	'Friends of Cohesion' coalition	No clear public stance, fast implementation of new SGP ³²⁹	Non-NATO, skeptical ³³⁰	Supports burden sharing ³³¹	Ranked 34th in the Climate Change Performance Index (CCPI).	Yes	Non-OECD

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³²⁸ European Parliament, 'Solidarity in EU Asylum Policy | Think Tank | European Parliament'.

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Country	MFF – EU cohesion	SGP Reform (April 2024)	Defence Spending attitude	EU Migration Stance	Climate ambition	Climate adaptation plan in place	Total % ODA spent on environment (split out adaptation vs mitigation)
Netherlands	'Frugals' MFF Under 1% GNI	Seen as more frugal. Fiscal conservative block in 2023	Upper middle cohort ³³²	Leaning towards burden sharing ³³³	Ranked 5th in the Climate Change Performance Index (CCPI).	Yes	58.3% (50.6% / 22%)
Poland	'Friends of Cohesion' coalition	On the frugal side: national expenditure rule to enshrine SGP. Exemptions for defence spending ³³⁴	Vanguard ³³⁵	Oppose burden sharing ³³⁶	Ranked 47th in the Climate Change Performance Index (CCPI).	No	4.5% (3.5% / 2.1%)
Portugal	'Friends of Cohesion' coalition	More lenient for individual country paths, but reiteration of fiscal discipline (and wariness of defence overspend) ³³⁷	Upper middle cohort ³³⁸	Support burden sharing ³³⁹	Ranked 15th in the Climate Change Performance Index (CCPI).	Yes	9.4% (2.8% / 2.9%)
Romania	'Friends of Cohesion' coalition	No clear public stance	Upper middle cohort ³⁴⁰	Leaning towards burden sharing ³⁴¹	Ranked 32nd in the Climate Change Performance Index (CCPI).	Yes	1%
Slovenia	'Friends of Cohesion' coalition	No clear public stance	Laggard ³⁴²	Leaning towards burden sharing ³⁴³	Ranked 30th in the Climate Change Performance Index (CCPI)	Yes	20.6% (19.9 / 22.3%)

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Country	MFF – EU cohesion	SGP Reform (April 2024)	Defence Spending attitude	EU Migration Stance	Climate ambition	Climate adaptation plan in place	Total % ODA spent on environment (split out adaptation vs mitigation)
Slovakia	'Friends of Cohesion' coalition	No clear public stance, national fiscal rule under 'Fiscal Compact' ³⁴⁴	Middle group ³⁴⁵	Oppose burden sharing ³⁴⁶	Ranked 46th in the Climate Change Performance Index (CCPI).	Yes	7.9% (4.7% / 3.6%)
Spain	'Friends of Cohesion' coalition	More lenient ³⁴⁷	Laggard ³⁴⁸	Supports burden sharing ³⁴⁹	Ranked 19th in the Climate Change Performance Index (CCPI).	Yes	31.5% (6.4% / 14.9%)
Sweden	'Frugals' MFF Under 1% GNI	Leaning towards frugal four, with exemption for defence spending. ³⁵⁰ Fiscal conservative block in 2023	Upper middle cohort ³⁵¹	Historically in favour of burden sharing ³⁵²	Ranked 11th in the Climate Change Performance Index (CCPI).	Yes	44.7% (27.5% / 14.9%)

Description of Defence spending and Migration grouping:

Defence support

Skeptical = Non-NATO + under 1.5% spend

Laggard = Under 2% and no clear commitment 5%

Middle group = Above 2% and no clear commitment to 5% or below 2% but clear commitment to 5%

Upper middle cohort = Above 2% and clear commitment to 5%

Vanguard = Above 2.5% and clear commitment to 5%

Migration support:

Oppose burden sharing = not accepting 2022 Solidarity Declaration and/or publicly opposing burden-sharing

Leaning towards burden sharing = accepting 2022 Solidarity Declaration

Support burden sharing = accepting 2022 Solidarity Declaration and/or public statements supporting additional burden-sharing

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