

ACCREU
Assessing Climate Change Risk in EUrope

CrossEU

THE ACCREU AND CROSSEU FINAL EVENT

CLIMATE RISK ACROSS EUROPE: KNOWLEDGE, TOOLS AND PATHWAYS TO RESILIENCE

Brussels and online, 13 November 2026

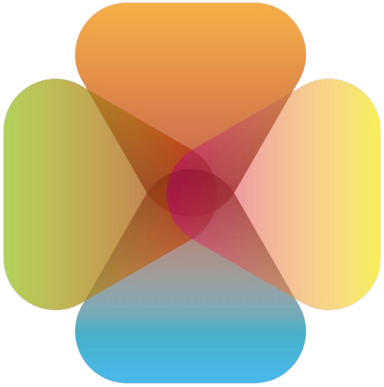
Organised by:

cmcc Centro Euro-Mediterraneo sui Cambiamenti Climatici

METEO ROMANIA

UK Research and Innovation

Funded by the European Union



ACCREU
Assessing Climate Change Risk in EUrope

Research highlights and policy implications from the ACCREU and CROSSEU projects

Francesco Bosello, Enrica De Cian
University of Venice and CMCC

The ACCREU-CROSSEU final event
Climate Risk Across Europe:
Knowledge,Tools and Path to Resilience

Brussels, Nov. 13th, 2026

ACCREU «Pillars»

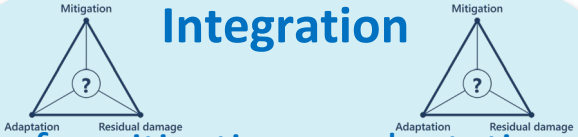
Impacts

comprehensive, integrated, assessment of climate risks across EU sectors, regions, countries.

Adaptation

Improved qualitative and quantitative assessment of costs, benefits, effectiveness, limits of adaptation.

Integration



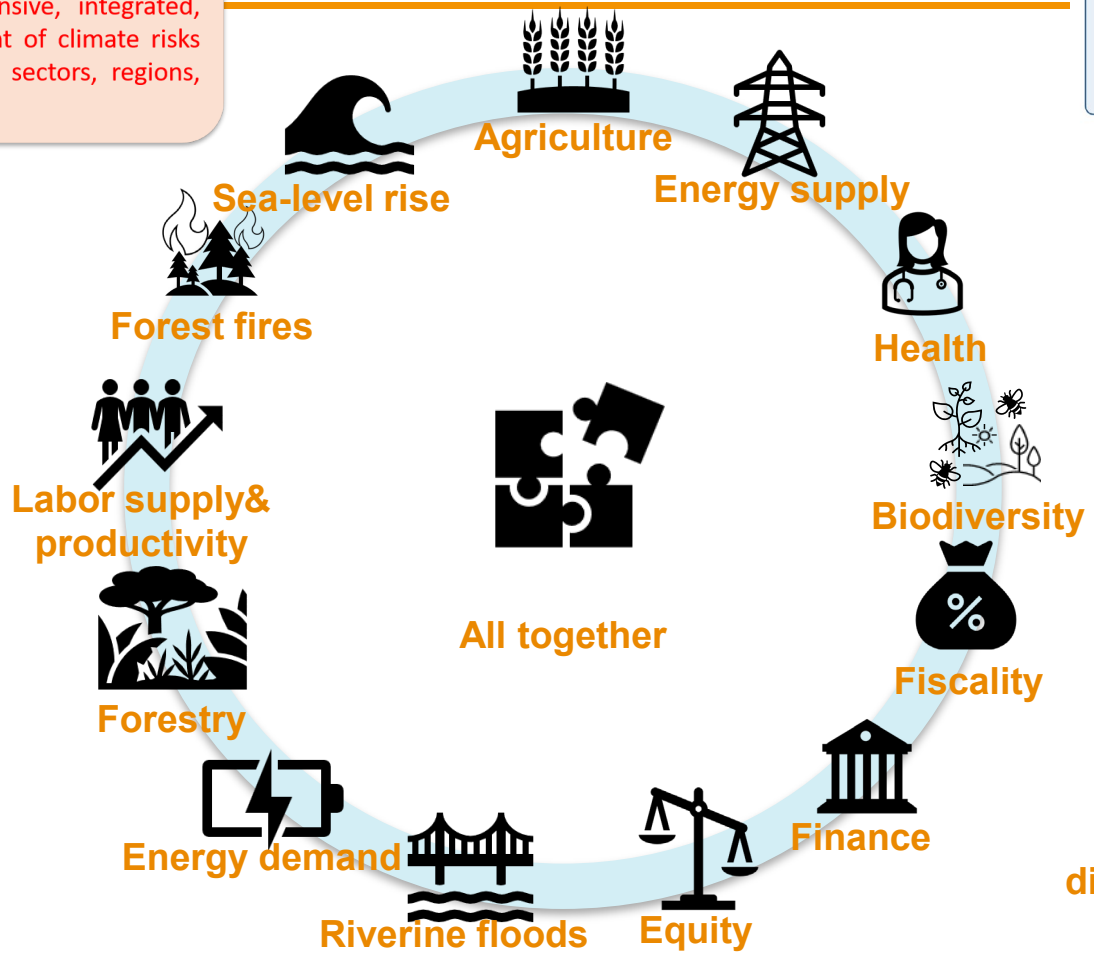
of mitigation, adaptation and residual damages into the policy decision process and identification of policy lessons

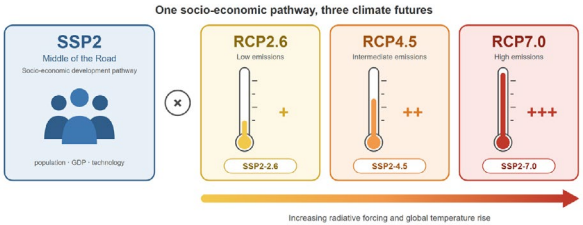
Co-design

co-produce and co-deliver project research and its outcomes with public and private actors at multiple level of governance.

Impacts

comprehensive, integrated, assessment of climate risks across EU sectors, regions, countries.





Across diferent scenarios





For major world macro-regions and for 122 EU 27+UK NUTS regions





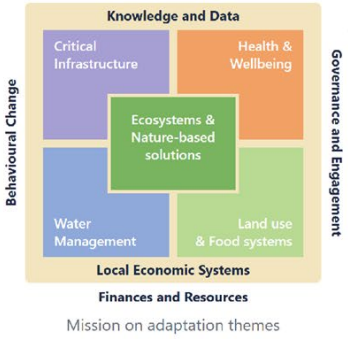


Assessing physical impacts, direct costs and macroeconomic implications

Adaptation

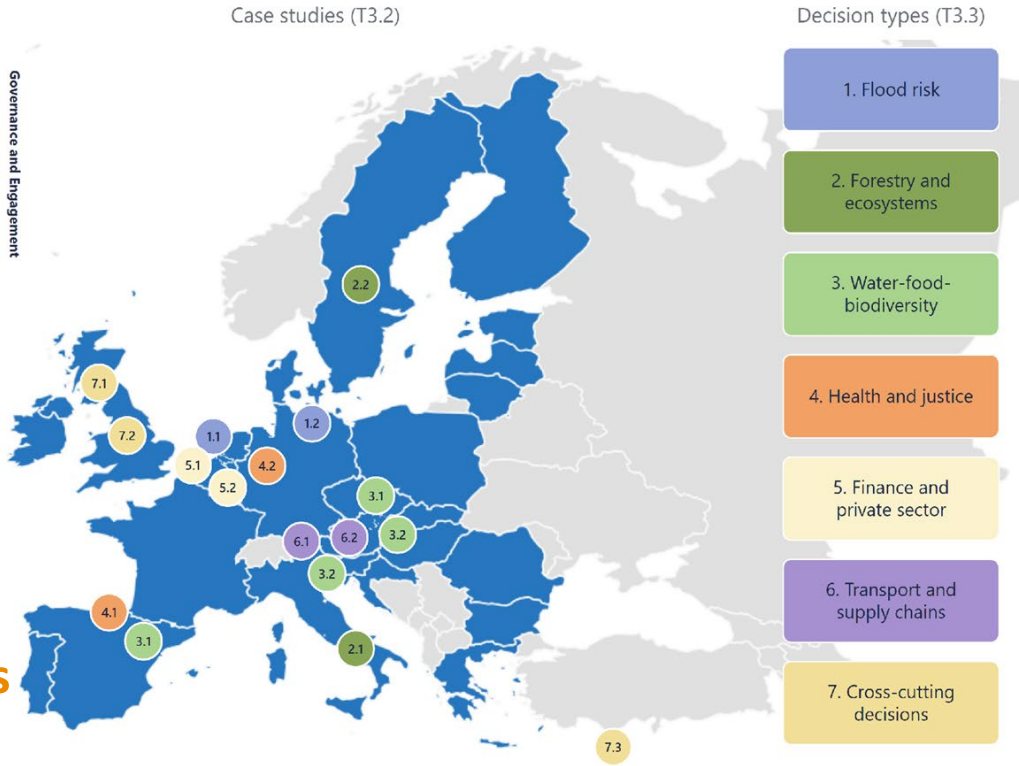
Improved qualitative and quantitative assessment and methods on costs, benefits, effectiveness, limits of adaptation.

- 15 case studies on adaptation
- 7 adaptation decision types
- Modelling and empirical assessments
- Systematic review of impact & adaptation literature



Mission on adaptation themes

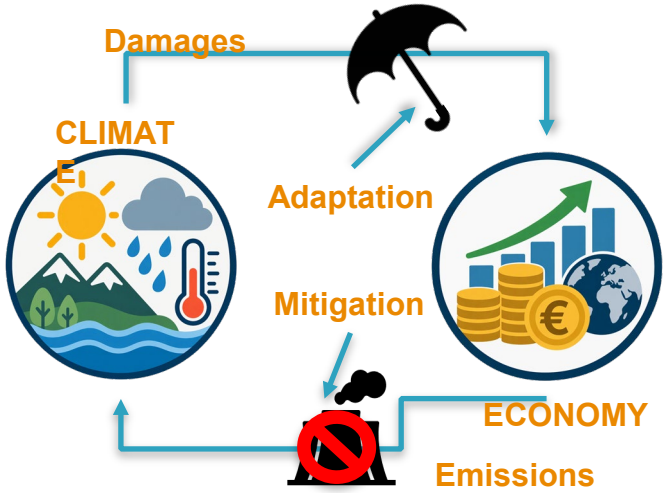
To quantify adaptation costs, benefits and effectiveness



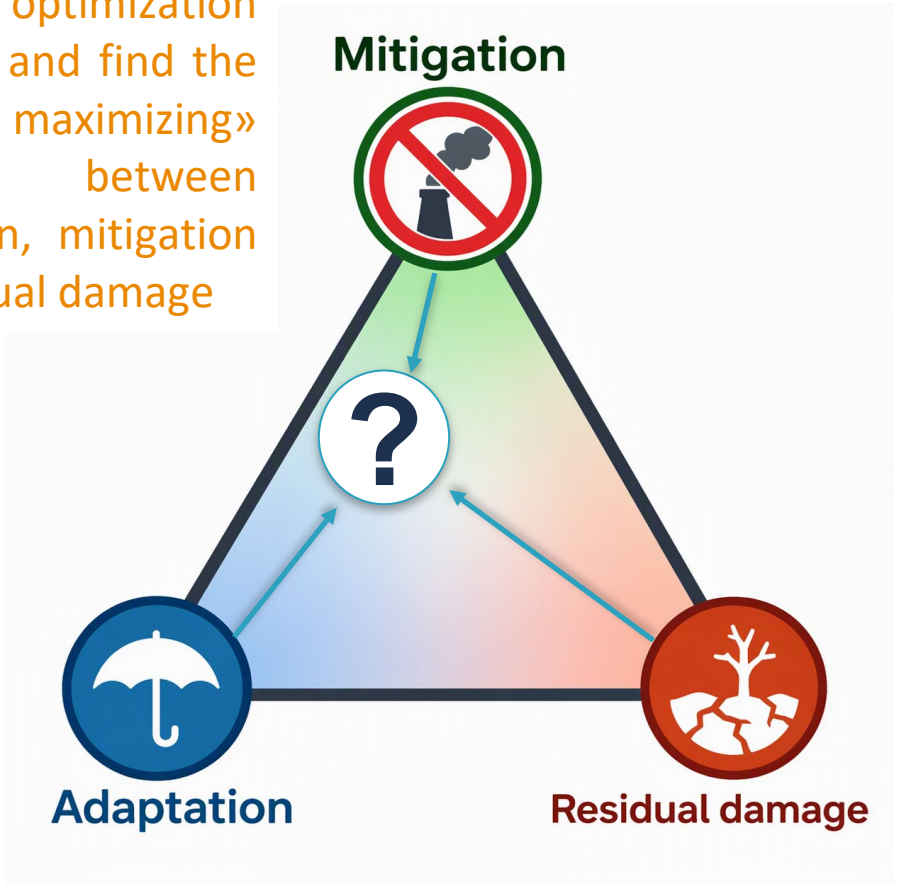
Integration

of mitigation, adaptation and residual damages into the policy decision process and identification of solutions

Up-to-date climate – economy – mitigation&adaptation policy integrated assessment models



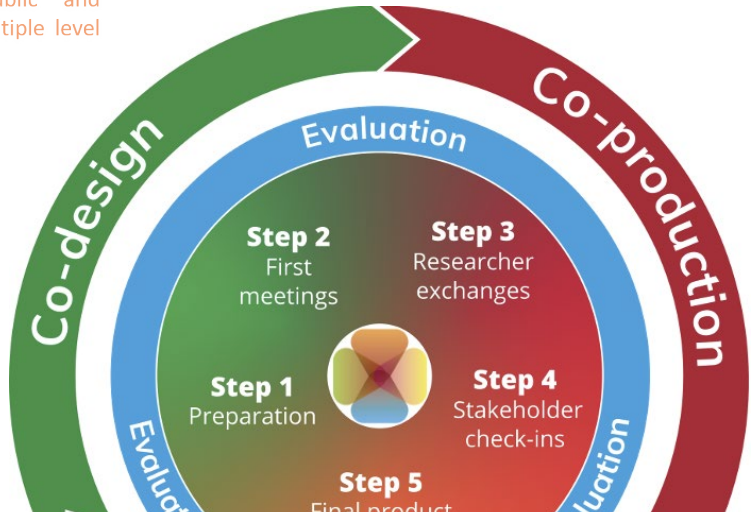
Used to perform a «policy optimization exercise» and find the «welfare maximizing» balance between adaptation, mitigation and residual damage



Co-design

co-produce and co-deliver project research and its outcomes with public and private actors at multiple level of governance.

Grounded on the «**co-creation**» concept



- **Co-design**, where the project team and stakeholders identify common interests and jointly develop research questions.
- **Co-production**, an iterative process where the project team works with stakeholders on chosen case studies to produce cutting-edge research with policy synergies.
- **Co-delivery** stage, the project team and develop communication products to translate and support uptake into

✓> 40 stakeholders

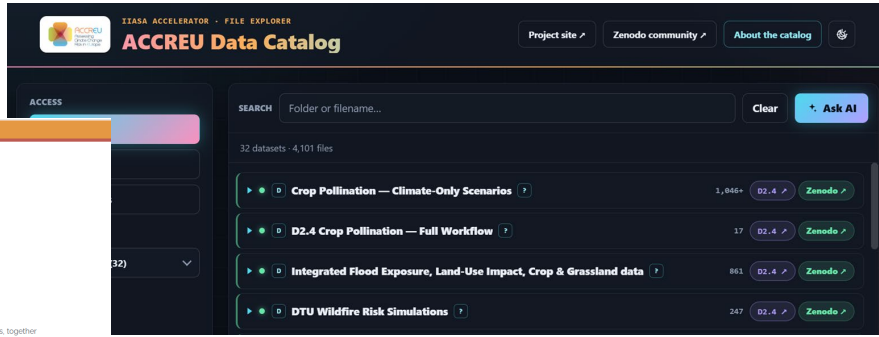
✓> 90 bilateral stakeholder meetings

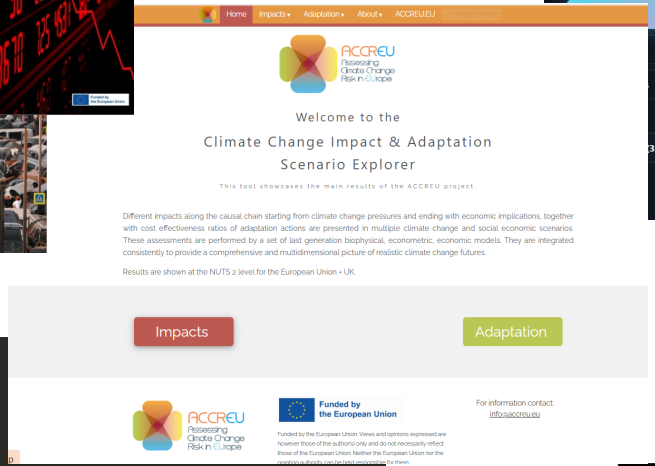
✓11 stakeholder workshops

✓4 webinars …

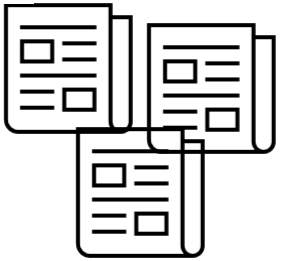
Last, but not least… dissemination











30 scientific publications (so far)

Results: an appetizer…

Assuming “current”mitigation and adaptation effort climate change impacts will be very costly for the EU	-7% -17% EU GDP in 2070 in the RCP 7.0
Major macroeconomic impact drivers	Impacts on labor, sea-level rise, riverine floods
High spatial and social heterogeneity	Mediterranean and Central-Eastern EU more affected
Adaptation has a high potential to cost-effectively reduce these impacts	-30% - -50% of impacts
Adaptation brings additional “dividends”	More tax revenues (lower erosion of the tax base), more equity
Still an important share of damages remains. Mitigation is essential	The temperature increase that **must not** be exceeded is 2°C
Mitigation & Adaptation should be combined	They perform better in combination than in isolation

Thanks!

PARTNERS

ACCREU research is conducted by a consortium of 14 leading EU research institutions:

- Euro-Mediterranean Center on Climate Change (CMCC) **Coordinator**
- BC3 Basque Centre for Climate Change (BC3)
- Ca' Foscari University of Venice
- Climate Analytics
- Deltares
- Ecologic Institute
- Global Climate Forum (GFC)
- IIASA
- Paul Watkiss Associates (PWA)
- Postdam Institute for Climate Research (PIK)
- Stichting VU
- Technical University of Denmark (DTU)
- University of Graz
- Utrecht University

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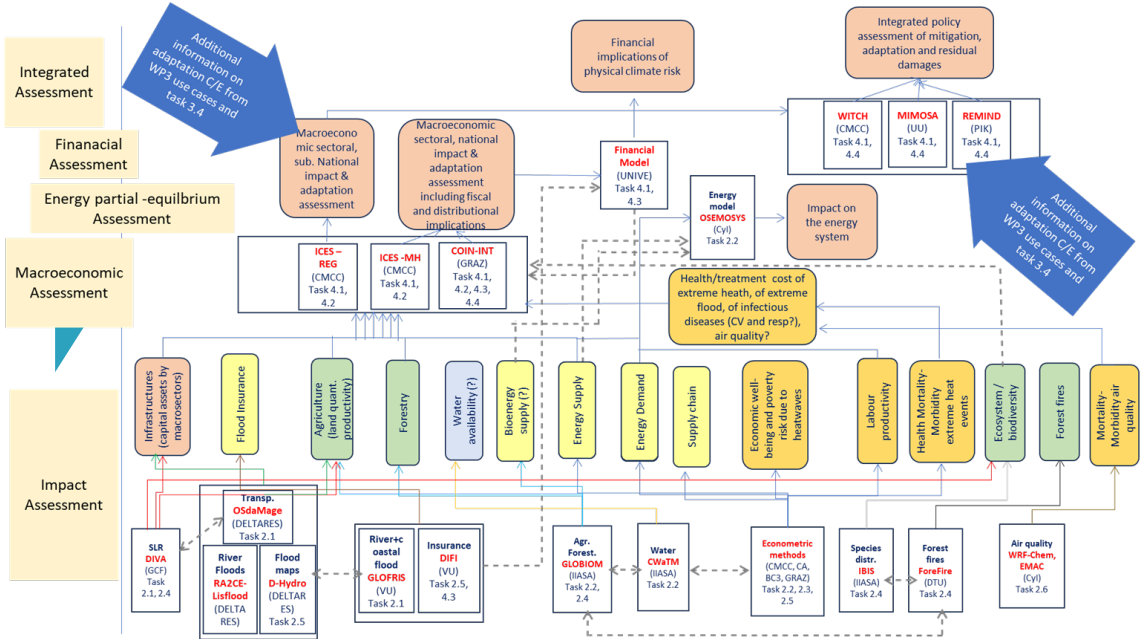
Methods

ACCREU is a complex project.

It deals with

- Different systems: Climatic, environmental, socio-economic,
- Different scales: Macroregional-national – regional – local -- > sectors and households, short medium and long term,
- Different domains: Impacts, mitigation, and adaptation; the real and the financial side of the economy, equity



It uses and integrates solid quantitative tools&methods: Bottom-up, top-down models, econometrics, surveys, decision theory

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CROSSEU • 2024–2026

Research highlights & policy implications

From cross-sectoral climate risks to actionable European resilience

Sorin Cheval | National Meteorological Administration

Brussels · 13 November 2026

Funded by the European Union

UK participants co-funded by UKRI

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Climate risk is more than a hazard

CROSSEU connects physical extremes to people, sectors, economies and public decisions.

01
CLIMATE HAZARDS
Heat · Drought · Storm · Snow

02
EXPOSURE
People · infrastructure · ecosystems

03
VULNERABILITY
Health · incomes · access · capacity

04
POLICY CHOICES
Mitigation · adaptation · investment

8
EVENT-BASED CASE STUDIES

12
SECTORS COVERED

2030 · 2050 · 2100
FUTURE POLICY HORIZONS

The central question: who is affected, how do impacts spill over, and which decisions reduce future risk?

Sources: D1.1; D2.1; project overview

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Hotspots, storylines and sectors

FROM CLIMATE HAZARDS TO SOCIETAL CONSEQUENCES

Climate Change Hotspots

Places where climate impacts and socio-economic risk can generate substantial damage.

Event-based Storylines

Real and plausible multi-hazard events that reveal cascading and spillover effects.

URBAN · RURAL · COASTAL · MOUNTAIN

SECTORS CONNECTED THROUGH RISK

HEALTH	SOCIAL JUSTICE	MIGRATION
FINANCE	INSURANCE	ENERGY
TOURISM	TRANSPORT	ECOSYSTEMS
FORESTRY	AGRICULTURE	WATER

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Four pillars — one coherent method

CONCEPT & METHODOLOGY

PL 1

Co-design

Agree the decisions, users, context and evidence needs.

PL 2

Integrated risk assessment

Assess hazards, impacts, vulnerability and interacting sectors.

PL 3

Strategic options

Co-create and compare approaches to build resilience.

PL 4

Policy & implementation

Translate evidence into governance, investment and uptake.

Each pillar informs the next — and stakeholder feedback loops through the full process.

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What the case studies reveal

LESSONS ACROSS HAZARDS, SYSTEMS AND EUROPEAN REGIONS

01 RISK IS COMPOUND

Heat + electricity demand; flood + drought; storms + coastal infrastructure.

02 LOSS IS NOT JUST MONEY

Human recovery time, wellbeing, inequality and access to essential services matter.

03 ADAPTATION IS CONTEXTUAL

Alpine communities, river basins and cities require different blends of measures.

04 BARRIERS ARE SHARED

Fragmented governance, financing constraints, data gaps and unclear responsibilities recur.

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From local storylines to European value

CASE-STUDY UPSCALING (SO1–SO3)

1

COMPLETE

Run the event-based storylines and retrieve initial model outputs.

2

CO-INTERPRET

Share preliminary results; consult stakeholders across case-study areas.

3

SCALE & VALIDATE

Fine-tune findings; integrate into broader risk evidence and test replicability.

Upscaling means interpreting, transferring and testing evidence — not simply enlarging a map.

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What should policy take forward?

LESSONS FROM D2.4, D4.2 & D4.8

1. INTEGRATE

Require multi-hazard, cross-sector risk governance and integrated planning.

3. FINANCE

Clarify who pays; clarify mechanisms; reduce barriers for local governments and smaller actors.

2. INCLUDE

Count unequal impacts, non-monetary losses and vulnerable communities.

4. COORDINATE

Build cross-border capacity, data sharing and future-aware regulations.

Evidence to options • policy instruments • implementation pathways

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THANK YOU

Building a more climate-resilient Europe requires connected evidence, policy and people.

Sorin Cheval | Project Coordinator

sorin.cheval@meteoromania.ro • https://crosseu.eu/

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UK participants in this project are co-funded by UK Research and Inn*ation (UKRI).

UK Research and Innovation

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Philippe Tulkens, ***DG Research and Innovation, 'Climate and planetary boundaries', Unit RTD B3***

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Expected deliverables

Assessing climate change risk in Europe (ACCREU)

- Enhance existing models for climate risk assessment
- Collected relevant data and assess potential impacts on economic challenges
- Gather information on adaptation methods and practices from stakeholders, focusing on their impact on vital services like healthcare and transportation.

Cross-sectoral framework for socio-economic resilience to climate change and extreme events in Europe (CROSSEU)

- Enhance understanding of the socioeconomic risks and response options associated with climate change impacts in Europe.
- Offer practical recommendations for political and societal action

ACCREU





Journal of Financial Stability 84 (2026) 101545

Contents lists available at ScienceDirect

Journal of Financial Stability

journal homepage: www.elsevier.com/locate/jfstabil

Floods and financial stability: Scenario level☆,☆☆

Francesco G. Caloia [a], Kees C.H. van Ginkel [b], D

nature communications

Article

Inequalities in global energy use to 2050

- Climate change exacerbates social and economic inequalities across Europe, with heatwaves and droughts disproportionately affecting low-income households and vulnerable populations.

- European resilience requires a systemic approach to interconnected risks, integrating climate change, land-use planning, disaster prevention and territorial vulnerabilities.

- Resilience must be socially equitable and financially sustainable.

- Adaptation requires a shift towards evidence-based and transformative policymaking.

D4.2

D4.3

Fiscal and Financial Analysis

Integrated distributional analysis

3017-024-00606-1

Check for updates

Heat stress and the labour force

Shouro Dasgupta [1,2,3], Elizabeth J. Z. Robinson [3,4], Soheil Shayegh [5,6], Francesco Bosello [1,2,7], R. Jisung Park [8] & Simon N. Gosling [9]

Commission

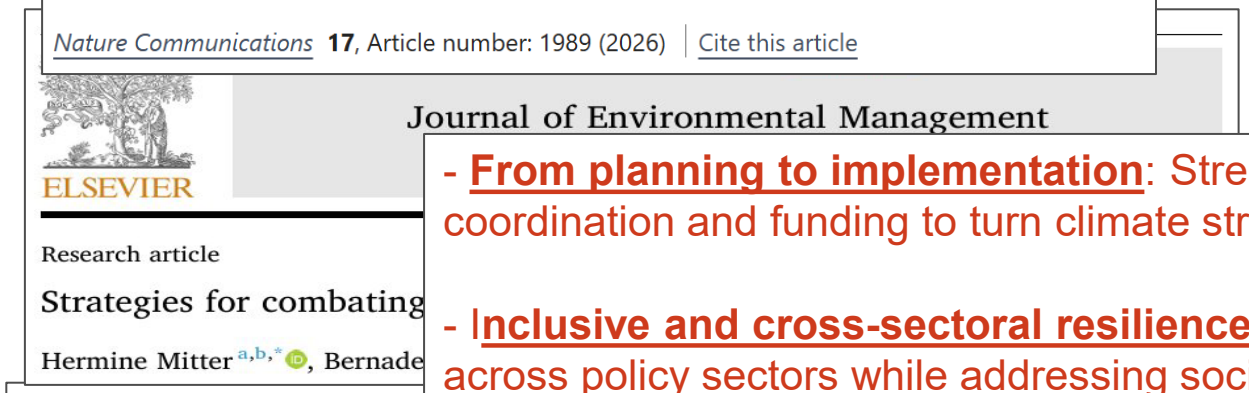
CROSSEU


Article | Open access | Published: 23 January 2026

Climate policy portfolios that accelerate emission reductions

Theodoros Arvanitopoulos, Simon Bulian, Charlie Wilson, Andrew J. Jordan, Jale Tosun & Nicholas Vasilakos

Nature Communications **17**, Article number: 1989 (2026) | Cite this article

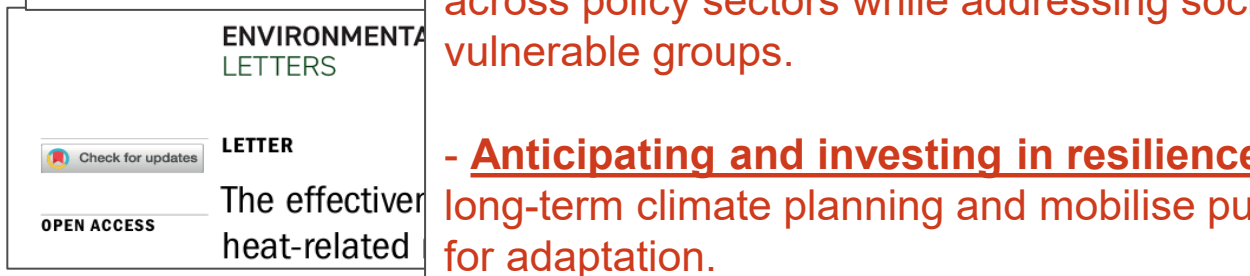

ELSEVIER

Journal of Environmental Management

Research article

Strategies for combating

Hermine Mitter[a,b,*], Bernade


ENVIRONMENTA
LETTERS

Check for updates

LETTER

The effectiver

OPEN ACCESS

heat-related

- **From planning to implementation**: Strengthen climate governance, coordination and funding to turn climate strategies into effective action.

- I**nclusive and cross-sectoral resilience**: Integrate climate risks across policy sectors while addressing social inequalities and protecting vulnerable groups.

- **Anticipating and investing in resilience**: Shift towards preventive, long-term climate planning and mobilise public and private investment for adaptation.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D4.2 – Effectiveness of the existing mitigation and adaptation policies

(Version 2)

WP4 - Task 4.1

December 2025

CrossEU

D4.3 - Analysis of the climate change impacts and responses in sectoral policies (Version 1)

WP4 - Task 4.2

May 2025 [M17]


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D4.7- Analysis of economic, finance and investment policies at EU/national level and in local context - Version 1

WP4 - Task 4.4

May 2025

European Commission

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R&I in EU Framework for Climate Resilience

1. R&I is a cornerstone of the EUFCR. R&I is evolving from knowledge production towards practical implementation and transformative change needs to be acknowledged as an R&I activity. Greater emphasis is needed on applied innovation, pilot projects and the transfer of solutions to local and regional authorities.

2. There is a gap between the asks in the public consultation (What the EU should do, in the public's mind) and the responses through the Communication and the proposed legislation (What the EC could do). While the Communication focuses on comparable climate risk assessments, institutional responsibilities, monitoring and compliance, the public consultation highlights persistent barriers on the ground, particularly insufficient funding, limited administrative capacity and lack of technical support.

3. Effective European climate resilience would require stronger territorialization and implementation-oriented governance across all levels of governance. Bridging the gap will require accessible and predictable financing (from all levels) , targeted technical assistance, tailored instruments for vulnerable regions, and better integration of health, social protection and climate justice into the EUFCR.

The interinstitutional dialogues on EUFCR will offer opportunities to debate these issues.

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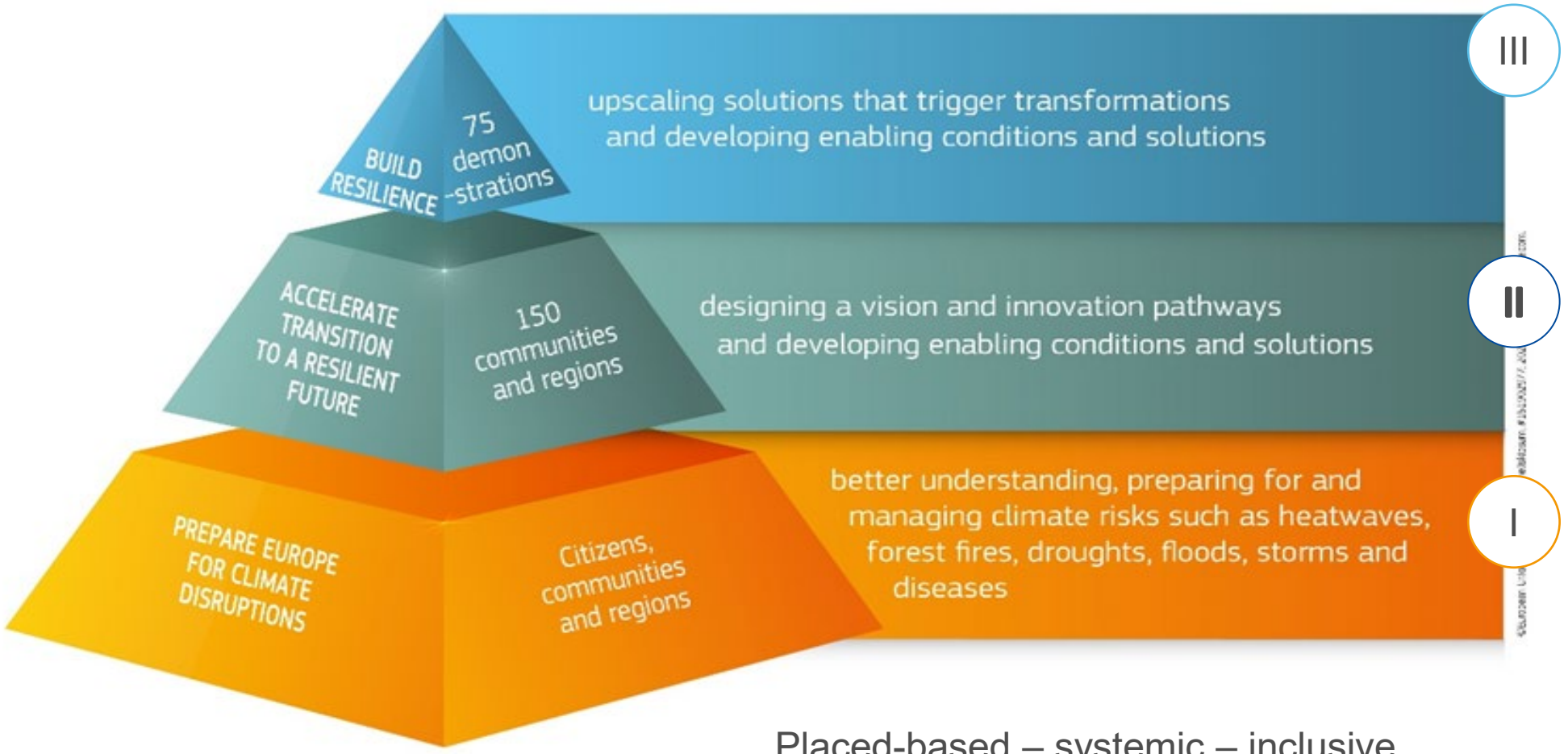
Links with the EU Mission on Adaptation to Climate Change

To support at least **150** European **regions** and local authorities towards climate resilience by 2030



Placed-based – systemic – inclusive

Beyond research & innovation

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76 Research & Innovation Horizon Europe projects



Adaptation Hubs, CLIMATEFIT, GreenING Cities, REGILIENCE+, spongeworks, Agora, Clim EMPOWER, MOUNT RESILIENCE, REHUBS, SystR, ARCADIA, Cliniveст, ICARIA, NATALIE, Regions 4Climate, TerraTwin, ARSINOE, COAST-SCAPES, IMPETUS, NATURE-DEMO, TURCA4DANU, Aurora, NBRACER, RESIST, TRANSFORM, nurish, RISE-IN, TransformAr, DRYAD, OCEANIDS, RISKADAPT, Trees4Adapt, CLIMAAX, FAIR FUTURE, SMARTER, UNDERPIN, climagen, FARCLIMATE, Land4Climate, PIISA, Soteria, URBREATH, CLIMA PANNONIA, genesis, MED-IREN, Precilience, Sponge Boost, valorada, CLIMAS, miraca, REGILIENCE, Sponge Scapes

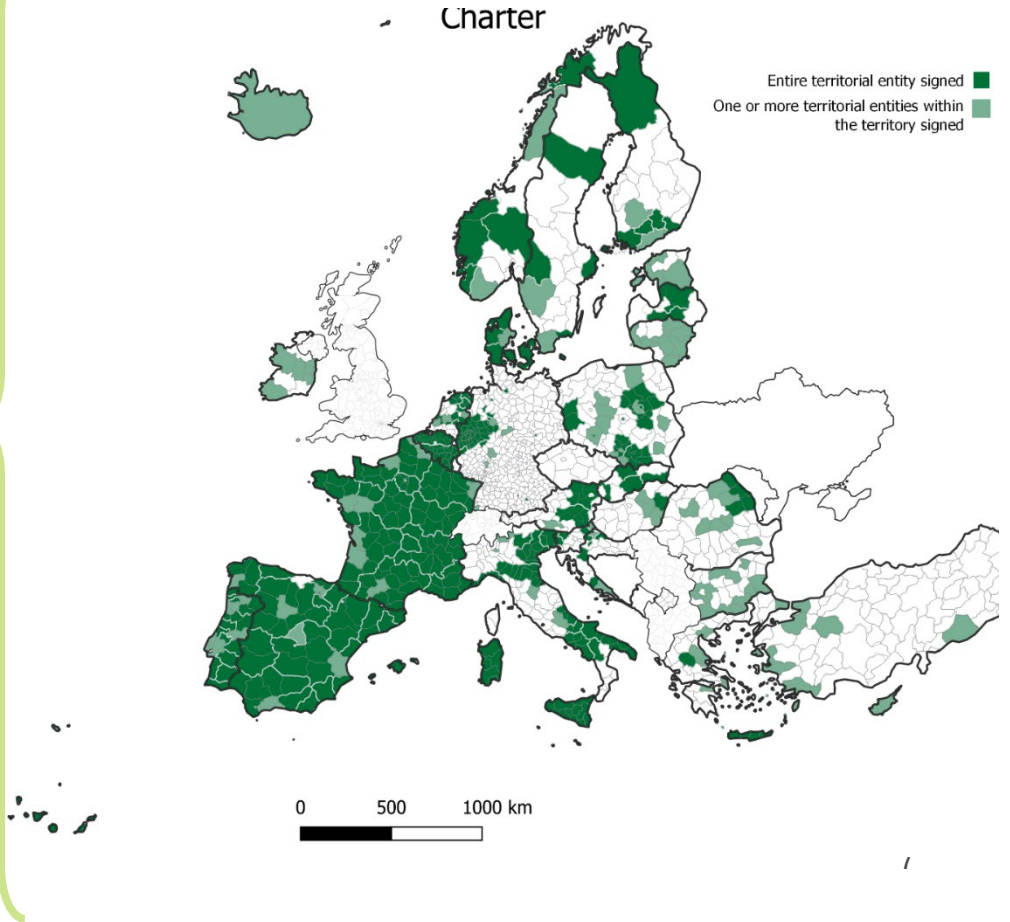
MIP4Adapt

Coordination & overall support for Mission implementation

↑

Adaptation Hubs
REGILIENCE+

333 Regions & local authorities committed through the Mission Charter



Different types of projects

Demonstration projects

Project with cascade funding *(support to regions)*

Research Projects

Coordination

- MIP4Adapt
- REGILIENCE+
- AdaptationHubs

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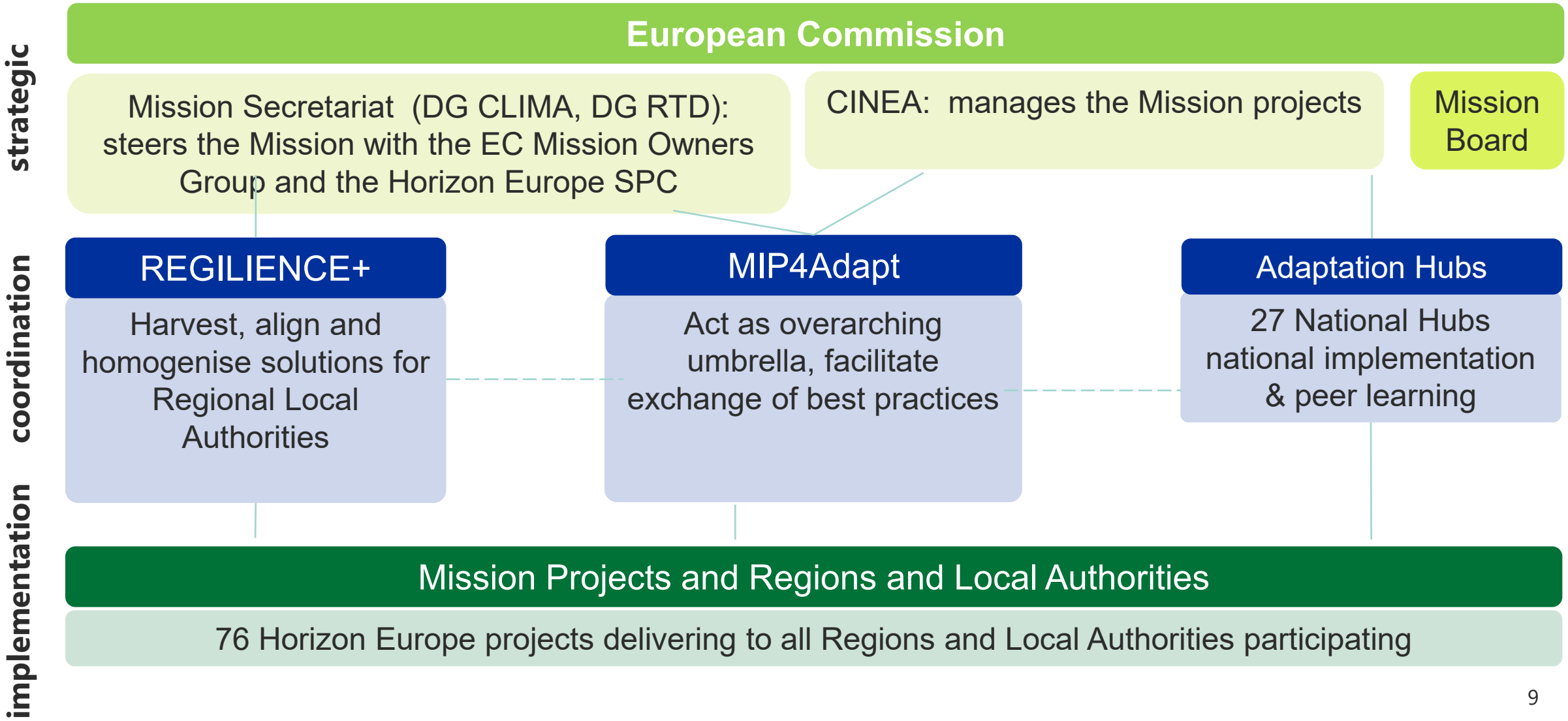
The Mission governance



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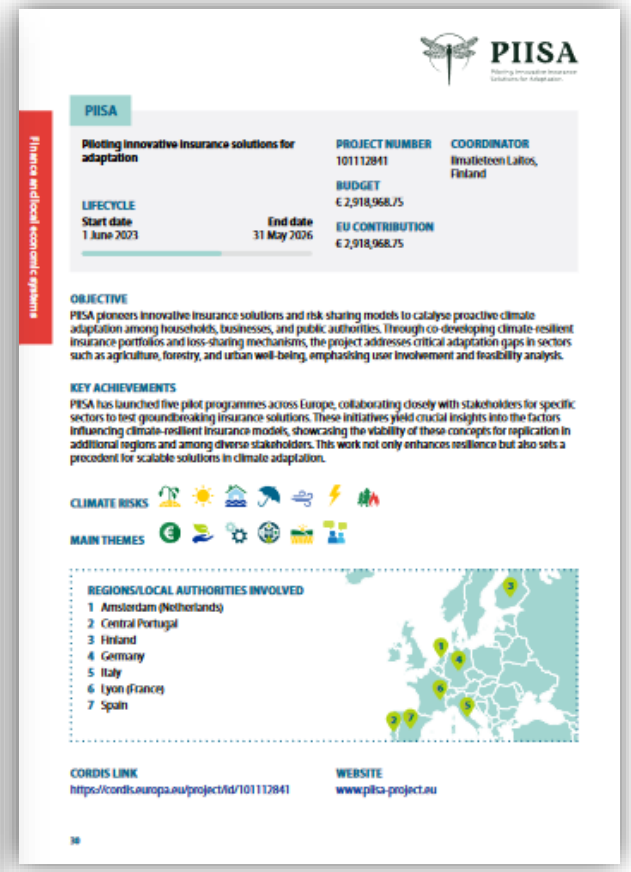
2026 Catalogue of Projects





- One fiche for each of the 65 Mission Project
- *(to be updated with projects from 2025 call)*
- Can be found there

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Mission Projects

- Interactive dashboard
- Mission-funded & Mission-relevant projects
- Participants information (incl contact form)

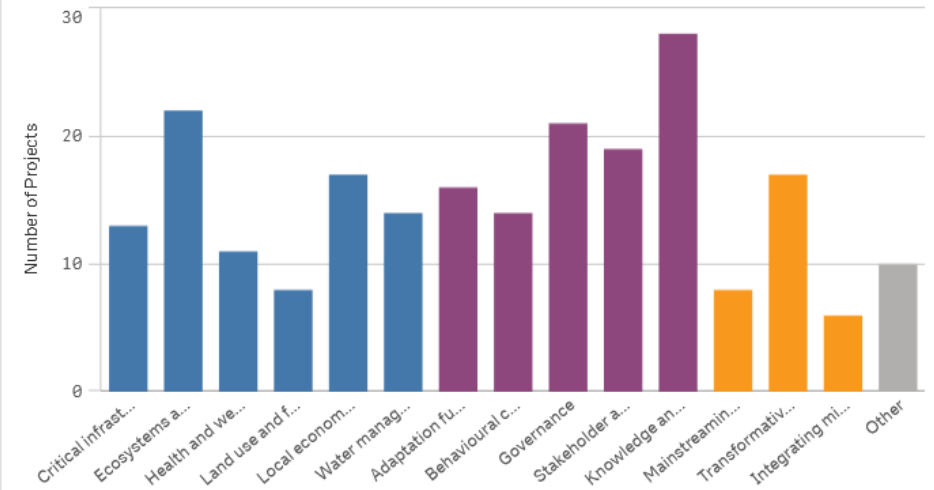
Number of Projects	Participations	Total budget (euro)	EU financial contribution (euro)
271	4.15k	1.72B	1.45B

Thematic areas of the mission

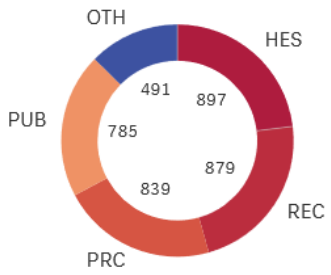
Key community systems
-Critical infrastructure
-Ecosystems & nature-based solutions
-Health & wellbeing
-Land use & food systems
-Local economic systems
-Water management

Enabling conditions
-Adaptation funding & finance
-Behavioural change
-Governance
-Stakeholder & citizen engagement
-Knowledge & data

Cross-cutting
-Integrating mitigation and adaptation
-Mainstreaming adaptation
-Transformative change

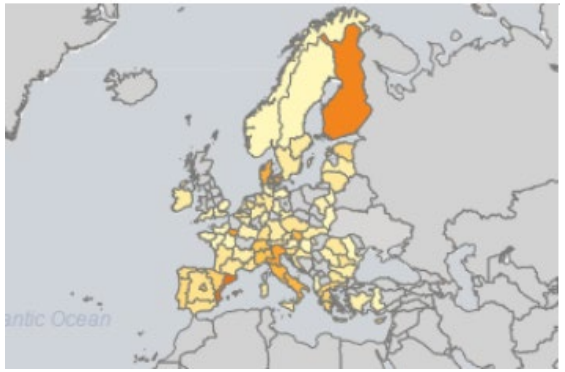


Participations by Type



HES-Higher Education, OTH-Other (incl. NGOs), PRC-private commercial (for-profit), PUB-Public, REC-Research (incl. RTOs)

Participations by country and region



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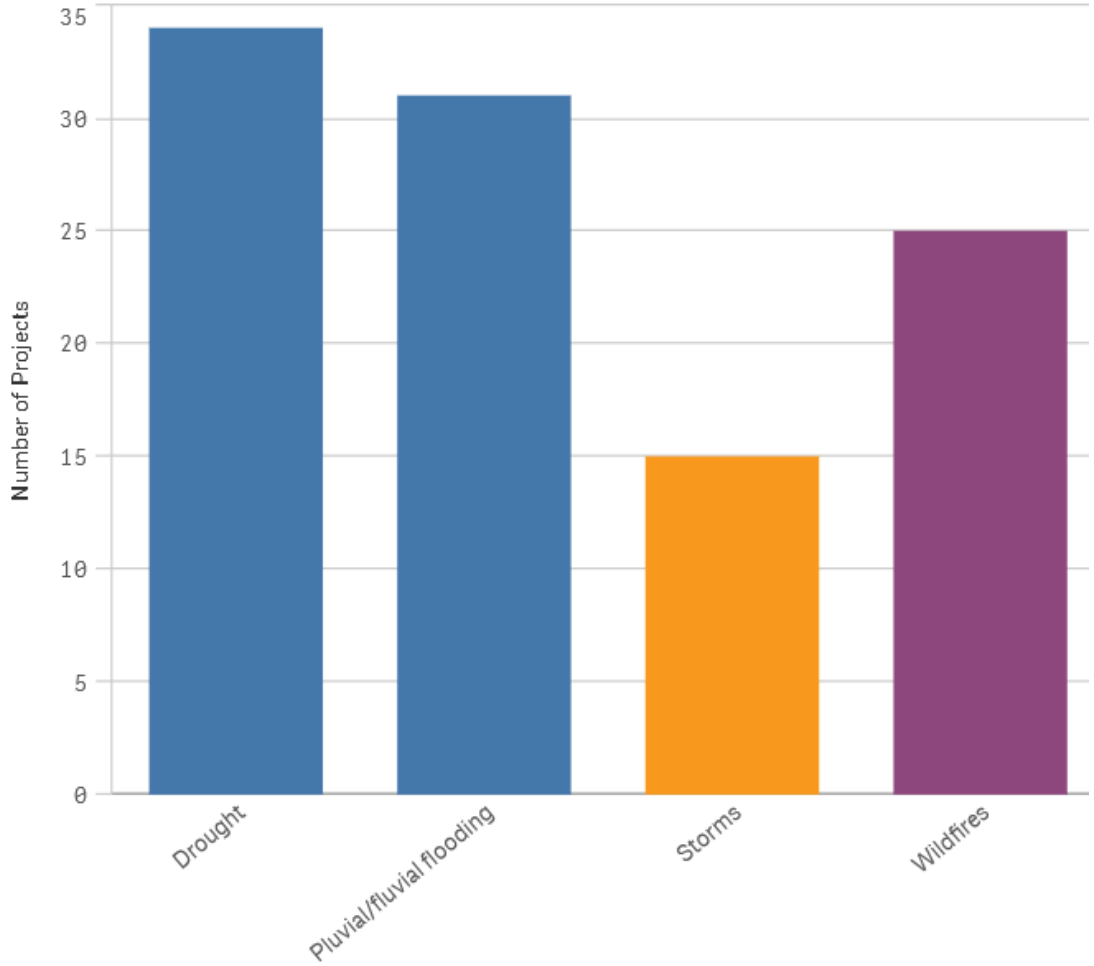
Connecting Mission, ACCREU and CROSSEU

- 45 Mission projects are focused on drought, flooding, wildfires and storms
- 28 of this projects address energy and health challenges
- Some Mission Regional and Local Authorities are included in the case studies of ACCREU and CROSSEU



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Looking ahead

- Join the EU Mission community
- Communication: outreach to Adaptation Hubs, MEPs, Council, mobilisation of local authorities beyond events, policy briefs and papers
- Roster of experts to support the local authorities (open list)
- Next calls

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Next calls

Proposals are invited against the following Destinations and topic(s):

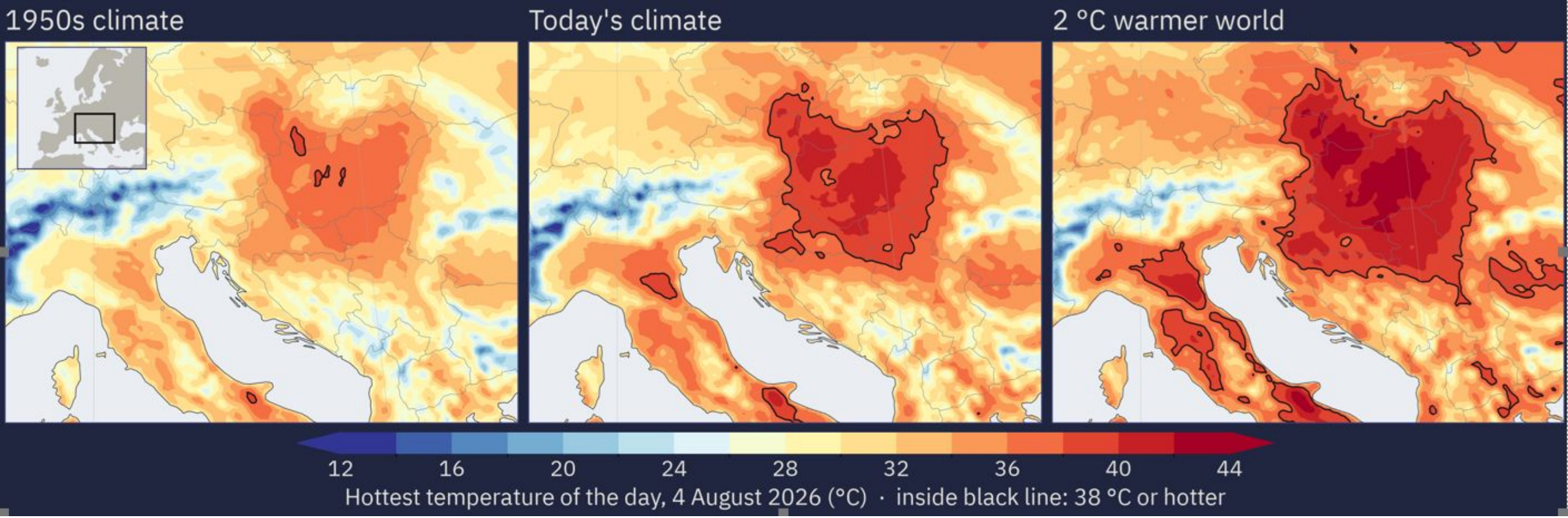
Topics	Type of Action	Budgets (EUR million) 2027	Expected EU contribution per project (EUR million)[21]	Indicative number of projects expected to be funded
Opening: 09 Feb 2027 Deadline(s): 21 Sep 2027				
Adaptation to Climate Change: Supporting the implementation of the EU Mission Adaptation to Climate Change				
HORIZON-MISS-2027-01-CLIMA-01: Demonstrating transformative solutions to increase cross-border climate resilience	IA	72.32	10.00 to 15.00	5
HORIZON-MISS-2027-01-CLIMA-02: Researching and applying the potential of Artificial Intelligence to foster climate resilience at the regional and local levels	RIA	12.00	Around 3.00	4

European Commission

EU Framework for Climate Resilience

A climate-resilient Europe: better prepared, better protected





- The changing reality: what the **August 2026 heatwave** would have looked like in 1950, and in a 2°C hotter world.
  - Modelling by the DestinationEarth initiative and its supercomputing facility, contributing to the supporting tools under the EU Framework for Climate Resilience.



State of the Union 2026

- *"On climate change, this summer was the **summer of truth.** Almost no part of our continent was spared."*
- *"These were the **hottest summer months ever** – but probably the **coolest of the years to come**."*
- *"This is not about **mitigation or adaptation**. **We need both**. And they need to strengthen each other. This is the only way to reach **climate resilience**. But we need to **step up dramatically on preparedness**."*
- *"We will present **a new framework for climate resilience** next month."*

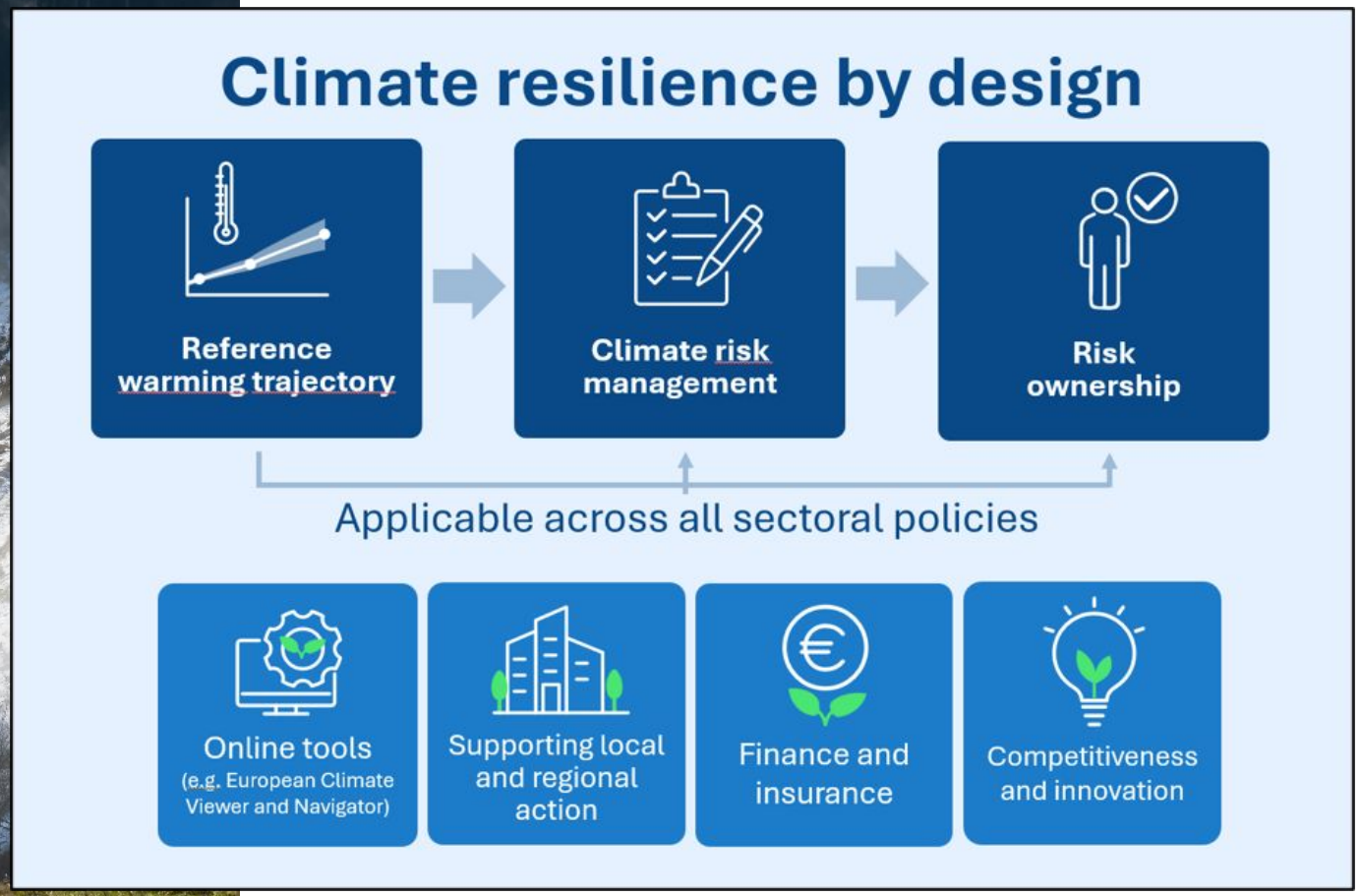


EU Framework for Climate Resilience

- Common European approach to climate resilience**, to anticipate, prepare for and manage climate risks**.
- Climate resilience becomes part of **how Europe makes decisions**
- Combines a proposed **European Climate Resilience Law** with practical **tools** and supporting measures.
- From resilience seen as a cost to **resilience as investment and opportunity.**



EU Framework for Climate Resilience – overview





Communication – main messages

- **Economic case** is compelling:
  - EUR 113 billion – estimated output cost due to the 2026 heatwave alone (across 30 European countries).
  - EUR 70 billion – estimated annual EU investment needs for climate resilience and adaptation.
  - Climate resilience supports **investment, innovation and long-term growth.**
- **Market opportunity** for climate adaptation and resilience solutions, technologies and products.
- Climate risks are **interconnected** across Europe and worldwide.
- **Climate resilience needs to become systemic**.



Communication – awareness and action

Embedding resilience across all major policy areas, domestic and international.

- **Supporting local and regional action**: European Implementation Programme.
- **Empowering European businesses and innovation**: Industrial Forum, Climate Resilience Industry and Innovation Dialogue, European Partnerships.
- **Finance and insurance**: Climate Insurance Alliance, DNSH Guidance.
- **SOTEU 2026 initiatives**: Climate Insurance Alliance; European Heatwave Plan; European Water initiative; Proposals for a European Firefighting Fleet; Identifying 100 of the most vulnerable territories in Europe.



European Climate Resilience Law

- **A common reference trajectory for global warming** based on projected future climate conditions to inform decisions on policies, assets and investments.
- **Clear identification of policy risk owners** to clarify who is responsible for managing climate risks across policy areas and levels of governance.
- **One single strategic plan** for Member States to meet their planning obligations under the Climate Resilience Law and the European Climate Law.
- **Simplified and more effective monitoring** to track progress, measure results, and improve climate resilience measures.



European Climate Resilience Law

- **A reference global warming trajectory for risk assessments and planning**, based on projected future climate conditions
  - For a shared understanding of the future to prepare for
  - To simplify climate resilience decisions
  - To consider national and sectoral circumstances in its application
- **Clear identification of policy risk owners** to clarify who is responsible for managing climate risks across policy areas and levels of governance
  - Member States identify the risk owners according to their national context.



European Climate Resilience Law (cont.)

Efficiency gains and limited administrative burden

- **Improved and more regular climate risk assessments** to strengthen consistency, synchronisation and comparability between EU and national assessments
- **Strategic plans on climate resilience at Union and national level** to bring priorities and actions together in a more coherent approach
- **Simpler monitoring and progress tracking** to assess climate resilience progress



European Climate Resilience Law (cont.)

Other elements

- **Promotion of transboundary cooperation**, when preparing national strategic plans
- **Online platform on climate resilience knowledge**, to facilitate the implementation of the Law, and facilitate access to information
- **European Environment Agency** to act as centre of excellence on climate resilience to assist the Commission on topics of relevance for the implementation of the Law



The European Climate Viewer

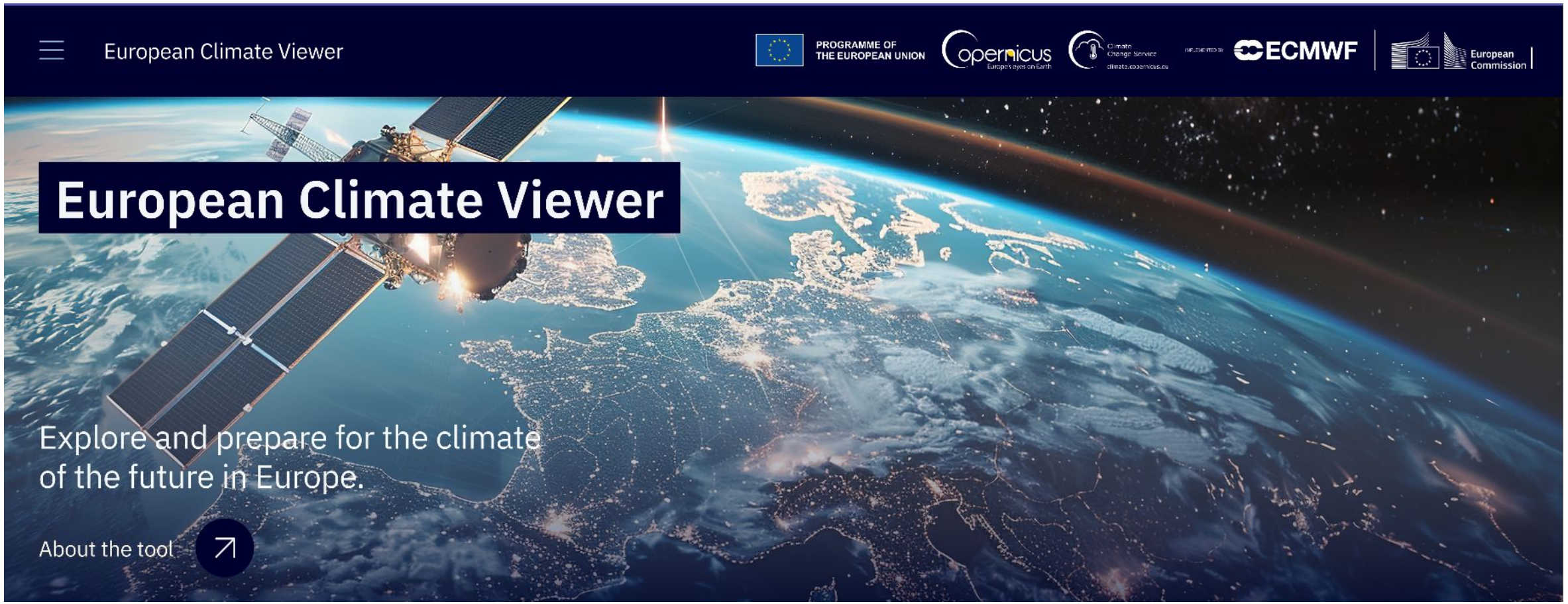
Explore projected climate hazards with an interactive map to support better planning.

The Navigator of Climate Resilience Tools

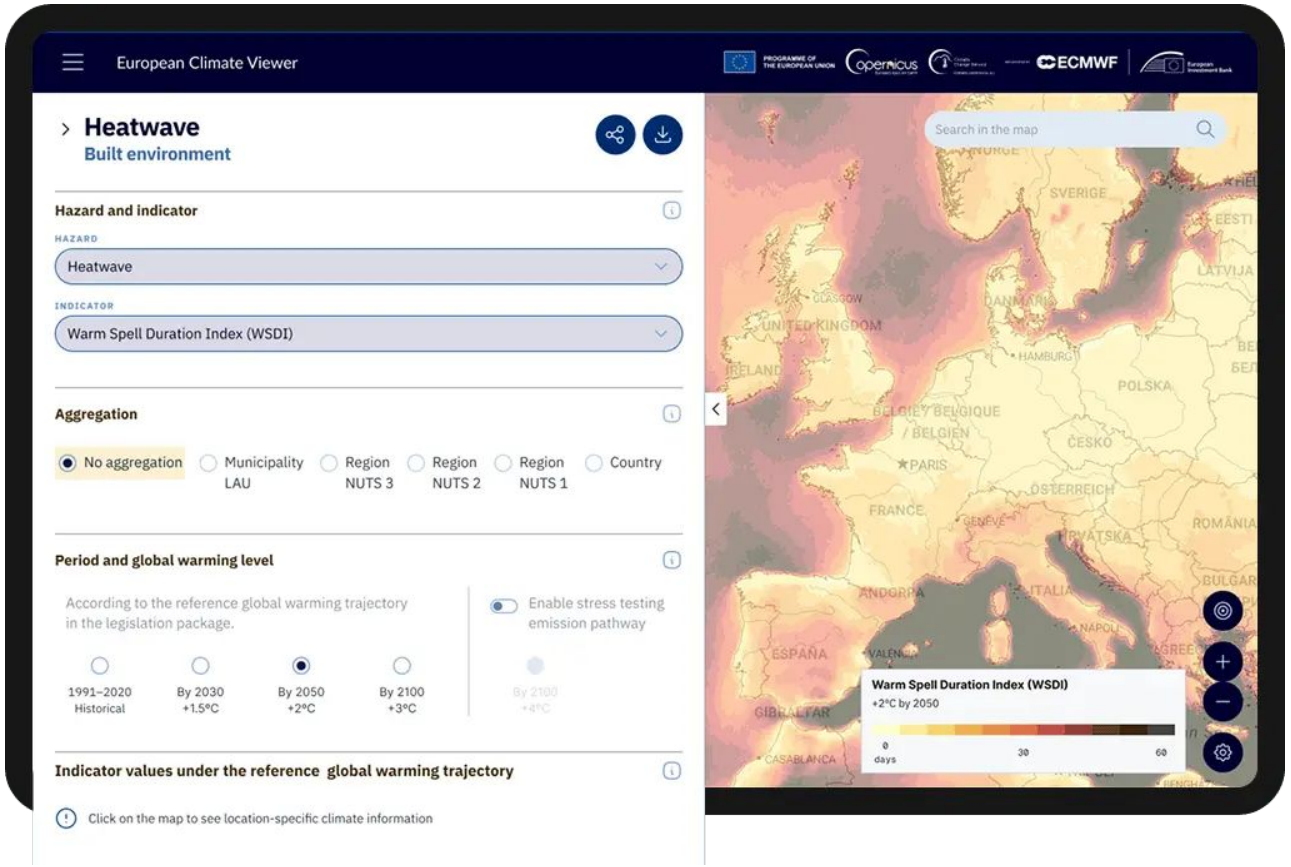
Discover a variety of adaptation tools tailored to different locations, sectors, and climate risks.

The Solutions Explorer

Learn about real-life adaptation projects developed and tested by the EU Mission on Adaptation to Climate change.


European Climate Viewer
PROGRAMME OF THE EUROPEAN UNION
Copernicus
Climate Change Service
ECMWF
European Commission
European Climate Viewer
Explore and prepare for the climate of the future in Europe.
About the tool

European Climate Viewer



- **Operationalises the reference global warming trajectory**
- Example: *'What will a 2C warmer world in 2050 mean in terms of precipitation, heatwaves, etc. in a country/region/local authority?'*
- **User-friendly**: without requiring prior knowledge about climate science.
- **Direct link to solutions**: via Navigator and other tools.
- **Dynamic evolution:** asset layer planned in 2027; super-computing and AI brought in.
- [European Climate Viewer]

Select a **hazard**, a global **warming level**, and the **sector** you want to explore.

Select climate hazard

Search climate hazard...

Heat

- Heatwave
- Changing air temperature
- Temperature variability

Select a global warming level from the reference trajectory

Global warming level → Time horizon

- Current climate → 1991–2020
- +1.5°C → 2030
- +2.0°C → 2050
- +3.0°C → 2100

Select sector

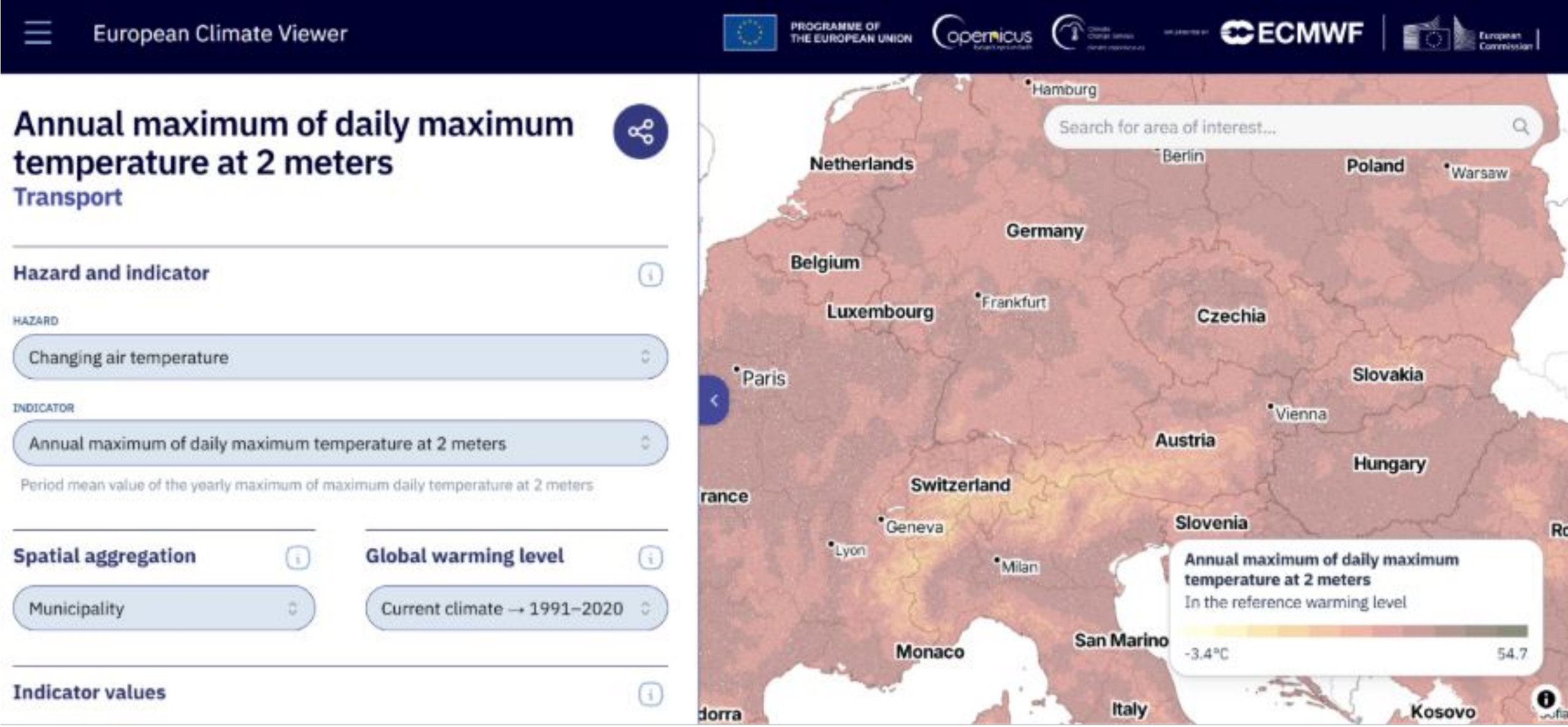
- Built environment and urban

Transport

- Transport
- Land transport
- Sea and coastal transport

Start exploring →

This Viewer provides harmonised climate hazard information across the EU. For more detailed information on climate hazards and adaptation measures, explore the National tools list in the Navigator of Climate Resilience Tools.


European Climate Viewer
PROGRAMME OF THE EUROPEAN UNION
ECMWF
Annual maximum of daily maximum temperature at 2 meters
Transport
Hazard and indicator
HAZARD
Changing air temperature
INDICATOR
Annual maximum of daily maximum temperature at 2 meters
Period mean value of the yearly maximum of maximum daily temperature at 2 meters
Spatial aggregation
Municipality
Global warming level
Current climate → 1991–2020
Indicator values
Search for area of interest...
Hamburg
Berlin
Poland
Warsaw
Netherlands
Germany
Belgium
Luxembourg
Frankfurt
Czechia
Paris
Slovakia
Vienna
Austria
Hungary
Switzerland
Slovenia
Geneva
Lyon
Milan
San Marino
Monaco
Italy
Kosovo
Annual maximum of daily maximum temperature at 2 meters
In the reference warming level
-3.4°C
54.7


European Climate Viewer
PROGRAMME OF THE EUROPEAN UNION
ECMWF
Number of wet days
No sector
Hazard and indicator
HAZARD
Precipitation variability
INDICATOR
Number of wet days
Number of days per year with 1mm or more precipitation.
Spatial aggregation
Municipality
Global warming level
+2.0°C → 2050
Indicator values
Search for area of interest...
Denmark
Lithuania
United Kingdom
Ireland
Hamburg
Belarus
Netherlands
Berlin
Poland
Germany
Belgium
Luxembourg
Czechia
Ukraine
Paris
Slovakia
Austria
Hungary
Moldova
France
Switzerland
Slovenia
Romania
Milan
Bosnia and Herzegovina
Monaco
San Marino
Bucharest
Andorra
Italy
Barcelona
Portugal
Spain
Lisbon
Athens
Number of wet days
In the 2.0°C warming level
0.0 days
>180.0



Cross-service linking to bridge the gap to citizens

- DGs contributing to the digital supporting tools:
  - CNECT (via Destination Earth)
  - DEFIS (via Copernicus and the space programme)
  - JRC (including through its Risk Data Hub)
  - RTD (including through the Mission on Adaptation)
- Additional DGs advising:
  - ECHO
- European Institutions delivering the Viewer and the Navigator:
  - European Centre for Medium-Range Weather Forecasts
  - European Environment Agency



Thank you



ACCREU
Assessing Climate Change Risk in EUrope

CrossEU

THE ACCREU AND CROSSEU FINAL EVENT

CLIMATE RISK ACROSS EUROPE: KNOWLEDGE, TOOLS AND PATHWAYS TO RESILIENCE

Brussels and online, 13 November 2026

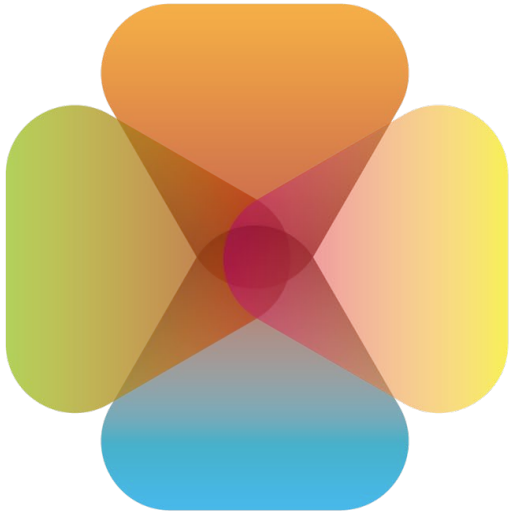
Organised by:

cmcc Centro Euro-Mediterraneo sui Cambiamenti Climatici

METEO ROMANIA

UK Research and Innovation

Funded by the European Union



ACCREU
Assessing Climate Change Risk in EUrope

Presentation 1.1: Sectoral impacts: a focus on health and biodiversity

Thematic session 1:
Advancing knowledge in climate change impacts

6th ACCREU final project meeting
Brussels, November 12th-13th 2026

Amanda Palazzo (IIASA)
Gemma Gerber (IIASA)
Elisa Sainz de Murieta (BC3)

Introduction

Climate change affects multiple interconnected sectors

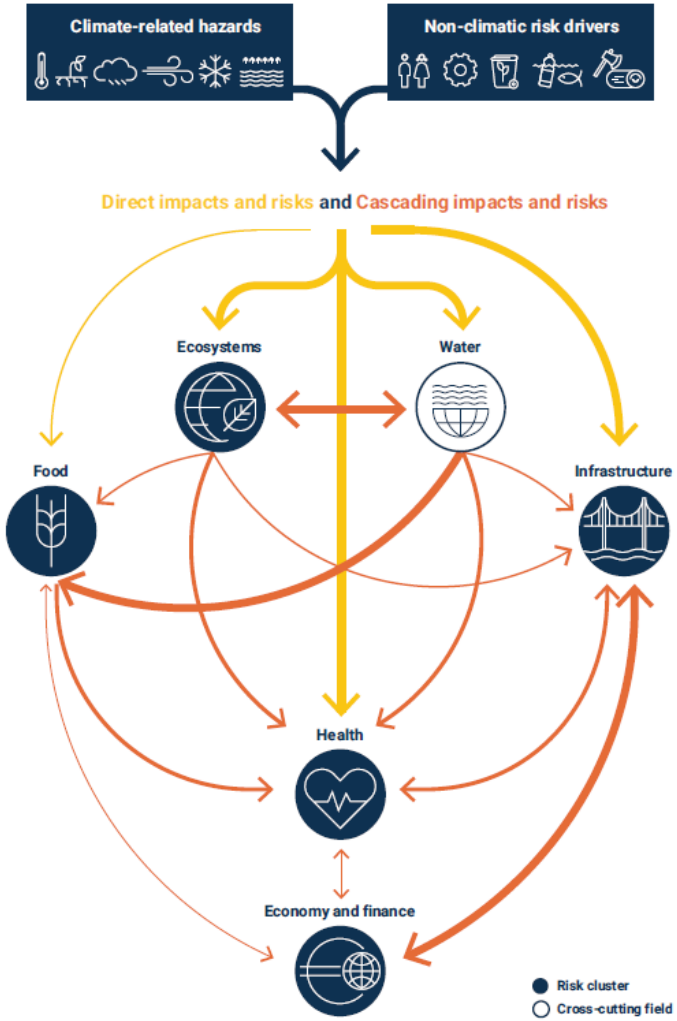
- Agriculture, forestry, water, energy, infrastructure, ecosystems and health

Direct impacts have wider indirect consequences and can cascade across sectors

- Changes in resource/land use, ecosystem services and human well-being

Adaptation responses depend on investment priorities and adaptive capacity

- Different levels of adaptation influence how sectors respond to and cope with climate change.



Source: EEA (2024), European Climate Risk Assessment, Figure ES.3 Direct and cascading climate risks across interconnected sectors.

Overview: Sectoral impacts: a focus on health and biodiversity

- EUCRA highlights ecosystems and human health among its major areas of concern.
- Integrated climate impact modelling still has important knowledge gaps in quantifying the economic consequences of changes in ecosystem services, biodiversity and health.
- ACCREU contributes quantitative evidence on these impacts and the role of adaptation, helping connect environmental and health outcomes with broader economic assessments.

ACCREU Focus Area:

Ecosystem & Biodiversity

ACCREU Focus Area:

Health and Wellbeing

ACCREU Focus Area: Impacts on Ecosystem & Biodiversity

Sectoral impacts: a focus on health and biodiversity

International Institute for Applied Systems Analysis
IIASA

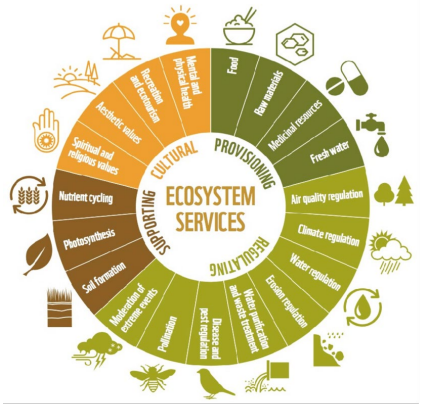
Habitat Suitability
Restoration BTC
Crop Pollination

DTU Denmark Technical University

Wildfire Risk

GCF Global Climate Forum

Coastal Flooding



thewholestory.co.nz/ecosystemservices/

Crop Pollination

- SEEA EA regulating ecosystem service: *"Pollination services are the ecosystem* ***contributions of wild pollinators to the fertilization of crops*** *that maintain or increase the abundance and/or diversity of other species that economic units use or enjoy."*

- Aim: A SEEA EA ecosystem service evaluation of pollination in Europe's field crops



Spatial Modelling Approach

- RCP2.6, 4.5, 7.0
- Agricultural Adaptation (Low, Medium/Reference, High)
- Years: 2020-2050

Supply

- Species distribution models (**ibis.iSDM**, Jung, 2023)
- Bees & Butterflies (n = 153)



Demand

- **GLOBIOM** (Market-driven land use)
- Seven field crops



Biophysical Flow & USD

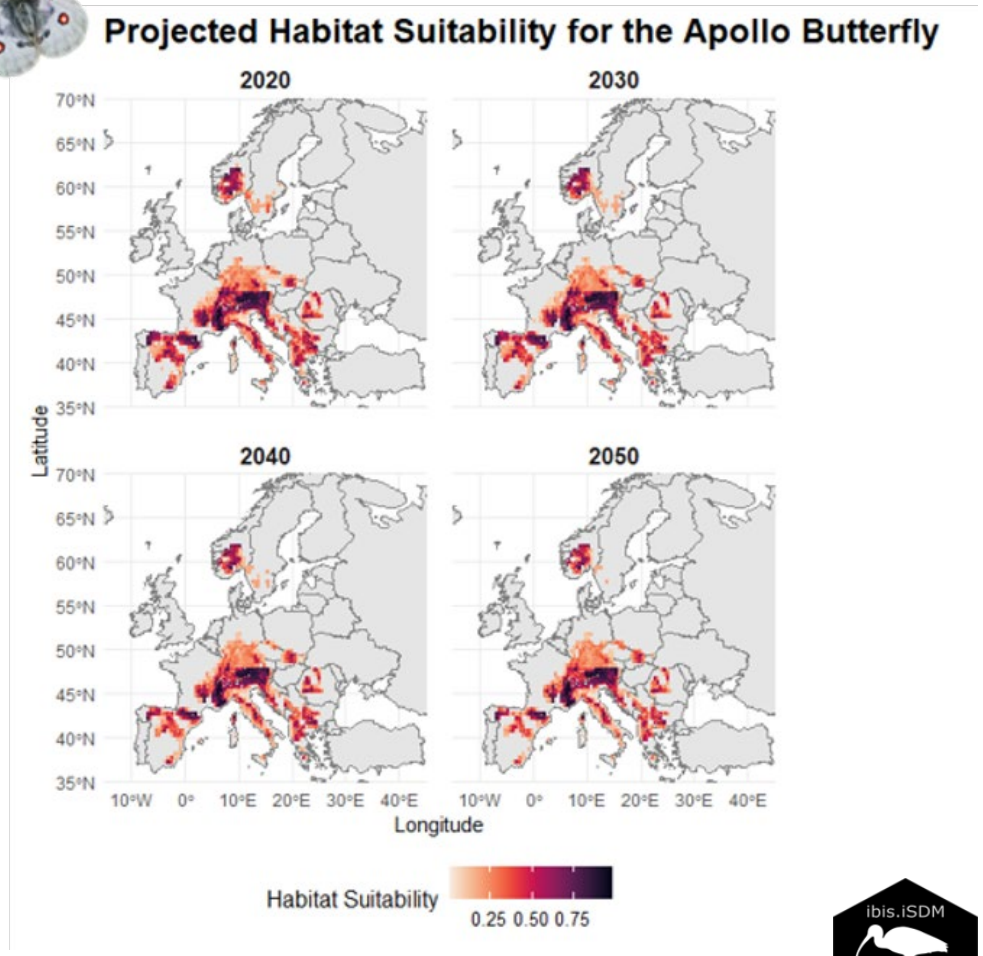
- **KIP INCA** (aligned with SEEA EA)
- Physical tonnes -> Realized exchange value (USD) i.e., ecosystem service contributions to production

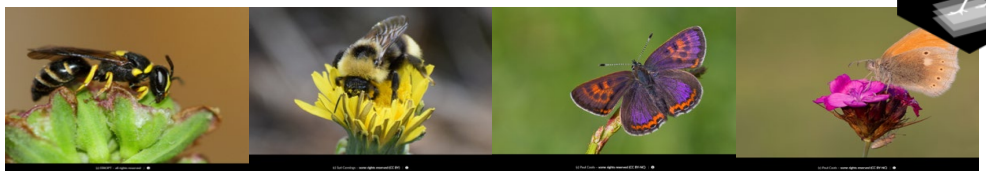
Shifting Supply: Pollinator habitat suitability by 2050

- Habitat suitability for 153 bee & butterfly species

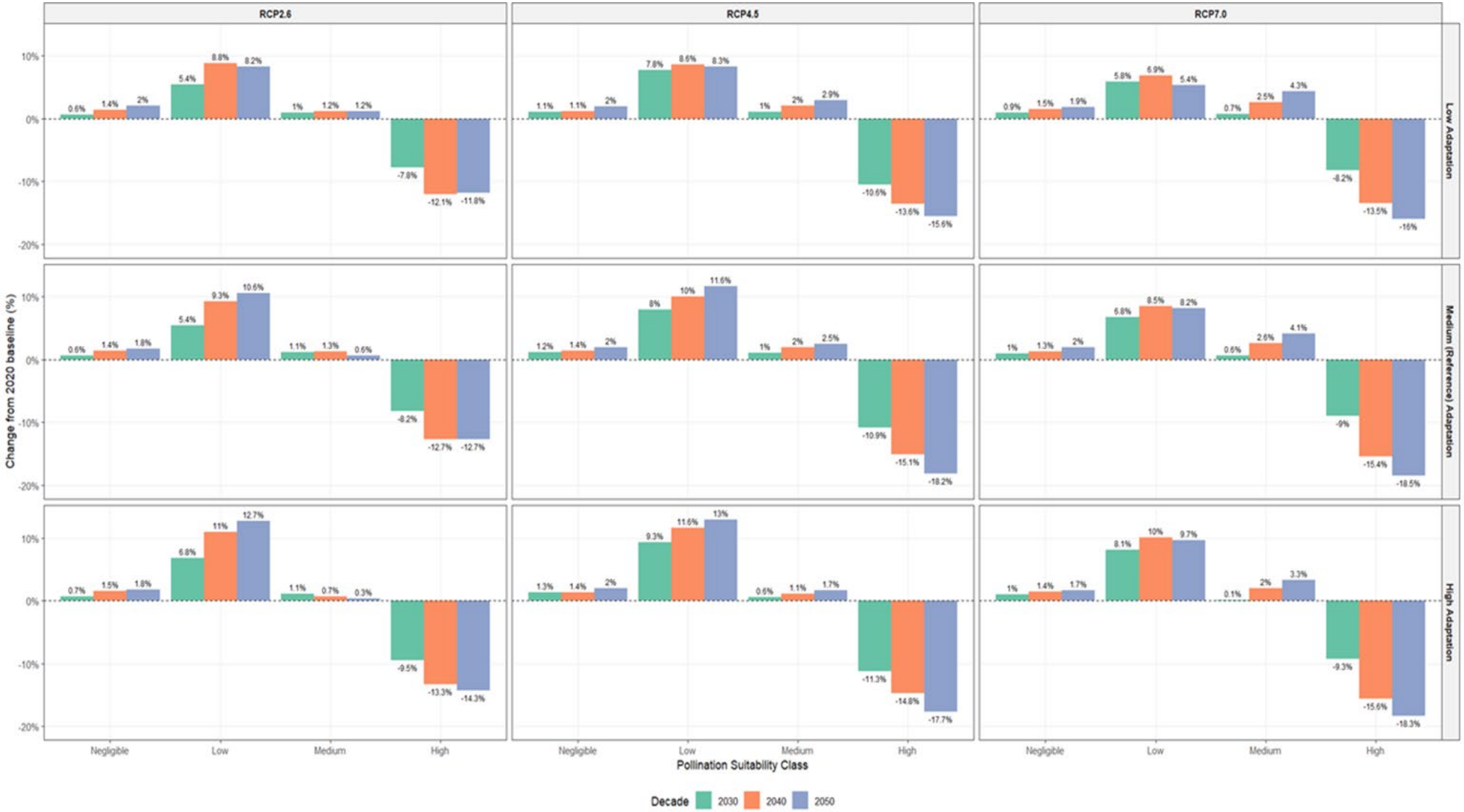
- Pollinator habitat suitability classes
  - >0.3 High
  - 0.2-0.3 Medium
  - 0.1-0.2 Low
  - < 0.1 Negligible





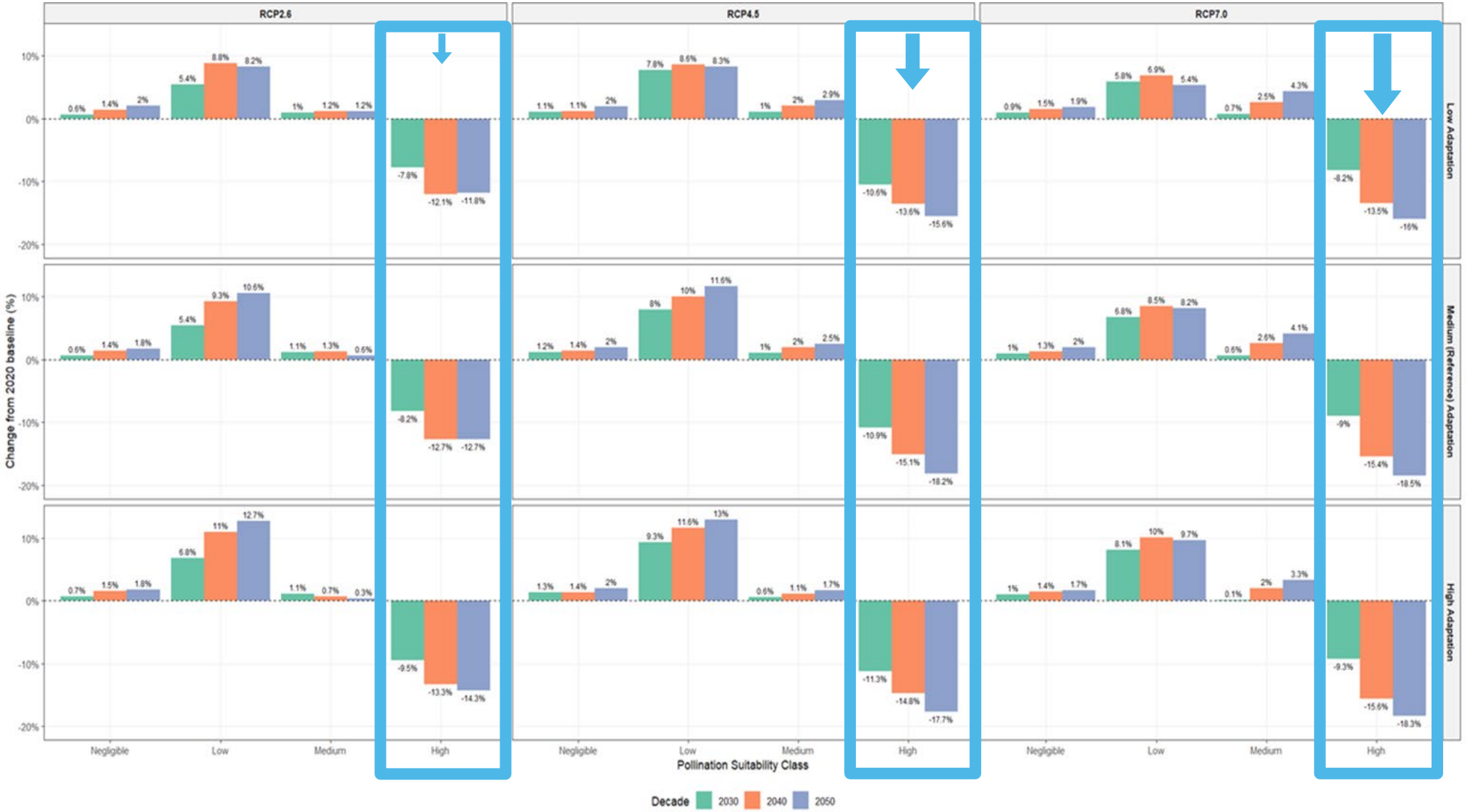


Shifting Supply: Pollinator habitat suitability by 2050



Change in suitable habitat area extent for pollinators (%), by suitability class, relative to 2020 under climate (RCP 2.6; 4.5; 7.0) and agricultural adaptation (high, medium/reference, low) scenarios. Pollinator habitat suitability classes: “High” suitability (>0.3), “Medium” suitability (0.2-0.3), “Low” (0.1-0.2) suitability, and “Negligible” suitability (< 0.1). For country-level data see ACCREU Deliverable 2.4.

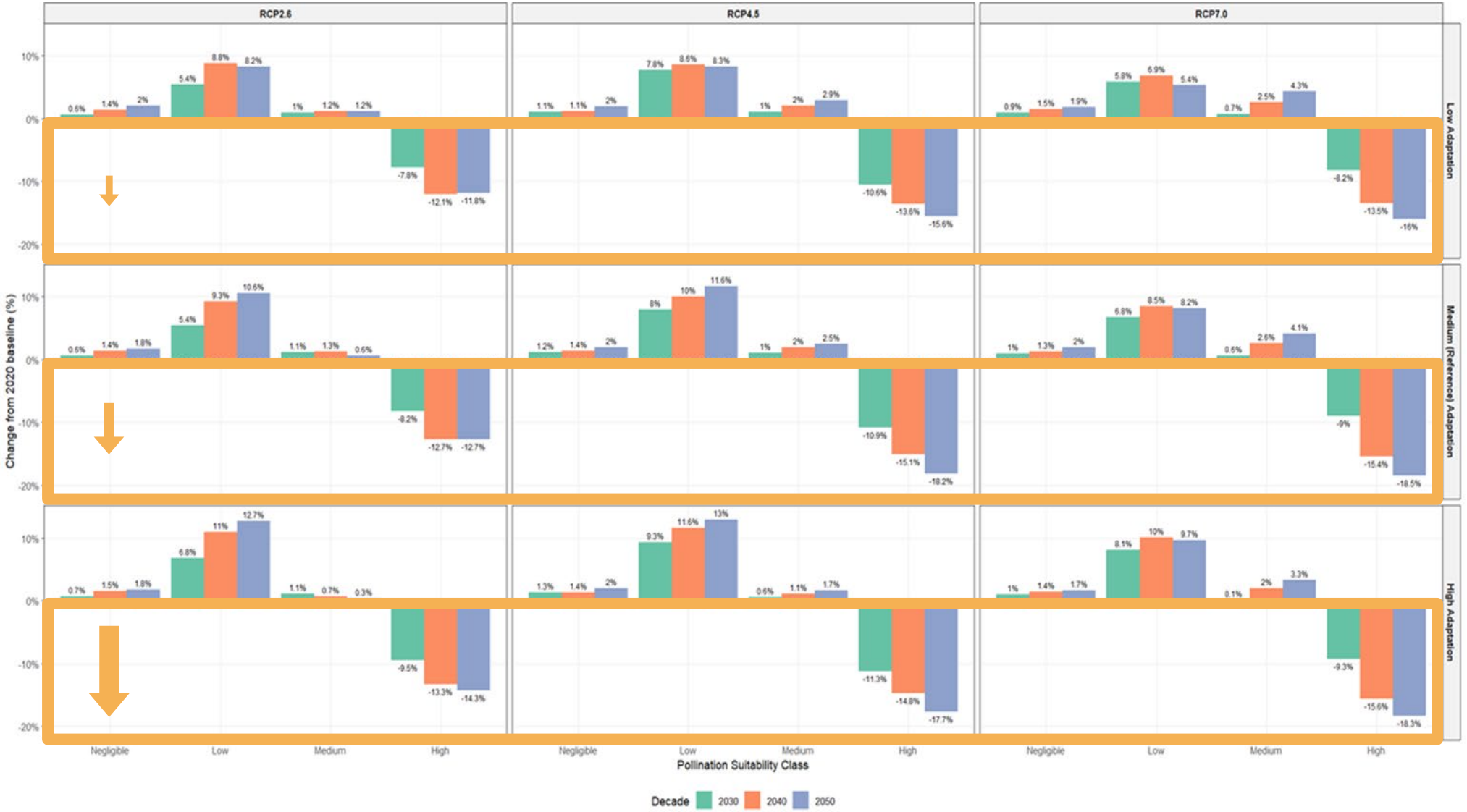
Shifting Supply: Pollinator habitat suitability by 2050



Significant decline in high-quality habitats

Change in suitable habitat area extent for pollinators (%), by suitability class, relative to 2020 under climate (RCP 2.6; 4.5; 7.0) and agricultural adaptation (high, medium/reference, low) scenarios. Pollinator habitat suitability classes: “High” suitability (>0.3), “Medium” suitability (0.2-0.3), “Low” (0.1-0.2) suitability, and “Negligible” suitability (< 0.1). For country-level data see ACCREU Deliverable 2.4.

Shifting Supply: Pollinator habitat suitability by 2050

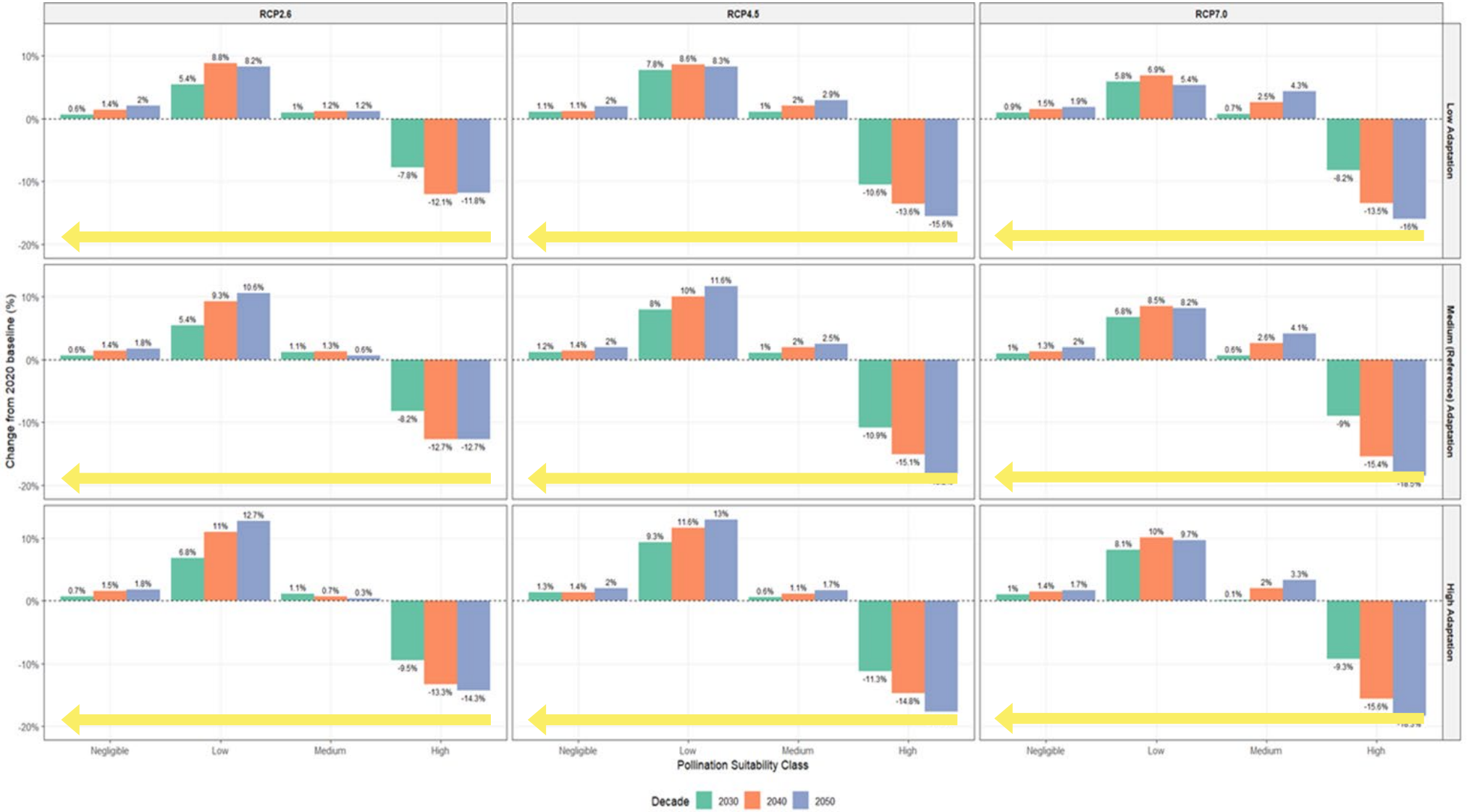


Significant decline in high-quality habitats

Short-term agricultural productivity, long term pollination loss

Change in suitable habitat area extent for pollinators (%), by suitability class, relative to 2020 under climate (RCP 2.6; 4.5; 7.0) and agricultural adaptation (high, medium/reference, low) scenarios. Pollinator habitat suitability classes: “High” suitability (>0.3), “Medium” suitability (0.2-0.3), “Low” (0.1-0.2) suitability, and “Negligible” suitability (< 0.1). For country-level data see ACCREU Deliverable 2.4.

Shifting Supply: Pollinator habitat suitability by 2050



Significant decline in high-quality habitats

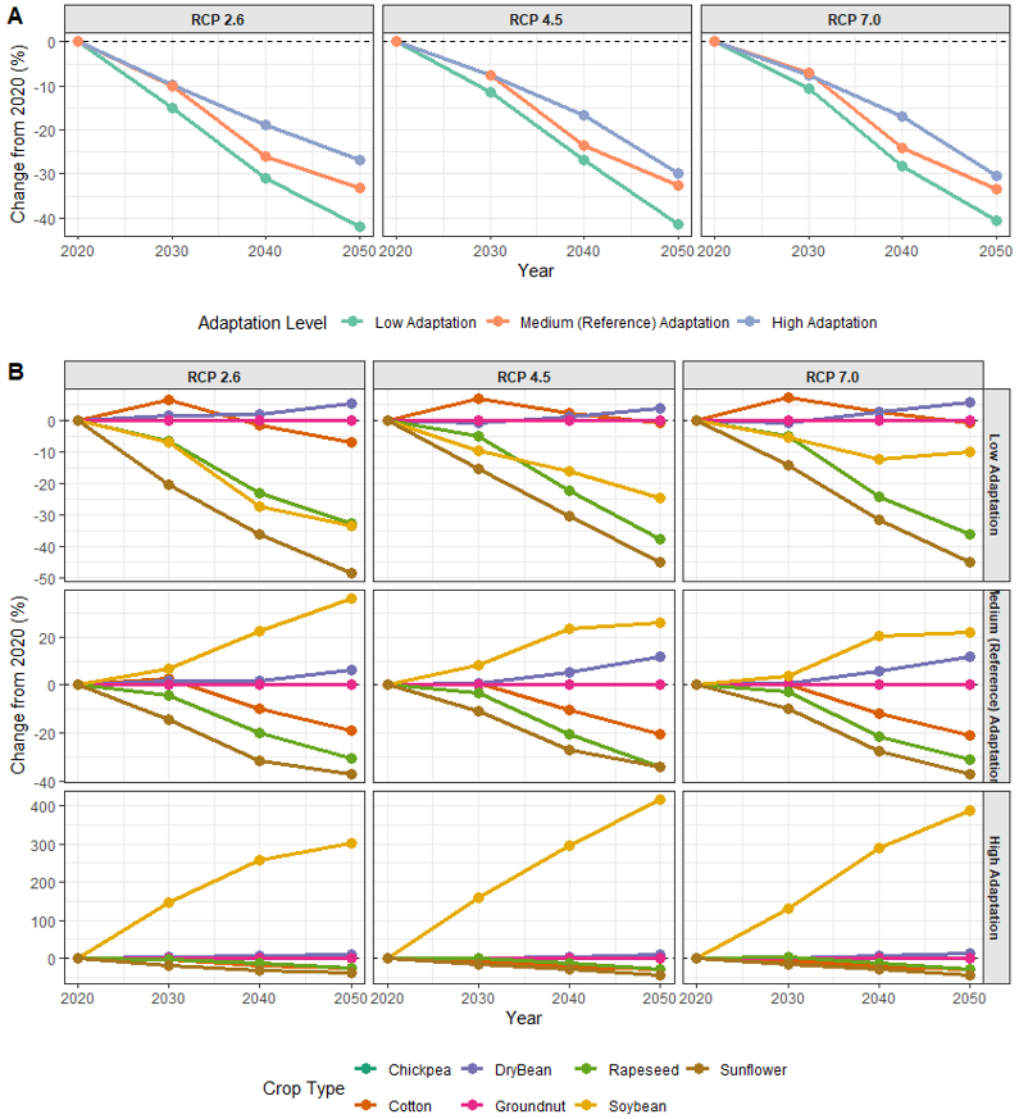
Short-term agricultural productivity, long term pollination loss

Habitat quality "downgrading": gradual degradation of pollination services

Change in suitable habitat area extent for pollinators (%), by suitability class, relative to 2020 under climate (RCP 2.6; 4.5; 7.0) and agricultural adaptation (high, medium/reference, low) scenarios. Pollinator habitat suitability classes: "High" suitability (>0.3), "Medium" suitability (0.2-0.3), "Low" (0.1-0.2) suitability, and "Negligible" suitability (< 0.1). For country-level data see ACCREU Deliverable 2.4.

Moving Demand: Pollinated crop distribution by 2050

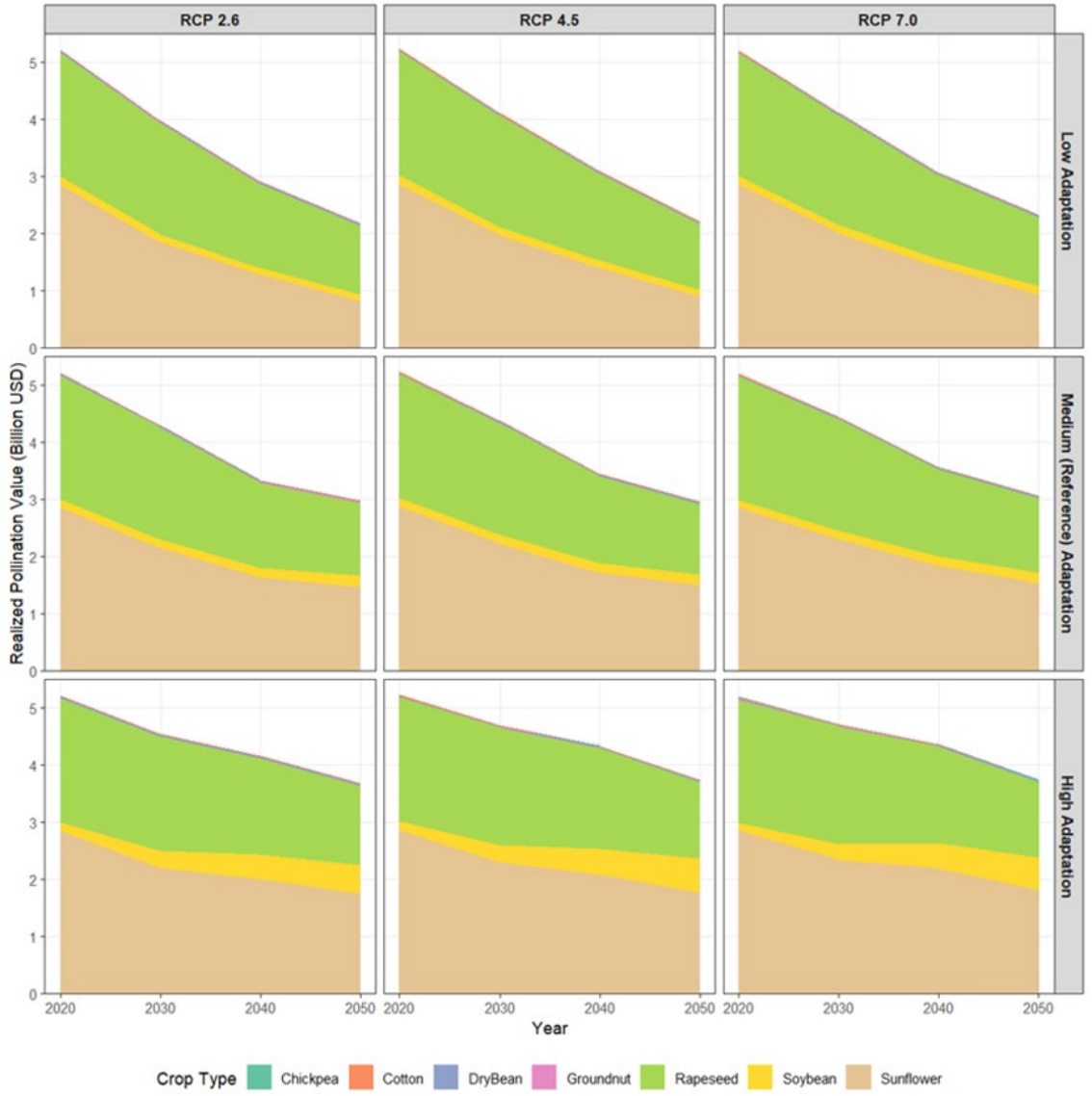
- Effective crop area depending on pollination services (crop area * pollination dependency)
- (A) ↓ pollination demand (27-42%) by 2050
  - Less severe under high adaptation
- (B) Changes in crop composition
  - ↓ high-dependency crops (sunflower)
  - ↑ moderate-dependency crops (soybean)
  - Agricultural adaptation favors moderate-dependency crops



Change in European field crop pollination demand area from 2020 by climate scenario (RCP) and adaptation level for (A) combined pollinator-dependent crops, and (B) Grouped by crop type. Calculated using crop-specific pollination dependency indices: High (65 %; Sunflower), Moderate (25 %; Rapeseed, Soybean, Dry bean, Chickpea), and Low (5 %; Cotton, Groundnut). For country-level data see ACCREU Deliverable 2.4.

Realized Crop Pollination Market Value

- Where pollinator supply meets crop demand
- Annual pollination services: **~5.23B USD (2020)**
- Projected decline: **2.18-3.75B USD by 2050**
- Major crop shifts or shifts in pollinators?
  - *Gerber et al. (in prep). Shifting supply, moving demand: Economic consequences of global change-induced pollination service mismatches for European field crops.*



European realized pollination value (Billion USD) over time per pollinator-dependent field crop type. The realized pollination value represents the financial contribution to agricultural production, accounting for both crop pollination supply and demand. For country-level data see ACCREU Deliverable 2.4.

Crop Pollination Evaluation: Takeaways

- Supply (pollinators) is degrading
- Demand (crops) is moving away from pollination-dependencies

- Why does pollinator biodiversity still matter?
  - Imports of pollinator-dependent crops – pollinators still needed elsewhere!
  - Preserving future flexibility
  - Maintaining nature's safety net
  - Protecting less flexible sectors







ACCREU Focus Area: Health & Wellbeing

CLIMATE ANALYTICS

Wellbeing & Poverty

Economic impacts of compound heatwaves and droughts on household income.

cmcc
Centro Euro-Mediterraneo sui Cambiamenti Climatici

Labour Productivity

Effects of rising temperatures on hours worked and worker productivity.

THE CYPRUS INSTITUTE
RESEARCH•TECHNOLOGY•INNOVATION

Air Quality

Climate projections for air pollution exposure and associated health burdens.

BC3
BASQUE CENTRE FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

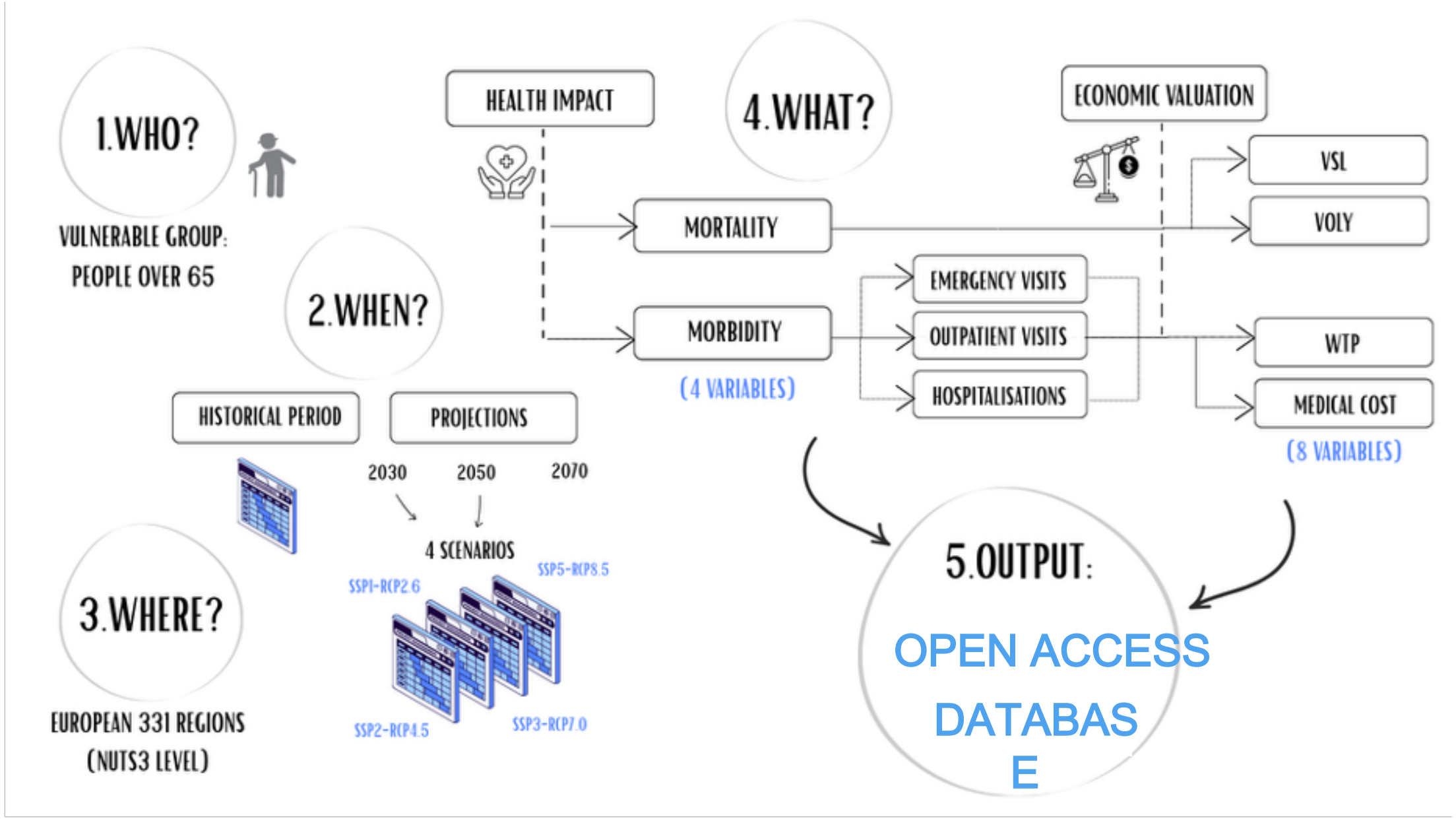
Health Impacts

Heat-related mortality, morbidity, vector-borne diseases, and flood health impacts.



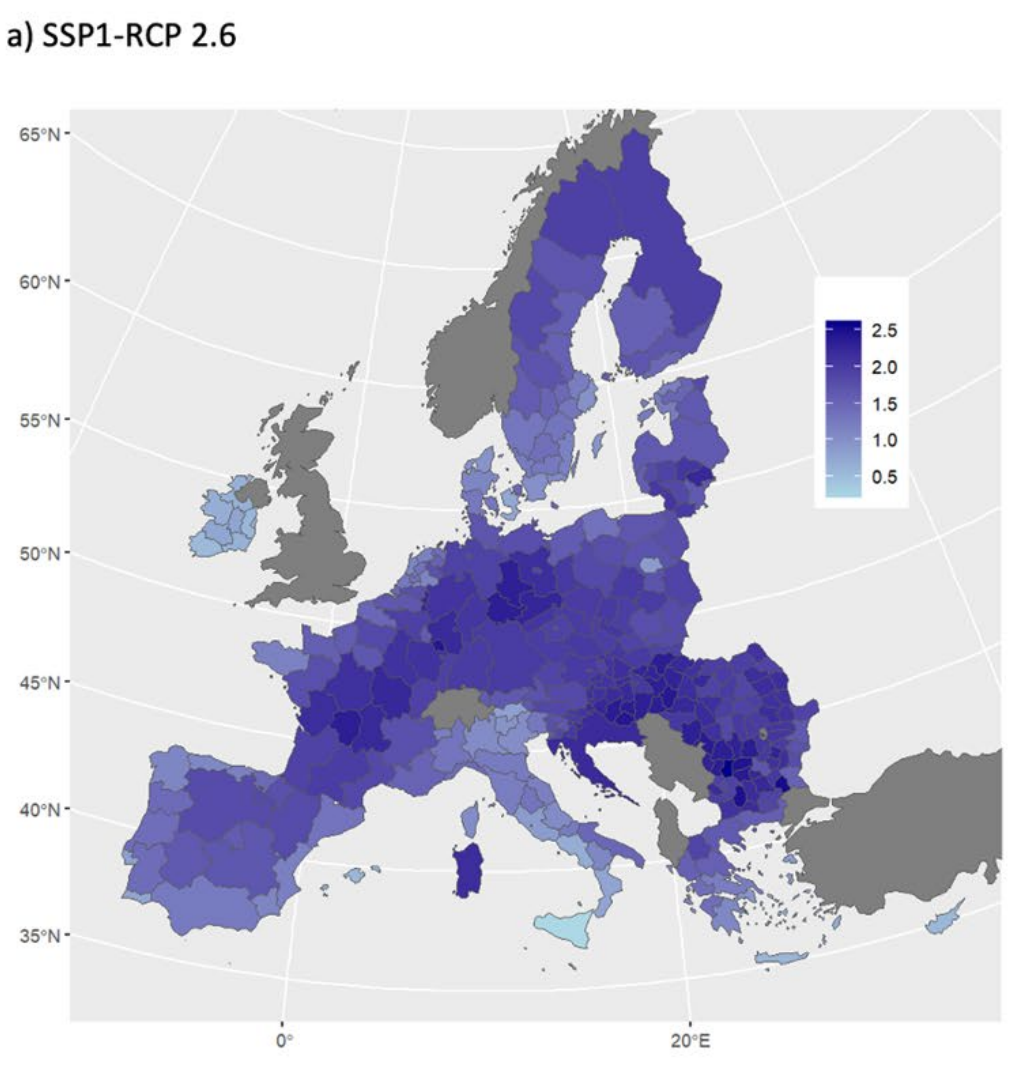
Picture by @PepeBurgos1900, vía Twitter

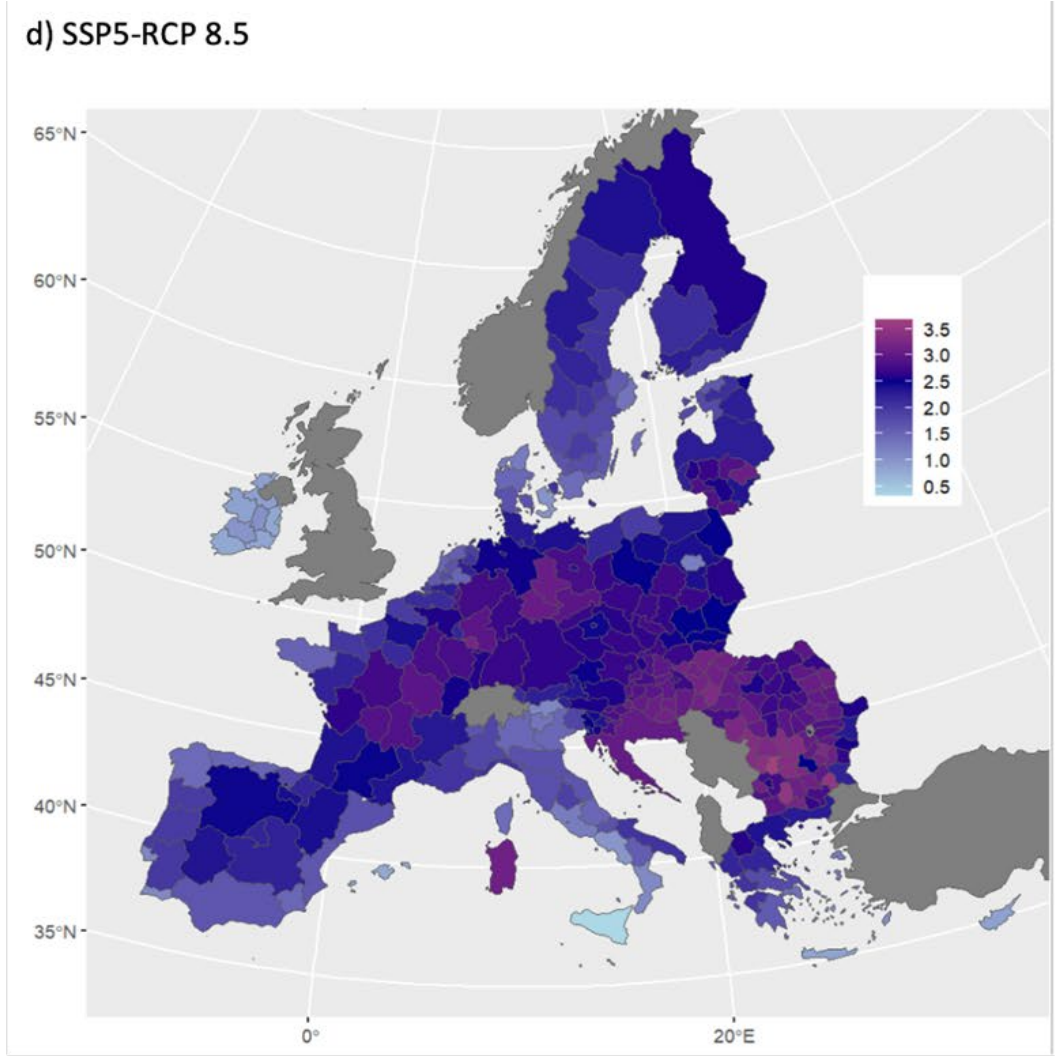
Heat-related mortality, morbidity and their costs



Heat-related **mortality** and its costs

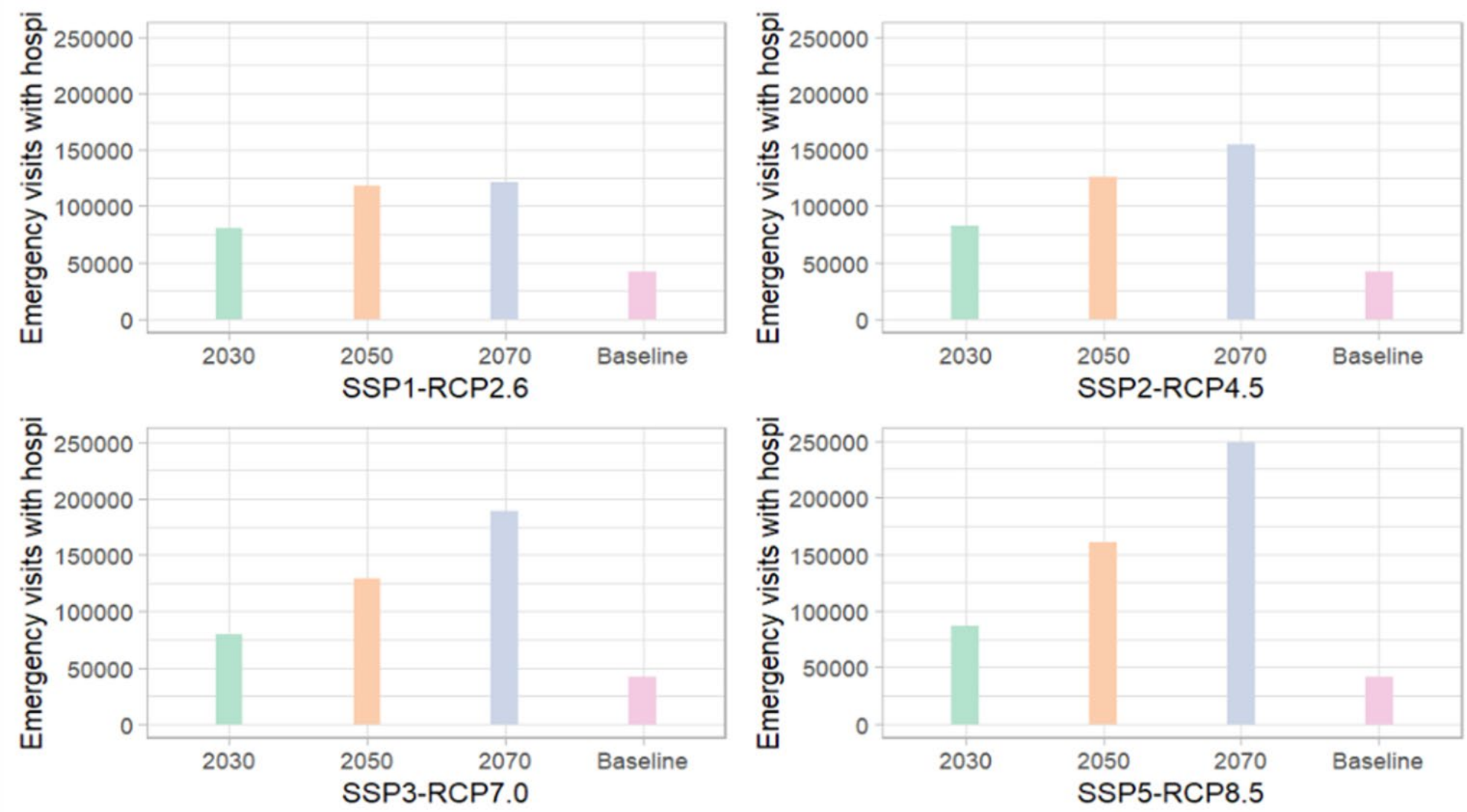
Heat-related mortality among over-65s could triple by 2050, from ~73,000 to 210,000–280,000 a year





Extreme heat and **morbidity** in Europe

Heat-related hospitalisations could reach 120,000–160,000 a year by 2050



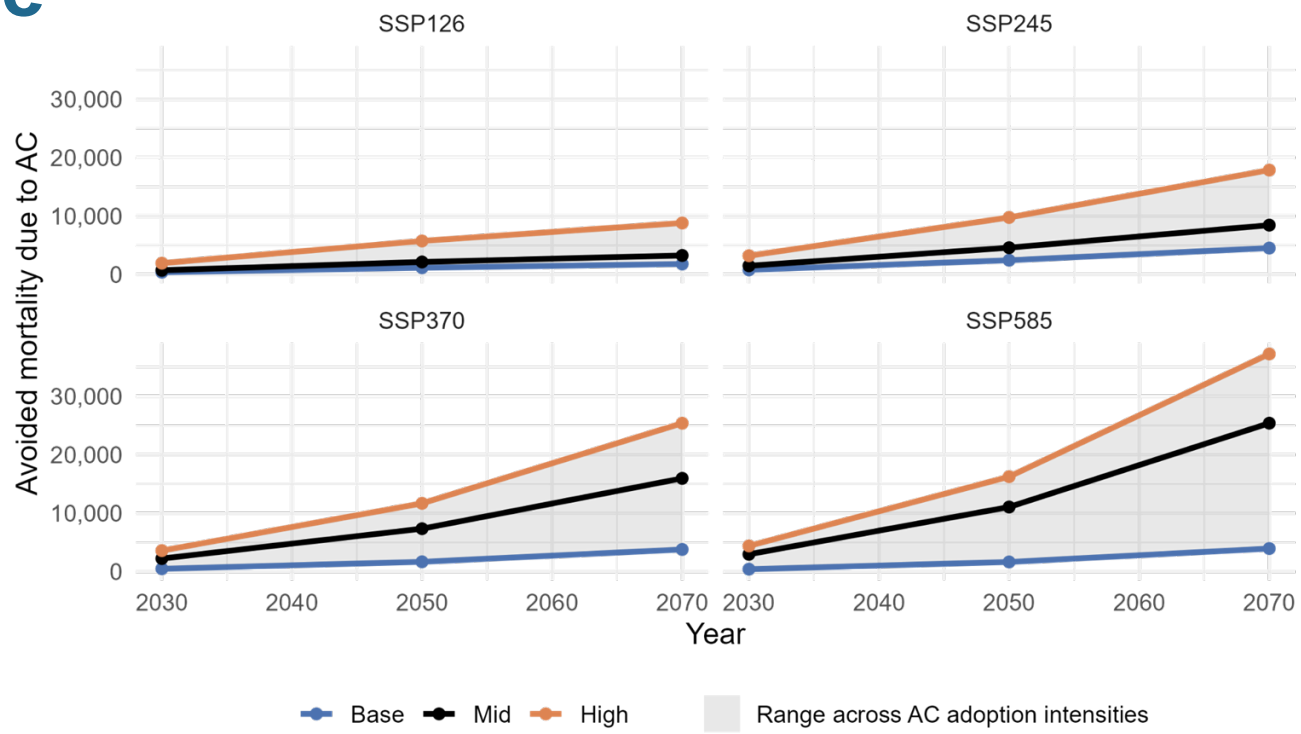
Adapting to extreme heat: the potential role of AC in Europe

Depending on climate and economic development, by 2050:

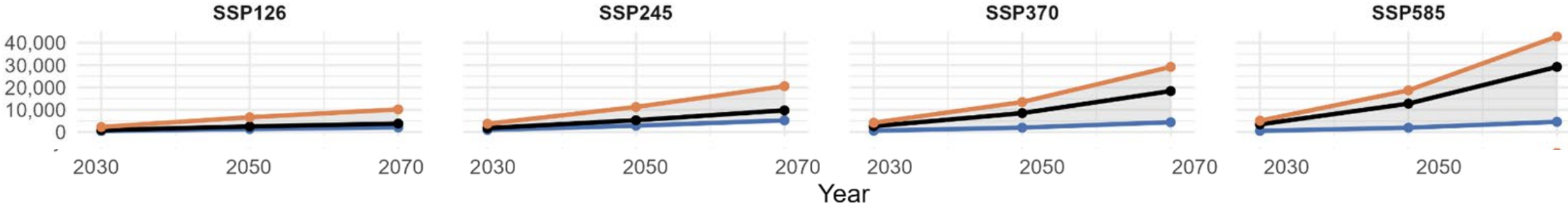
Mortality
High AC uptake could avoid 6,000–16,000 deaths a year.

Morbidity
High AC uptake could avoid 7,000–19,000 emergency department visits a year.

Avoided mortality due to AC



Avoided emergency visits



Key messages

- Climate change poses widespread and interconnected risks that vary across sectors and regions, with consequences for ecosystems, biodiversity and human well-being.

- Direct climate impacts can cascade through economic and environmental systems. Changes in agricultural and forest productivity, water availability and land use can generate indirect consequences for biodiversity and ecosystem services.

- Health impacts depend on more than climate exposure alone. Heat, air pollution and compound extremes affect mortality, productivity and well-being, while population aging, urbanization and socioeconomic inequalities shape who is most affected.

- Adaptation can substantially reduce risks, but benefits in one sector may come with trade-offs elsewhere. For example, maintaining competitive agricultural production may limit opportunities for habitat recovery, while health adaptation raises questions about affordability and equitable access.

Thanks!

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CrossEU

CROSSEU lessons & findings: Climate Change Risks and Solutions

Nicholas Vasilakos and Olivier Dessens

UEA and UCL

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

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UK Research and Innovation

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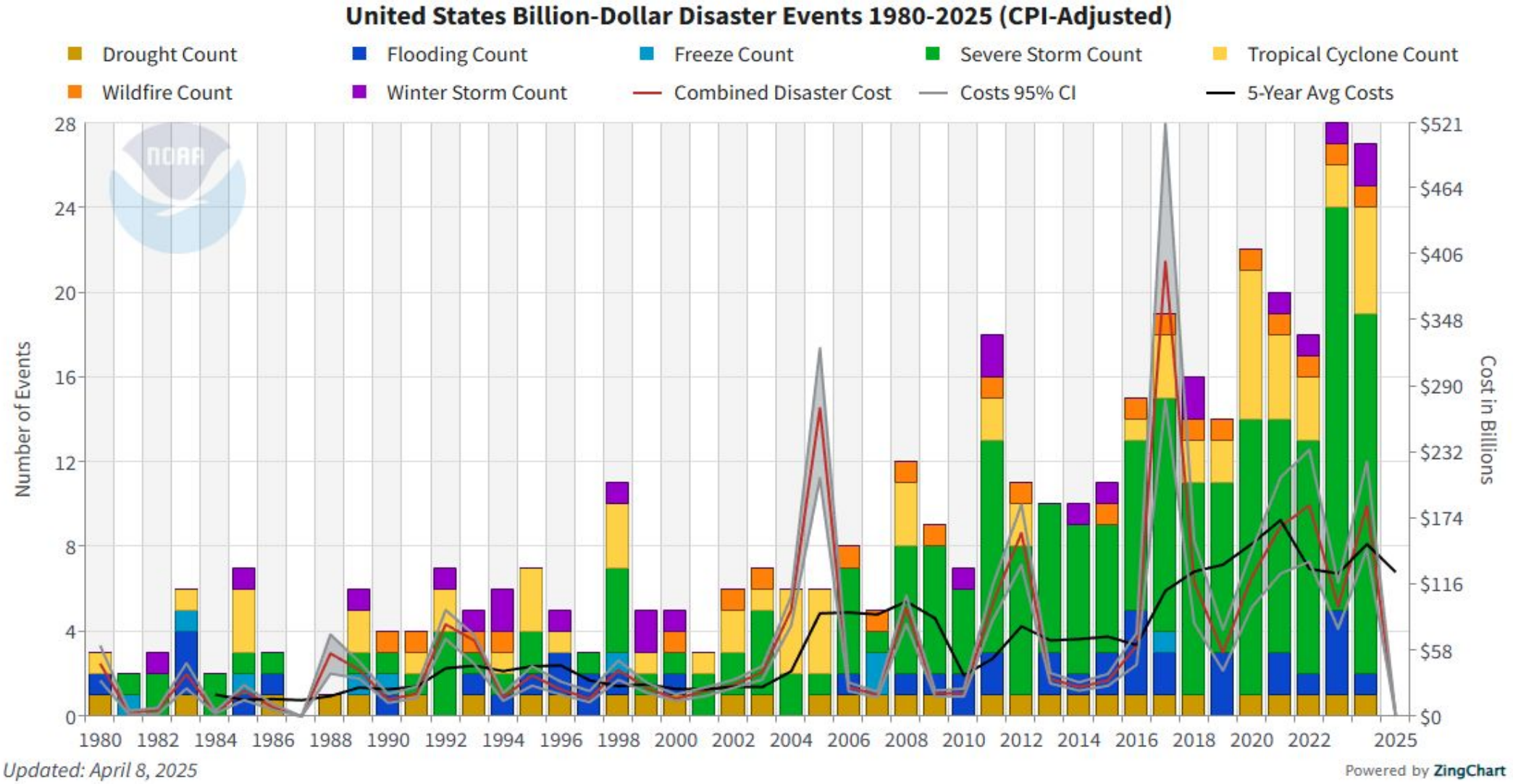
With thanks to all partners whose work has supported the results presented today.



National Centers for Environmental Information
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

CrossEU

Lesson 1: climate extremes are distributional shocks

Aggregate losses hide who is losing most.

Inequality

144

countries combined with percentile-level income data

P10

lower tail of the distribution is repeatedly exposed



Gini and 90/10 ratios under several hazards

Empirical finding

Heatwaves, droughts and extreme precipitation tend to reduce incomes more strongly at the lower end of the distribution, widening inequality.

Interpretation

Climate shocks interact with labour markets, sectoral dependence, institutional capacity and financial buffers. Vulnerability is structural, not incidental.

Methodology – Models

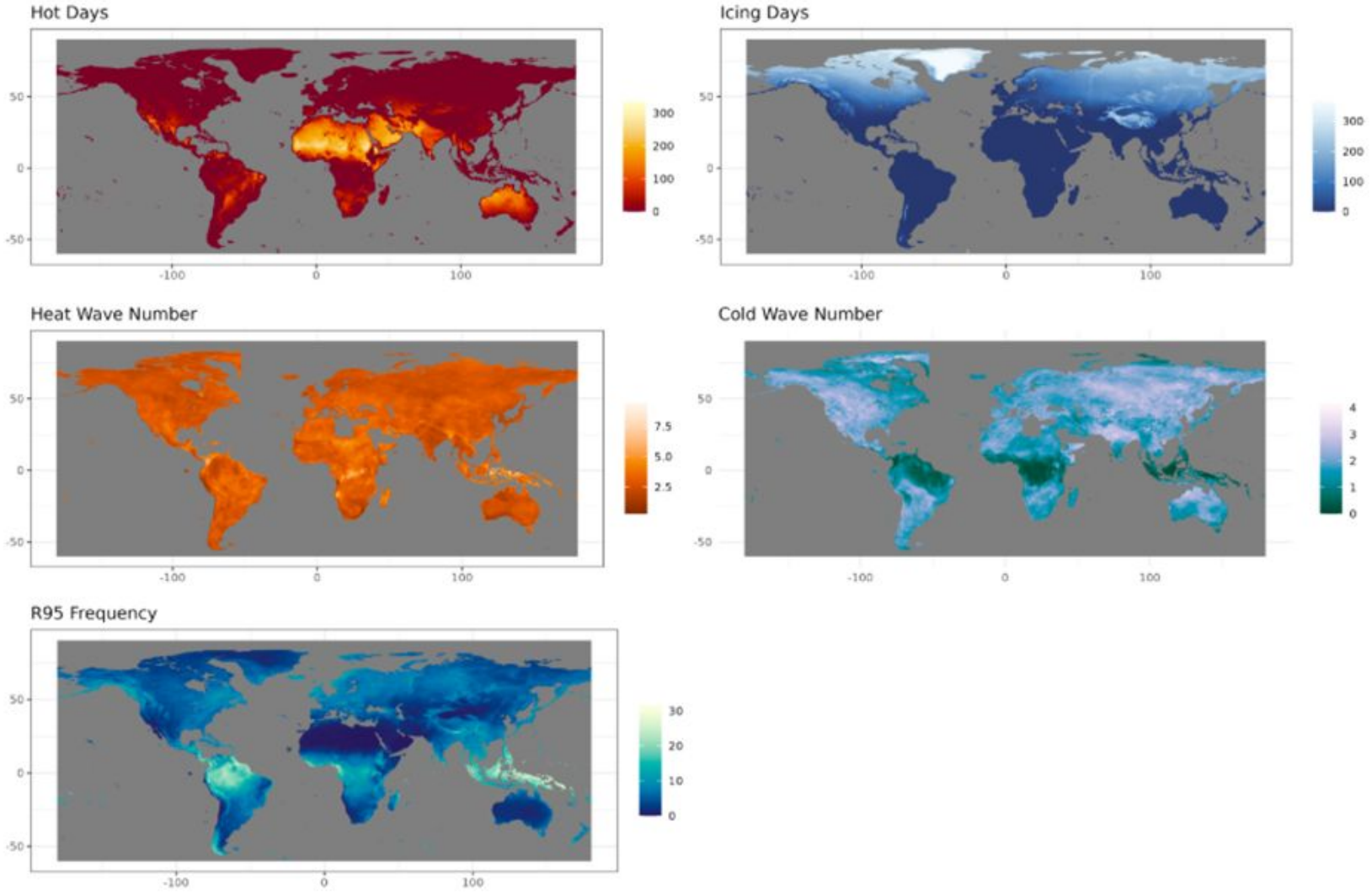
Baseline model

$$\ln_ave_inc_{i,t}^{q} = \alpha + \boldsymbol{\beta_1 CR_{i,t}} + \beta_2 \ln_real_sectorGDP_{i,t}^{s} + \boldsymbol{\beta_3 X_{i,t}} + \gamma_i + \theta_t + \epsilon_{it}$$

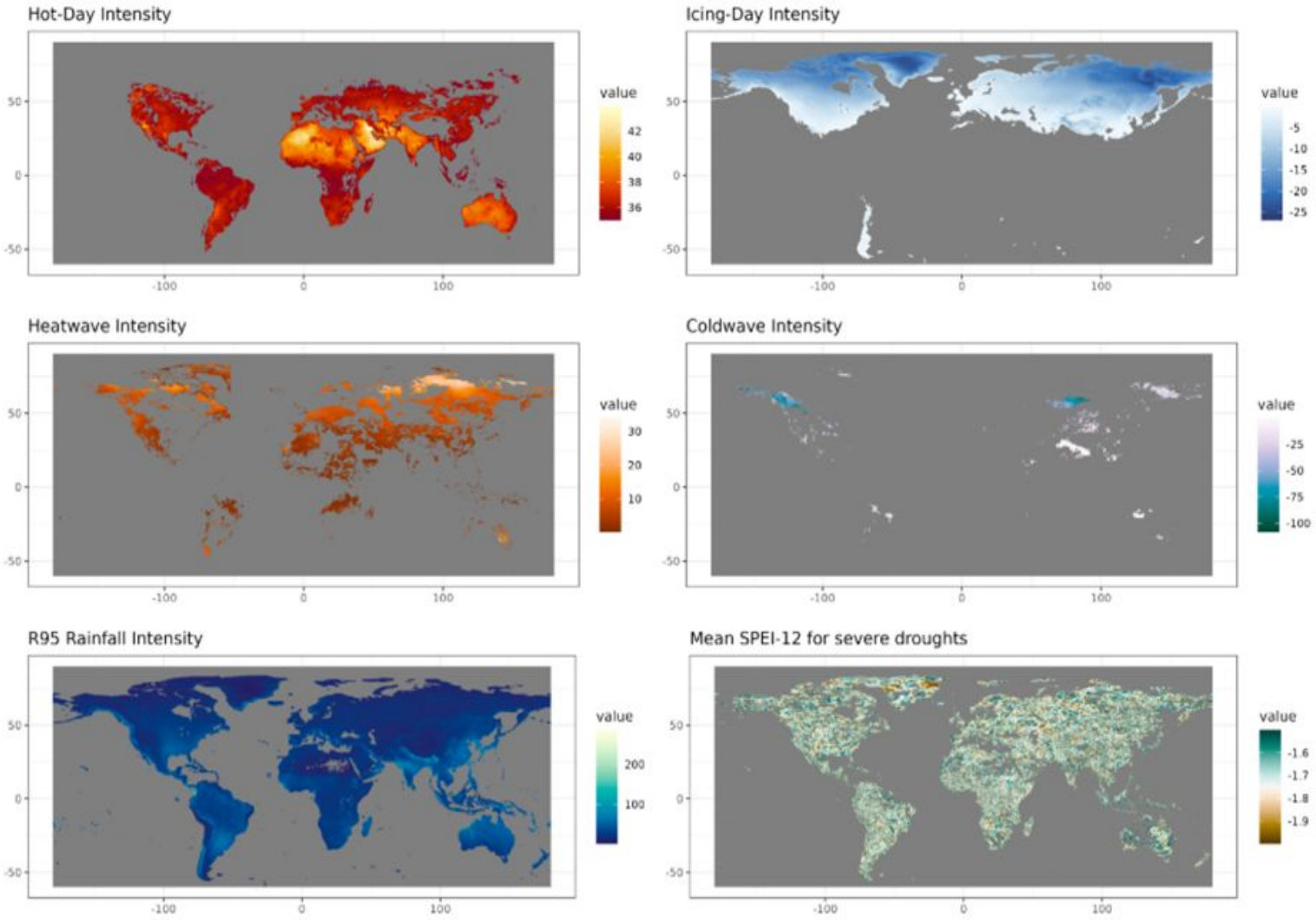
where

- $ln_ave_inc_{i,t}^{q}$ denotes our measure of income inequality in country i and year t, represented as the logarithm of the average income of decile q.
- $\boldsymbol{CR_{i,t}}$ is a vector of EWE, including HW_IF, CW_IF, $Icing_IF$, and Hot_IF.
- $ln_real_sectorGDP_{i,t}^{s}$ captures either three sector-specific specifications of real GDP, where s refers to $\ln_real_Agri_GDP_{i,t}$, $\ln_real_Ind_GDP_{i,t}$, or $\ln_real_Serv_GDP_{i,t}$.
- The vector $\boldsymbol{X_{i,t}}$ refers to the control variables.
- γ_i and θ_t represent country and time fixed effects, respectively; ϵ_{it} is the error term; and α is the intercept.

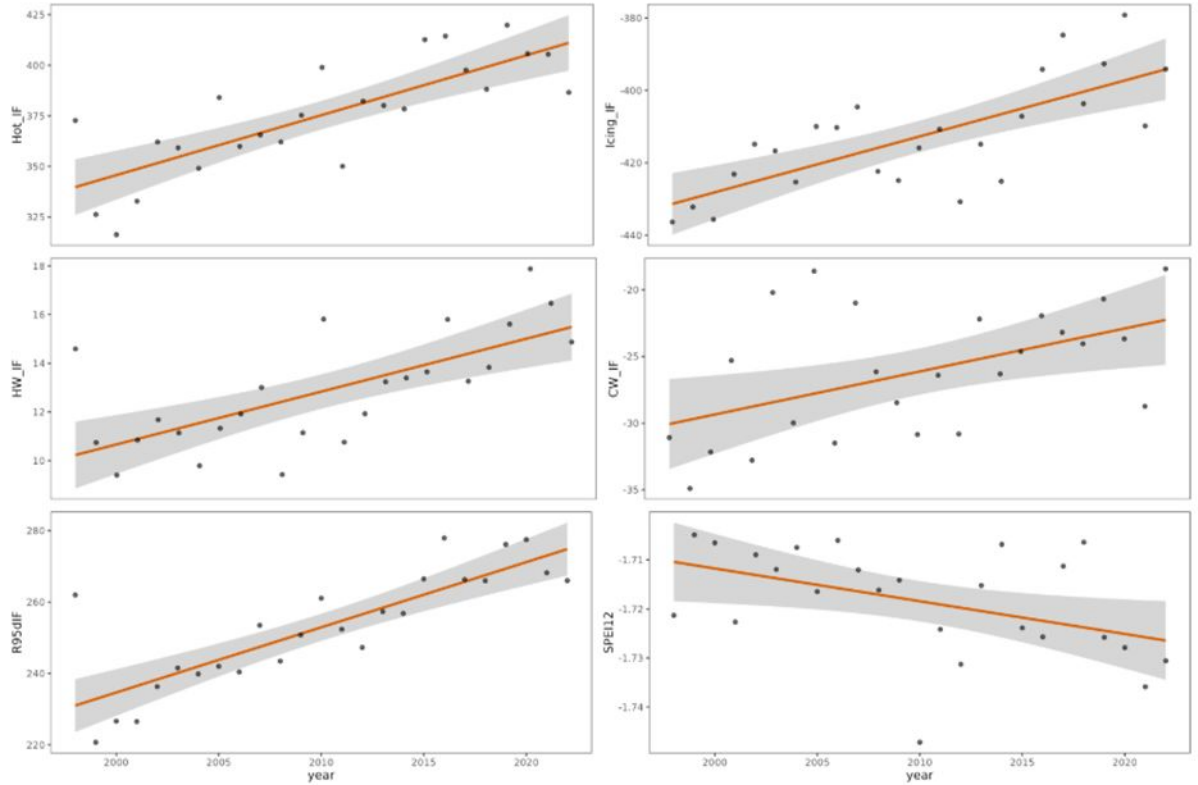
The modelled frequency of key climate variables aggregated over the time-period 1992-2022



The modelled intensity of key climate variables aggregated over the time-period 1992-2022.



Global trend in the interaction between intensity and frequency of modelled climate variables from 1992-2022 .



Results

VARIABLES	(1) 90-10th ratio ln_r_avg_wel	(2) 90-10th ratio ln_r_avg_wel	(3) 90-10th ratio ln_r_avg_wel	(4) 90-10th ratio ln_r_avg_wel	(5) Gini ln_r_avg_wel	(6) Gini ln_r_avg_wel	(7) Gini ln_r_avg_wel	(8) Gini ln_r_avg_wel
HW_IF	0.021***	0.021***	0.021***	0.023***	0.003***	0.003***	0.002***	0.003***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
CW_IF	0.034***	0.032***	0.034***	0.038***	0.002***	0.002***	0.003***	0.003***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
Icing_IF	0.006***	0.007***	0.007***	0.006***	0.000**	0.000***	0.000***	0.000*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Hotdays_IF	0.009***	0.007**	0.007**	0.007**	0.002***	0.001***	0.001***	0.001***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)
R95dIFmax	0.008***	0.005	0.003	0.007**	0.004***	0.004***	0.004***	0.004***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)
ln_r_Agri_GDP	-0.937***				-0.243***			
	(0.010)				(0.002)			
ln_r_Ind_GDP		-0.896***				-0.235***		
		(0.010)				(0.002)		
ln_r_Serv_GDP			-0.922***				-0.239***	
			(0.010)				(0.002)	
PC_GDPsip				-1.343***				-0.348***
				(0.014)				(0.003)
Constant	-39.535***	-40.246***	-37.536***	-57.154***	-1.777***	-1.847***	-1.083***	-6.834***
	(1.838)	(1.840)	(1.828)	(1.805)	(0.178)	(0.179)	(0.181)	(0.156)
Observations	153,492	153,592	153,692	153,492	153,492	153,592	153,692	153,492
Time Effect	YES	YES	YES	YES	YES	YES	YES	YES
Country Effect	YES	YES	YES	YES	YES	YES	YES	YES

Results

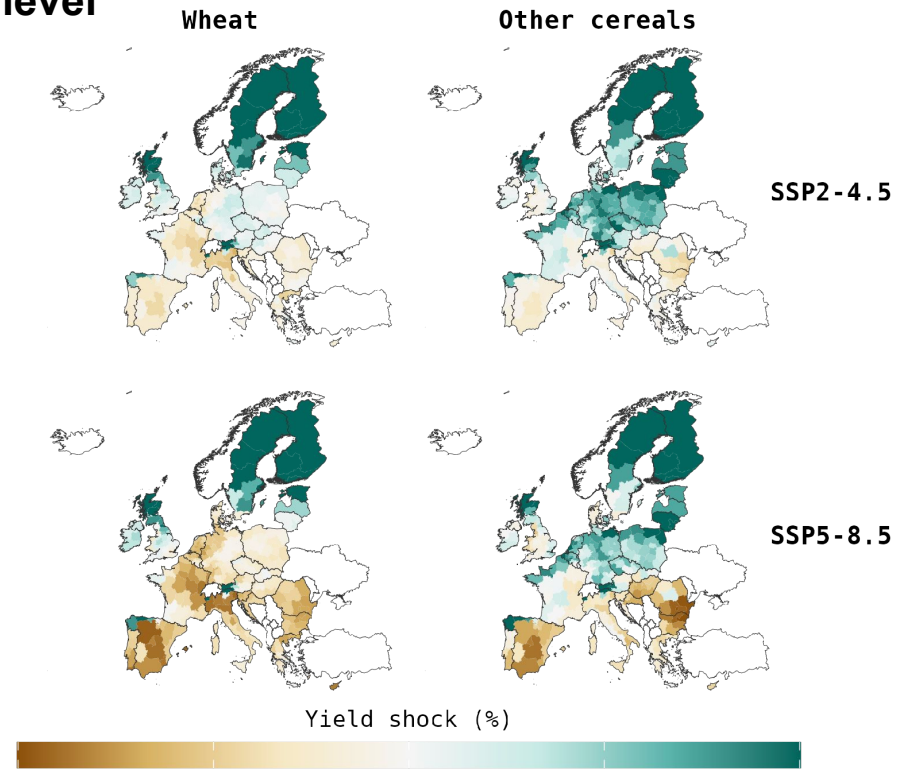
VARIABLES	(1) 90-10 ln_r_avg_wel	(2) 90-10 ln_r_avg_wel	(3) 90-10 ln_r_avg_wel	(4) 90-10 ln_r_avg_wel	(5) Gini ln_r_avg_wel	(6) Gini ln_r_avg_wel	(7) Gini ln_r_avg_wel	(8) Gini ln_r_avg_wel
Drought_IF	0.001***	0.001***	0.001***	0.001***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln_r_Agri_GDP	-0.740***				-0.259***			
	(0.010)				(0.003)			
ln_r_Ind_GDP		-0.714***				-0.249***		
		(0.010)				(0.003)		
ln_r_Serv_GDP			-0.714***				-0.252***	
			(0.010)				(0.003)	
PC_GDPsip				-1.069***				-0.371***
				(0.015)				(0.004)
Constant	-46.256***	-42.169***	-43.756***	-58.999***	-1.623***	-1.011***	-0.469**	-6.616***
	(2.239)	(2.219)	(2.232)	(2.223)	(0.208)	(0.208)	(0.219)	(0.189)
Observations	111,193	111,393	111,393	111,193	111,193	111,393	111,393	111,193
Country Effect	YES	YES	YES	YES	YES	YES	YES	YES

Results -- Full distribution (Agricultural sector)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Agri	Agri	Agri	Agri	Agri	Agri	Agri	Agri	Agri	Agri
VARIABLES	ln_ave_inc1	ln_ave_inc2	ln_ave_inc3	ln_ave_inc4	ln_ave_inc5	ln_ave_inc6	ln_ave_inc7	ln_ave_inc8	ln_ave_inc9	ln_ave_inc10
HW_IF	-0.016***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.011***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
CW_IF	-0.012**	-0.010**	-0.009**	-0.008**	-0.009**	-0.009**	-0.009**	-0.009**	-0.009**	-0.009**
	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Icing_IF	-0.022**	-0.016**	-0.011	-0.006	-0.005	-0.006	-0.006	-0.007	-0.007	-0.010
	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Hotdays_IF	-0.022***	-0.015***	-0.012**	-0.011**	-0.011**	-0.011**	-0.012**	-0.010*	-0.011**	-0.011*
	(0.008)	(0.006)		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
ln_real_Agri_GDP	0.027***	0.024***	0.021***	0.019***	0.018***	0.019***	0.019***	0.019***	0.019***	0.009
	(0.009)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
ln_Pop_1564	-0.489***	-0.644***	-0.681***	-0.690***	-0.680***	-0.677***	-0.666***	-0.662***	-0.662***	-0.716***
	(0.068)	(0.049)	(0.047)	(0.046)	(0.047)	(0.047)	(0.047)	(0.047)	(0.046)	(0.050)
Unemp_rate	-1.840***	-1.408***	-1.325***	-1.267***	-1.269***	-1.297***	-1.301***	-1.282***	-1.249***	-1.394***
	(0.189)	(0.138)	(0.131)	(0.130)	(0.131)	(0.131)	(0.131)	(0.131)	(0.130)	(0.139)
Female_rate	-0.234	-0.189	-0.173	-0.180	-0.180	-0.154	-0.128	-0.124	-0.143	-0.247**
	(0.161)	(0.117)	(0.112)	(0.111)	(0.111)	(0.112)	(0.112)	(0.112)	(0.111)	(0.119)
Trade_Openess	0.197**	0.201***	0.194***	0.198***	0.210***	0.202***	0.204***	0.205***	0.208***	0.199***
	(0.089)	(0.065)	(0.062)	(0.061)	(0.061)	(0.062)	(0.062)	(0.062)	(0.061)	(0.066)
DCPS	0.057**	0.078***	0.082***	0.081***	0.079***	0.076***	0.078***	0.081***	0.085***	0.105***
	(0.026)	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)
IQ_PC	0.077***	0.077***	0.085***	0.089***	0.091***	0.090***	0.090***	0.090***	0.089***	0.071***
	(0.013)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
polarisation	-5.414***	-3.628***	-2.789***	-2.273***	-1.834***	-1.393***	-0.959***	-0.501***	0.040	1.353***
	(0.165)	(0.120)	(0.114)	(0.113)	(0.114)	(0.114)	(0.114)	(0.114)	(0.113)	(0.121)
Constant	13.908***	16.320***	16.909***	17.090***	16.966***	16.913***	16.744***	16.709***	16.803***	18.188***
	(1.089)	(0.790)	(0.753)	(0.749)	(0.750)	(0.754)	(0.754)	(0.753)	(0.749)	(0.801)
Observations	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
R-squared	0.682	0.721	0.698	0.672	0.646	0.621	0.596	0.570	0.543	0.498
Number of country_id	145	145	145	145	145	145	145	145	145	145
Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

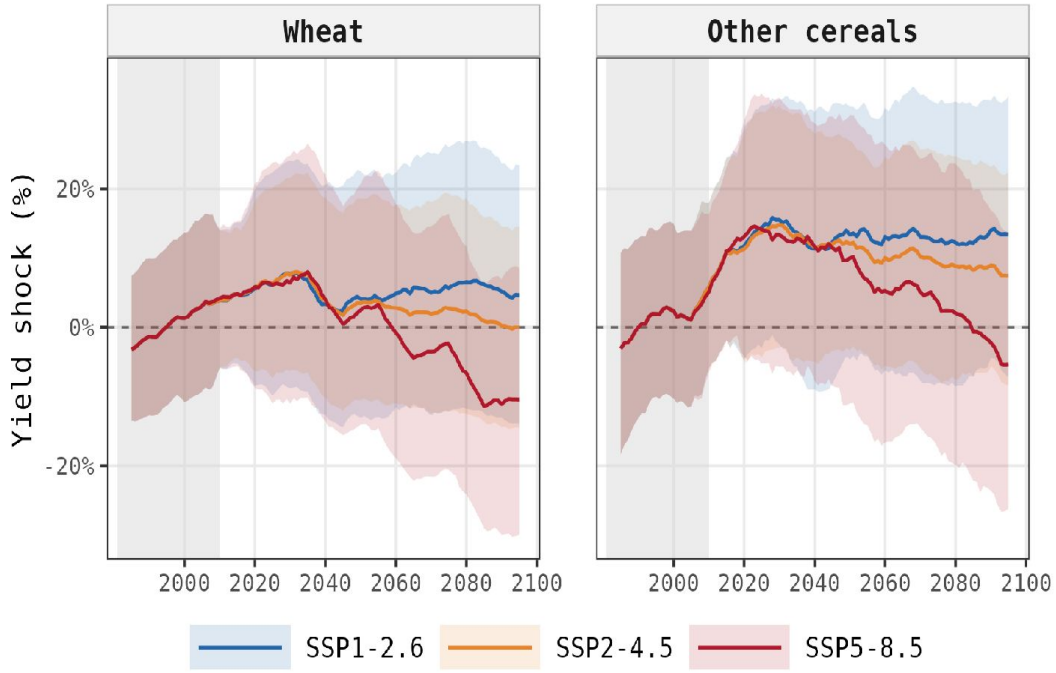
Lesson 2: climate change leads to spatially heterogeneous impacts

National aggregation masks regional climate impacts, motivating the introduction of shocks at NUTS2 level



End-of-century attainable yield shocks. Wheat (left column) and other cereals (right column) under SSP2-4.5 (upper row) and SSP5-8.5 (lower row) across EU27 (NUTS2) and UK (ITL2) regions`

NUTS2-level yield shocks are incorporated into ENGAGE as regional agricultural productivity changes



Area-weighted EU27+UK mean attainable yield shocks. Wheat (left), and other cereals (right) over the period 1981–2100 under SSP1-2.6 (blue), SSP2-4.5 (orange), and SSP5-8.5 (red).

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Lesson 2: climate change leads to spatially heterogeneous impacts

ENGAGE modelling framework

Climate-induced shocks

- crop-yield shocks
- Labour productivity shocks

Adaptation policy levers

- Crop management
- Irrigation
- Mechanization

Model shocks

Subnational ENGAGE

Spatial Unit covers 296 regions:

- 237 EU regions
- 46 UK regions
- 13 Main Trade partners[1]

Sectors include 11:

Six agricultural sectors including Wheat (WHT), Paddy Rice (PDR), Other Grains (GRO), Oilseeds (OSD), Other Crops (OCR), and Other Agriculture (OTH, including forestry and fishing);

Extractive Industries (EXT, including mining, energy, and water); Manufacturing (MAN); Construction (CNS); Transport and Storage (TRN); and Services (SER).

Model Outputs

Model Outputs

- GDP
- Welfare
- Change in sectoral output
- Change in sectoral prices
- Change in exports/imports

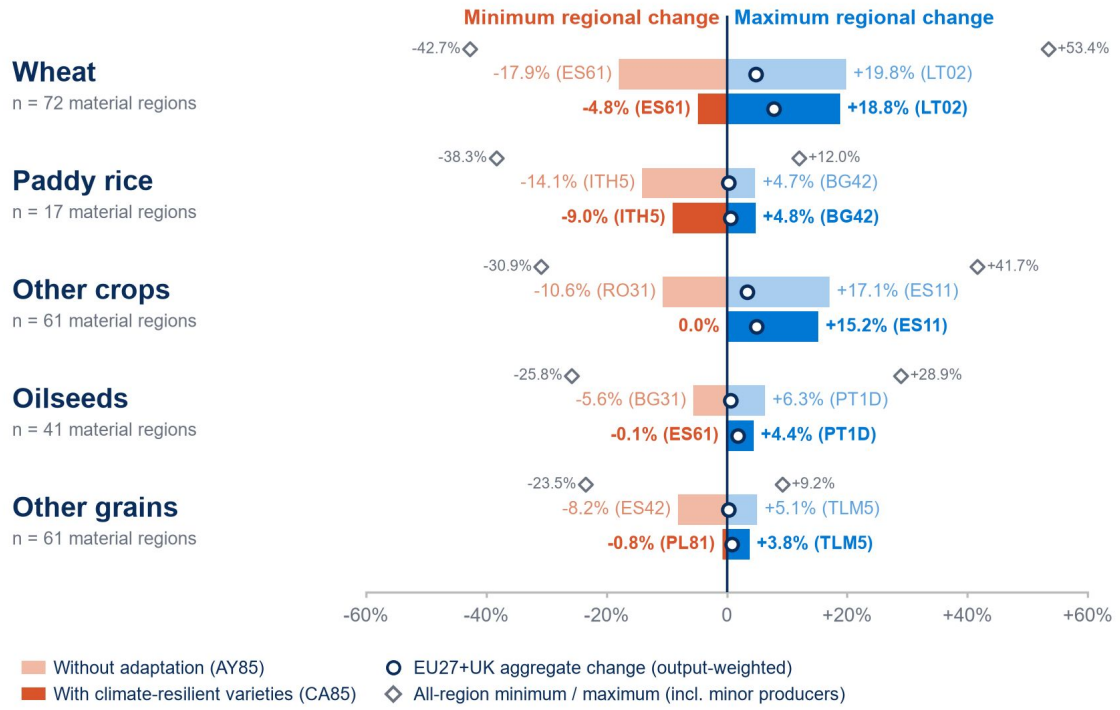
The modelling goal is not only to estimate losses, but to see where shocks relocate activity and where adaptation leaves residual risk.

1 Main trade partners are presented at country level and include: Argentina, Australia, Brazil, Canada, Switzerland, China, Indonesia, India, Japan, South Korea, Mexico, Norway, Russia, Saudi Arabia and South Africa

Lesson 3: modest aggregate losses can mask large regional divergence

leading for policy.

Under the high-emissions scenario, modest changes in aggregate European crop output mask substantial regional differences, with some regions experiencing considerable production losses



Regional variation in crop output under the high-emissions scenario (RCP8.5) in 2050, relative to the baseline. Bars show the largest output declines and increases among material producing regions, with and without climate-resilient crop varieties. Circles indicate output-weighted EU27+UK aggregate changes, while diamonds represent the full regional range, including minor producers.

Aggregate change is small. EU27+UK output changes are at or slightly above zero for the crop groups considered.

Regional change is not. the largest losses among material regions[1] reach −17.9% (wheat). Including minor producers, wheat ranges from −42.7% to +53.4%.

Adaptation measures can help offset those loses. Wheat −17.9% to −4.8% and other crops −10.6% to 0.0%.

Policy implication

Adaptation cannot be designed from national or European averages alone. Losses concentrate in southern and south-eastern producing regions, so it needs spatial targeting.

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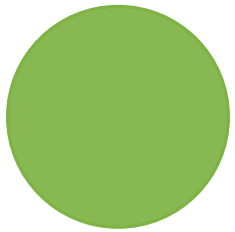
Lesson 4: adaptation reduces cost of damages, residual risk remains

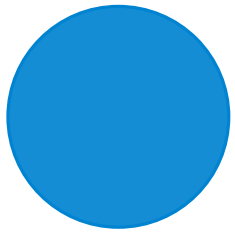
tion acts on a different part of the system.



Climate-resilient crop varieties

Reduce yield losses through farm management / cultivar adaptation.

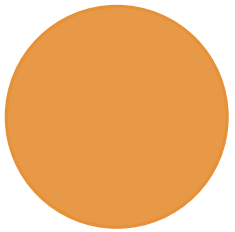
Crop-productivity channel



Irrigation expansion

Maximum use of equipped irrigation potential; changes land-water allocation.

Rainfed to irrigated production



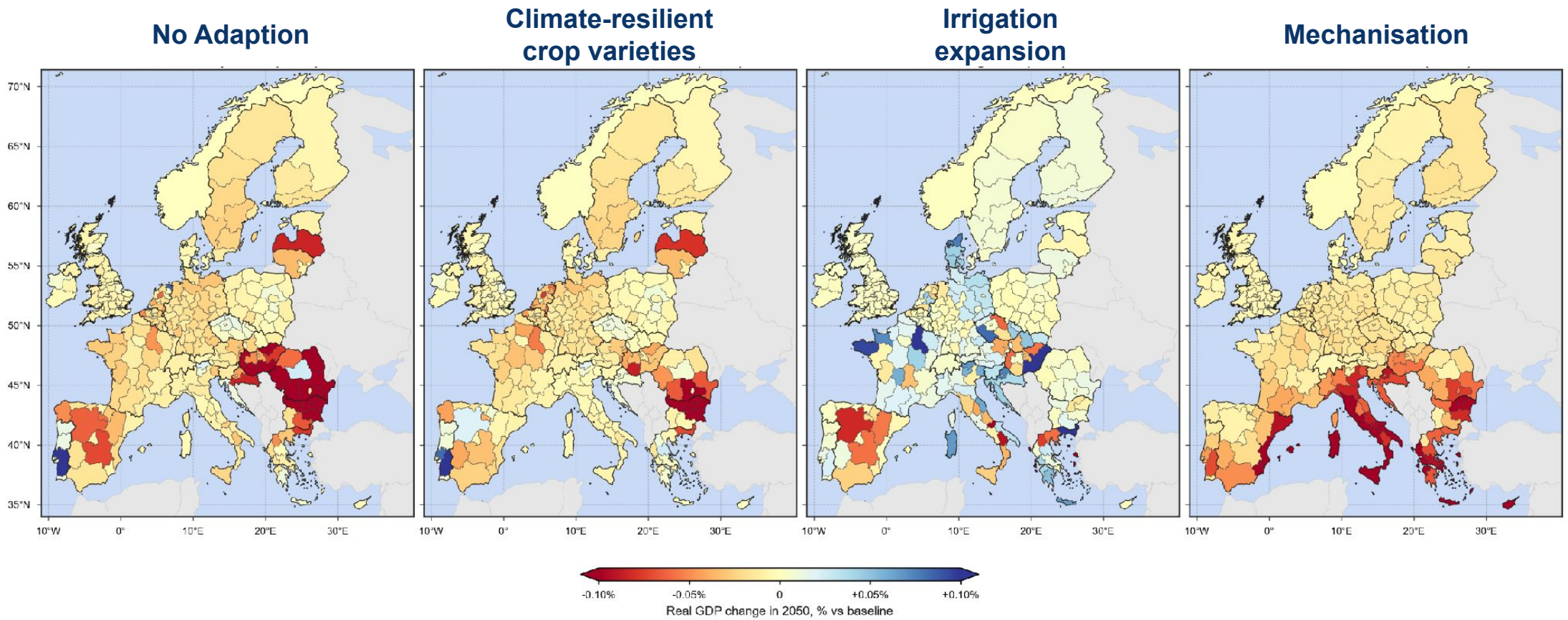
Mechanisation

30% increase in value-added substitution elasticity as a proxy for capital–labour flexibility under heat stress.

Heat-stress labour channel

Combined adaptation helps identify avoided damages and residual climate risk after multiple measures are applied simultaneously.

Lesson 4: adaptation reduces cost of damages, residual risk remains



Yield losses hit agriculture-dependent economies hardest: Romania, Bulgaria, Hungary, Latvia, central Spain

Climate resilient crop varieties offsets some losses. GDP persist via price and trade effects (similar hotspots but smaller)

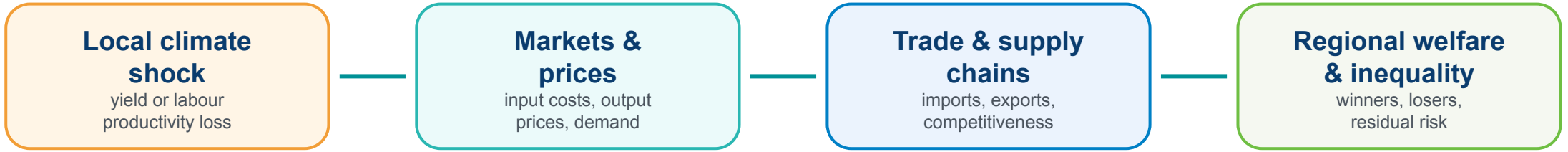
Gains where unused irrigation capacity raises output, including France, Hungary, Czechia, Greece; Central Spain still highly exposed

Heat stress on labour persists. Mechanisation only partly offsets it, so losses stay highest in hottest regions (Mediterranean region)

Lesson: adaptation is necessary, but it is not a substitute for mitigation or social protection.

Lesson 5: climate risks spill over through the economy

Local shocks can propagate through prices, trade, supply chains and welfare.

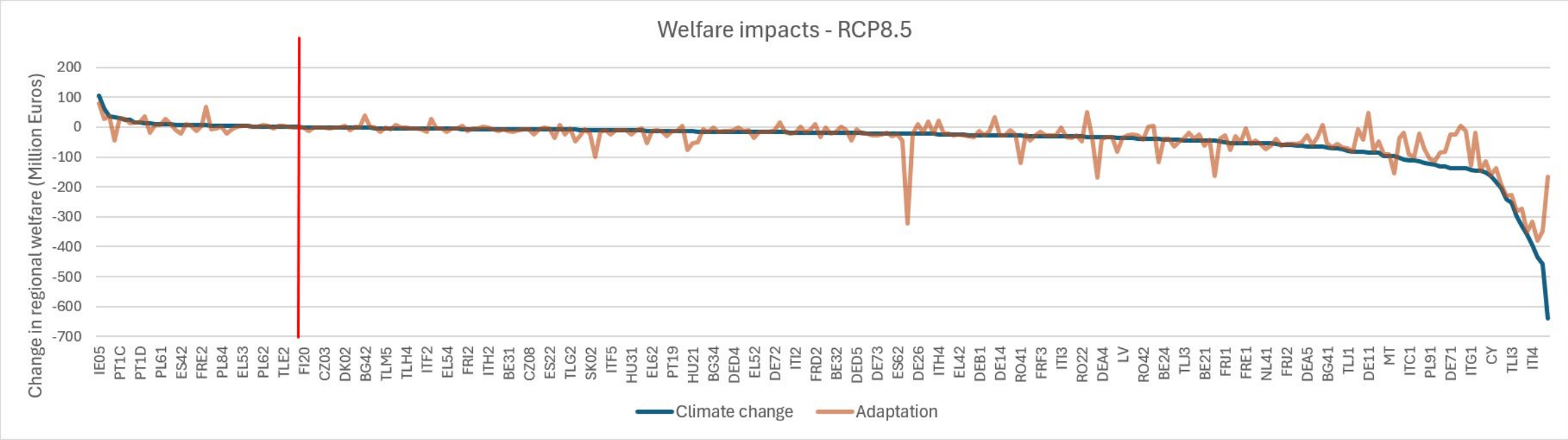


The relevant boundary is the economic system, not the location of the weather event.

What this means for adaptation policy

1. Do not assess adaptation only at the point of impact.
2. Trace price, trade and supply-chain channels.
3. Monitor who gains, who loses and what residual risk remains.

Lesson 5: climate risks spill over through the economy



- **Adaptation** mitigates some of the negative impacts of climate change.
- The individual **regional impact of adaptation** depends on the combination of direct and indirect impacts.

Policy takeaway: ask not only where the hazard occurs, but where its economic effects travel.

Lesson 6: risk changes the economics of timing (PAGE)

Accounting for environmental risk strengthens the case for earlier action.

Standard Ramsey intuition

$$SDR = \delta + \eta g$$

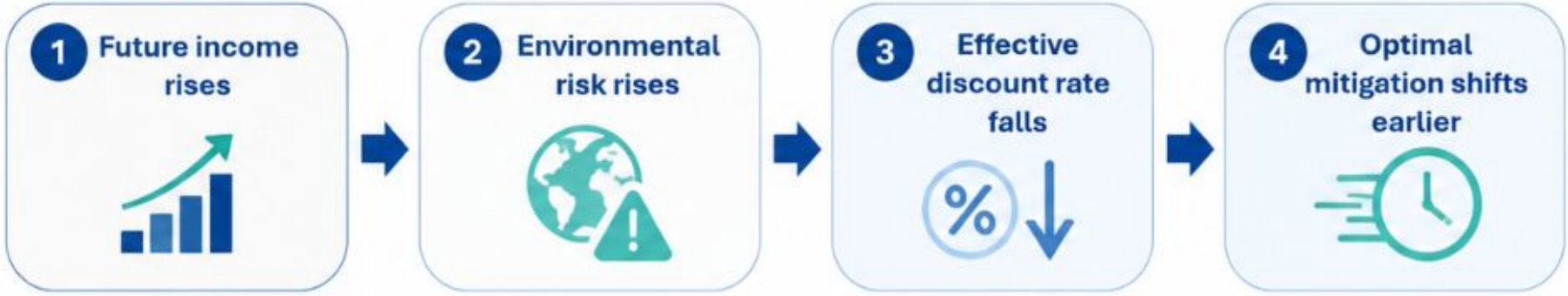
δ: pure time preference
η: elasticity of marginal utility of consumption
g: consumption growth

CROSSEU extension

discounting adjusts for growth in environmental risk per capital.

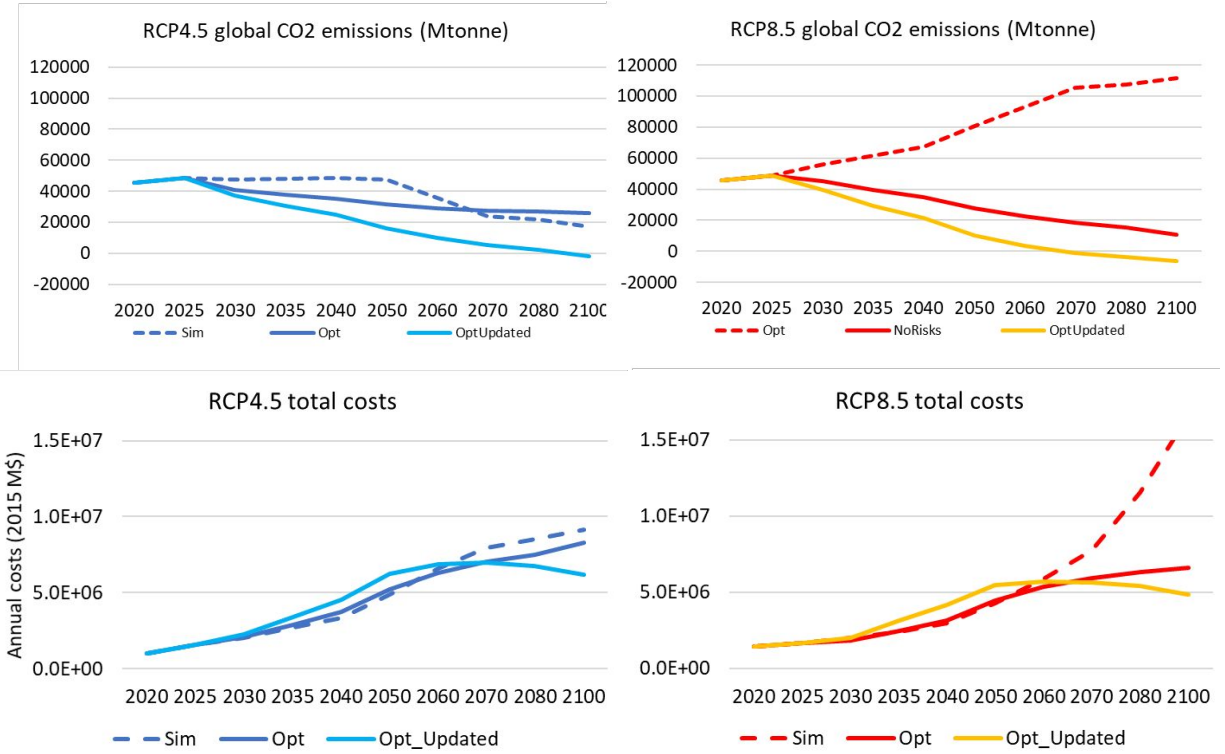
The elasticity of marginal utility of environmental risk exposure is estimated using the behavioural experiment of Xie, Liu and She (2014).

Future generations may be richer in consumption terms, but they may also face higher environmental risk; calibration should account for both.



Lesson 6: risk changes the economics of timing (PAGE)

Accounting for environmental risk strengthens the case for earlier action.



Standard discounting focuses on consumption growth. CROSSEU extends the logic to environmental risk exposure: future generations may be wealthier, but they also face higher climate risk.

When environmental risk is incorporated into the social discount rate, future damages receive more weight and earlier mitigation becomes more attractive.

Original SDR → **Risk-adjusted SDR** → **Earlier action**

Adaptation and mitigation are linked through risk: the less risk we reduce now, the more we transfer to future welfare.

Policy implications

Adaptation should be designed as economic resilience policy.

1 EWE are distributional shocks (not just aggregate output shocks)	RIF results show regressive effects, particularly for lower-income groups.
2 Economic structure & adaptive capacity determine who absorbs the losses	Agriculture, climate zone, institutions and financial depth condition the sign and magnitude of impacts.
3 CC reshapes economic geography & competitive advantage	Climate change reorganises comparative advantage, production costs and regional trade.
4 Adaptation reduces damages but leaves uneven residual risk	Irrigation, crop varieties and mechanisation leave uneven residual risk and sometimes trade-offs.
5 Climate risks spillover through prices, trade & supply chains	These spillover effects must be accounted for when designing regional/national adaptation policy frameworks.
6 Risk-aware welfare strengthens early action	PAGE extension makes future risk exposure a welfare-relevant discounting parameter.

Adaptation is most effective when it is treated as part of an integrated economic resilience strategy.

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UK participants in this project are co-funded by UK Research and Innovation (UKRI).

UK Research and Innovation

Scenario design: climate shocks and adaptation pathways

Scenario group	IDs	Model input / representation
Baseline	SSP2	Population and GDP to 2050; no additional climate impacts or adaptation
Agri-yield impacts	AY45 / AY85	Agricultural productivity shock from crop-yield impacts
Labour productivity	LP45 / LP85	Effective productivity shock from heat-related labour losses
Combined impacts	AL45 / AL85	Crop-yield + labour-productivity shocks
Adaptation	CA45 / CA85	Climate-resilient crop varieties reduce crop-yield losses
Adaptation	IA45 / IA85	Irrigated land expansion and land-use substitution
Adaptation	ME45 / ME85	Higher value-added substitution under heat stress
Adaptation	CO45 / CO85	Combined crop varieties + irrigation + mechanisation

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NUTS2 region codes

Code	Region	Country	Comment
FRJ1	Languedoc-Roussillon	France	Former region, now part of Occitanie
ITH4	Friuli-Venezia Giulia	Italy	North-eastern Italy
ITF6	Calabria	Italy	Southern Italy
ES62	Región de Murcia	Spain	South-eastern Spain
ITH1	Provincia Autonoma di Bolzano / Bozen, South Tyrol	Italy	Alpine north-east Italy
AT33	Tirol	Austria	Western Austria
PT11	Norte	Portugal	Northern Portugal
PT19	Centro	Portugal	Central Portugal
ITC2	Valle d'Aosta / Vallée d'Aoste	Italy	North-western Italy
FI1D	North and East Finland	Finland	Finnish NUTS2 macro-region

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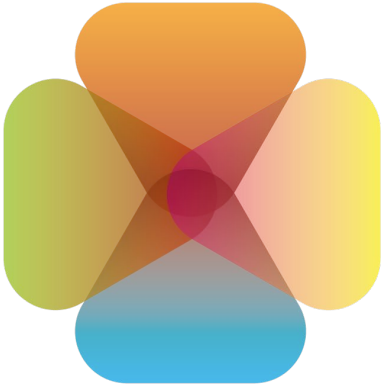


ACCREU
Assessing Climate Change Risk in EUrope

The macroeconomic dimension of climate change impacts in the EU regions and countries

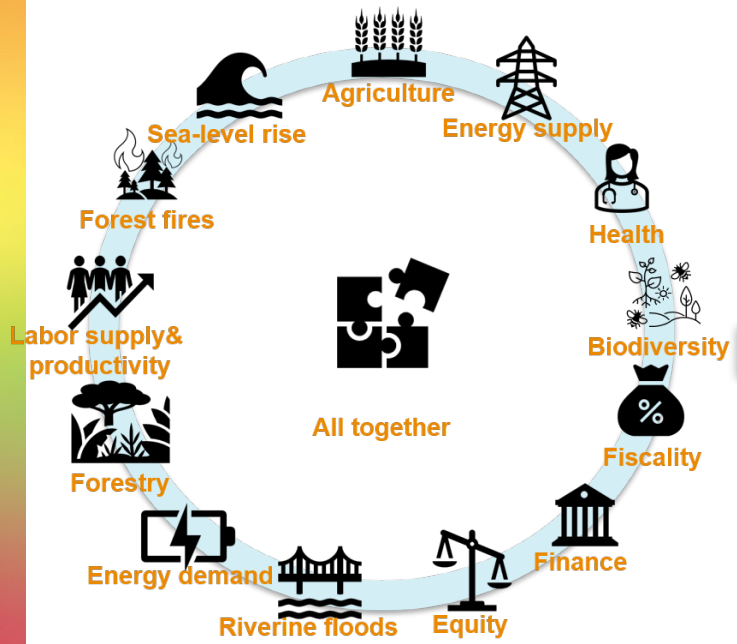
Francesco Bosello, Enrica De Cian
University of Venice and CMCC

The ACCREU-CROSSEU final event
Climate Risk Across Europe:
Knowledge,Tools and Path to Resilience

Brussels, Nov. 13th, 2026

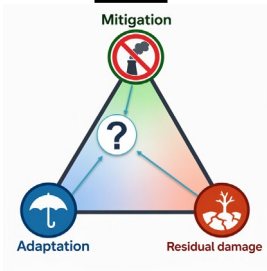
ACCREU macroeconomic scope

ACCREU «Impact focus»

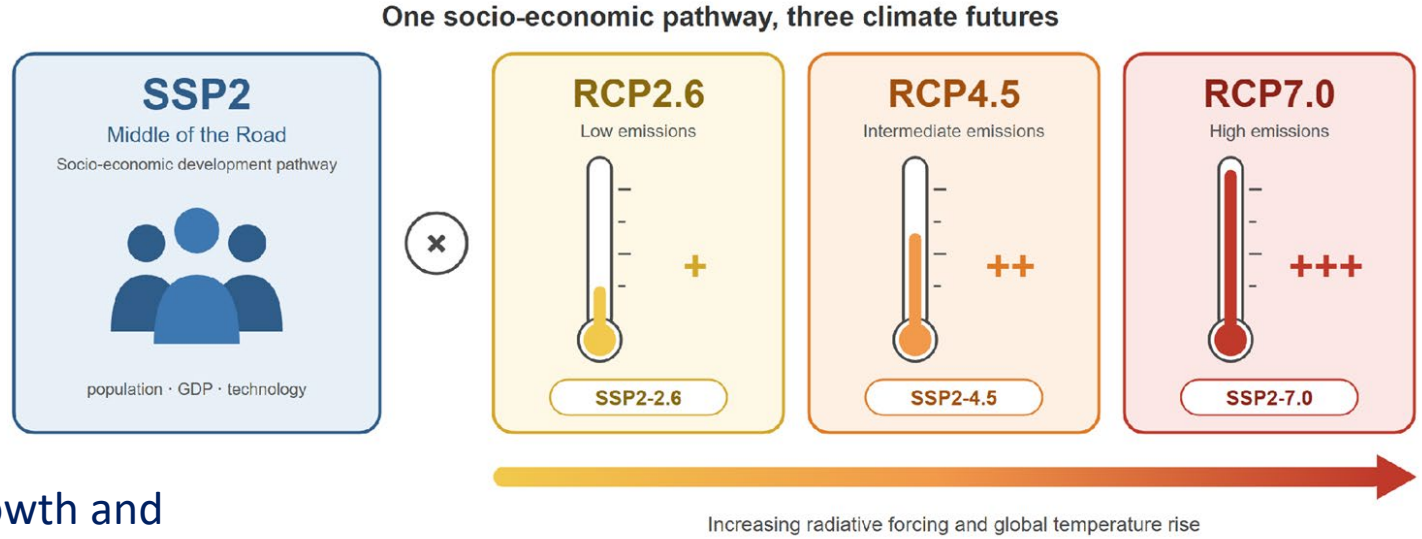


Macroeconomic models

All produce information on GDP and growth, that will be presented, but the different models have been used with different focuses

1 Nuts-2 (regional) CGE model for the EU	Regional macroec. impacts 
2 country-level CGE models	Macroeconomics of adaptation 
1 CGE multi-household model for the EU	Equity 
3 global integrated assessment models	Policy optimization 

The scenario framework



Growth and technological trends follow historical patterns

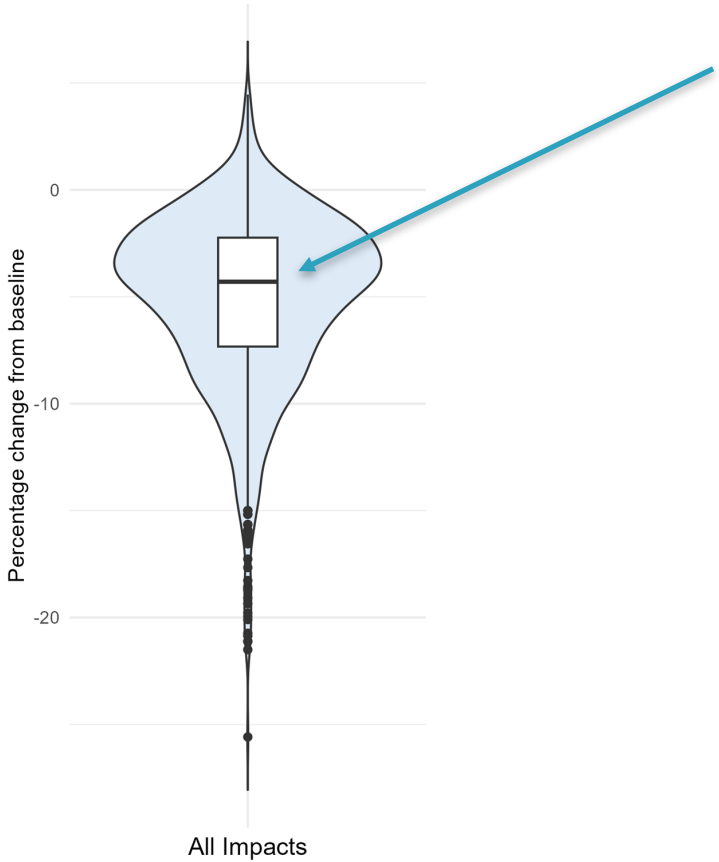
Below 2°C respect to pre-industrial level

Roughly 2.7°C respect to pre-industrial level

Roughly 3.6°C respect to pre-industrial level

Important: Results that follow are shown for adaptation frozen at today's level!

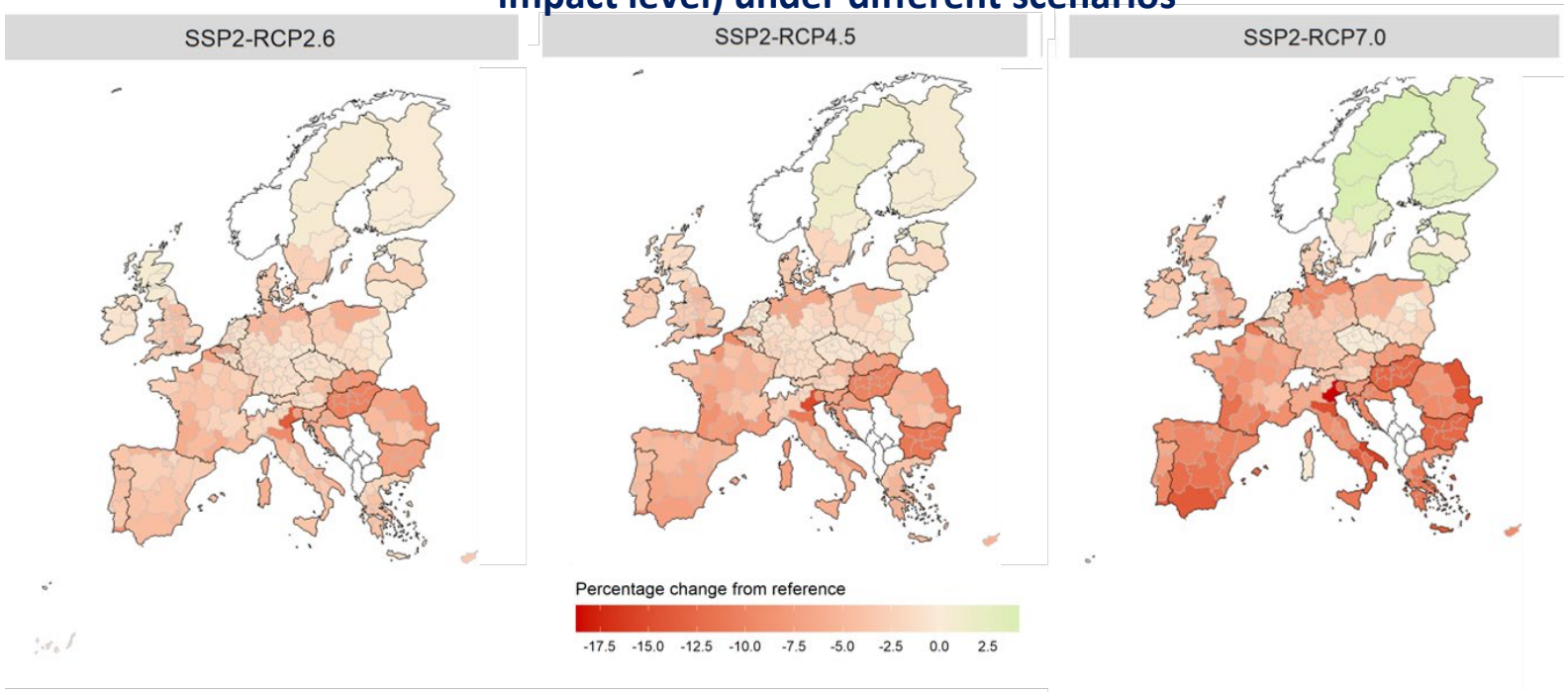
Putting all together… in 2070



The median GDP loss across all scenarios (all regions) is 4.3 % wrt the current climate.

The regional picture… in 2070

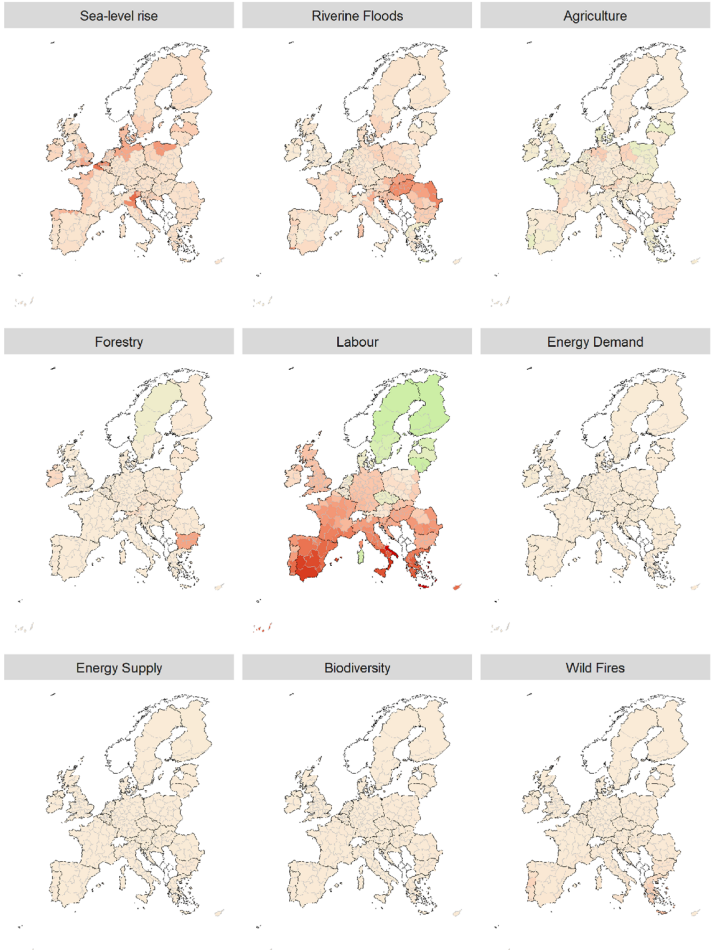
Climate change impacts on EU NUTS2 region per-capita GDP in 2070 (medium impact level) under different scenarios



Large economic losses are projected in RCP7.0 by 2070 especially for areas in the MED and Central-Eastern EU

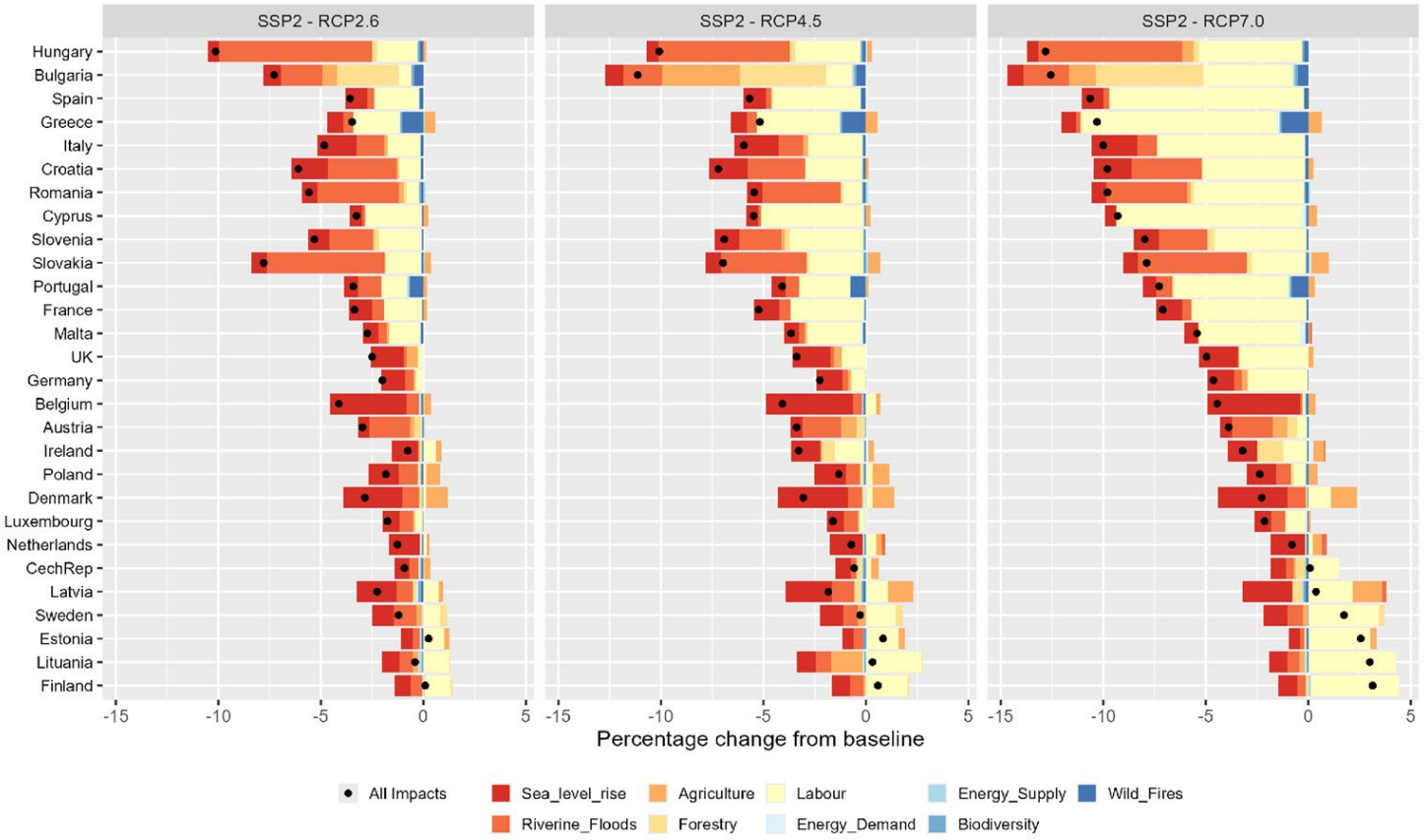
Impact decomposition

Climate change impacts on NUTS2 region per capita GDP per impact driver in 2070 (medium level impact, SSP2-RCP7.0 scenario)

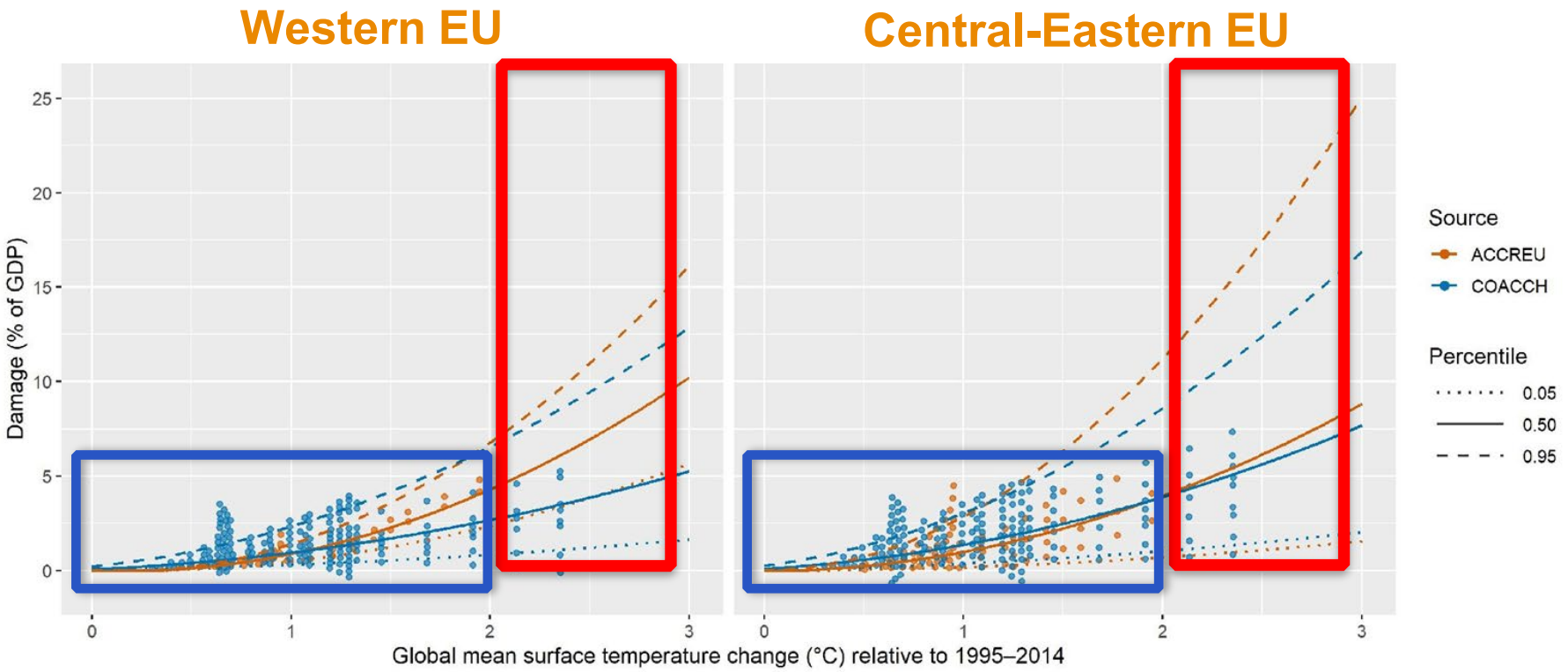


GDP losses are dominated by impacts on the labor force, riverine floods and sea-level rise

The country picture… GDPs in 2070



Considerations on the relation between temperature and GDP loss



On the one hand good consistency, on the other hand, huge uncertainty for temperature increases >2°C => additional cautiousness and important INSURANCE role of MITIGATION

Conclusions

Macroeconomic implications of climate change (recall the «no adaptation premise») are large especially for the Mediterranean and Central-Eastern EU.

The most important drivers for economic losses are impacts on the labor force and on infrastructure and operations from sea-level rise and riverine floods.

Impacts on the labor force need more scrutiny...

All uncertainty considered, the «aggregated picture» for the EU remains robust. Furthermore, potential for huge losses is highlighted beyond 2°C temperature increases (compared this time with the reference 1995-2014 period). A mix of mitigation and adaptation is required (see next presentations!)

Thanks!

PARTNERS

ACCREU research is conducted by a consortium of 14 leading EU research institutions:

- Euro-Mediterranean Center on Climate Change (CMCC) **Coordinator**
- BC3 Basque Centre for Climate Change (BC3)
- Ca' Foscari University of Venice
- Climate Analytics
- Deltares
- Ecologic Institute
- Global Climate Forum (GFC)
- IIASA
- Paul Watkiss Associates (PWA)
- Postdam Institute for Climate Research (PIK)
- Stichting VU
- Technical University of Denmark (DTU)
- University of Graz
- Utrecht University

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ACCREU
Assessing Climate Change Risk in EUrope

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CROSSEU FINAL CONFERENCE

Climate Policy Response and Targeted Recommendations

From cross-sectoral evidence to implementable instruments for mitigation, adaptation and European investment planning

Alice Ludvig
BOKU University, Vienna — Work Package 4, Deliverable 4.9

HOW WE GOT HERE

From five analyses to one integrated climate-policy response

T4.1 —Policy frameworks
EU and national mitigation & adaptation policies (D4.2)

T4.2 —Sectoral responses
Climate impacts and policy responses in the hotspots (D4.4)

T4.3 —Social consequences
Inequality, vulnerability and safeguards (D4.6)

T4.4 —Economic instruments
Finance and investment policies (D4.8)

plus modelling results from WP1 & WP2 · stakeholder analysis from WP5 · Decision-Support System from WP3

T4.5 —Synthesis (D4.9): targeted policy instruments for the twelve CROSSEU sectors, hazard storylines and European investment planning

12 sectors **8** case studies **5** hazard groups **42** expert interviews

Source: CROSSEU WP4 deliverables D4.2, D4.4, D4.6, D4.8, D4.9 (internal project reports).

KEY FINDING 1 · SECTORAL ANALYSIS (D4.4)

Climate strategies are in place —delivery is not

> **“The gap is implementation, not ambition.”**

Across the nine hotspots studied, regions hold extensive strategies and plans —but budgets, mandates, staff and coordination to deliver them are frequently missing.

Unclear responsibilities —fragmented mandates across sectors and governance levels

Limited capacity —shortage of staff, skills and technical expertise

Unstable funding —ad-hoc project money instead of multiannual budgets

Knowledge not usable —climate information poorly translated into decisions

Weak monitoring —no systematic review of outcomes and adjustment

Source: CROSSEU D4.4 —case-study analysis, 42 expert interviews in 9 climate-change hotspots (internal project report).

KEY FINDING 1 · SECTORAL ANALYSIS (D4.4)

Each hazard calls for a coordinated instrument package

HEAT & HEALTH

- Funded heat-health action plans
- Warning-to-action protocols
- Targeted outreach to isolated and older people
- Overheating safeguards in renovation finance

DROUGHT & WATER

- Metered abstraction permits and restrictions
- Retention, soil management and restoration
- Advisory services for farms
- Irrigation grants conditional on water availability

SNOW & MOUNTAIN

- Updated avalanche hazard zoning
- Monitoring and warning services
- Local avalanche commissions maintained
- Diversification of snow-dependent tourism

Regulation, planning, finance, climate services and participation work only as a package —no single instrument is sufficient. Source: CROSSEU D4.4 / D4.9 (internal project reports).

KEY FINDING 2 · ECONOMIC INSTRUMENTS (D4.8)

Economic instruments fund recovery better than they prevent risk

Recovery grants and compensation —essential after droughts, storms and floods —but they restore rather than reduce future risk

Insurance gaps persist —avalanche and flood coverage limited, unaffordable or incomplete

Credit-based finance excludes —renovation loans miss households that cannot borrow

Public financial institutions deliver —EIB/ EBRD infrastructure gains —but need water governance, flexibility and demand-side measures alongside

SHIFT THE BALANCE

- Predictable multiannual prevention windows
- Recovery finance tied to resilient reconstruction
- Grants where repayment capacity is missing
- Loans and guarantees where returns are feasible

Source: CROSSEU D4.8 —evaluation of economic, financial and investment instruments across the eight case studies (internal project report).

KEY FINDING 3 · SOCIAL CONSEQUENCES (D4.6)

Well-designed climate policy can still exclude the vulnerable

Two faces of vulnerability

Vulnerability to hazards

heat, drought, floods and snow hit some groups far harder than others

Vulnerability created by policy

upfront costs, ownership rules and paperwork can exclude those least able to act

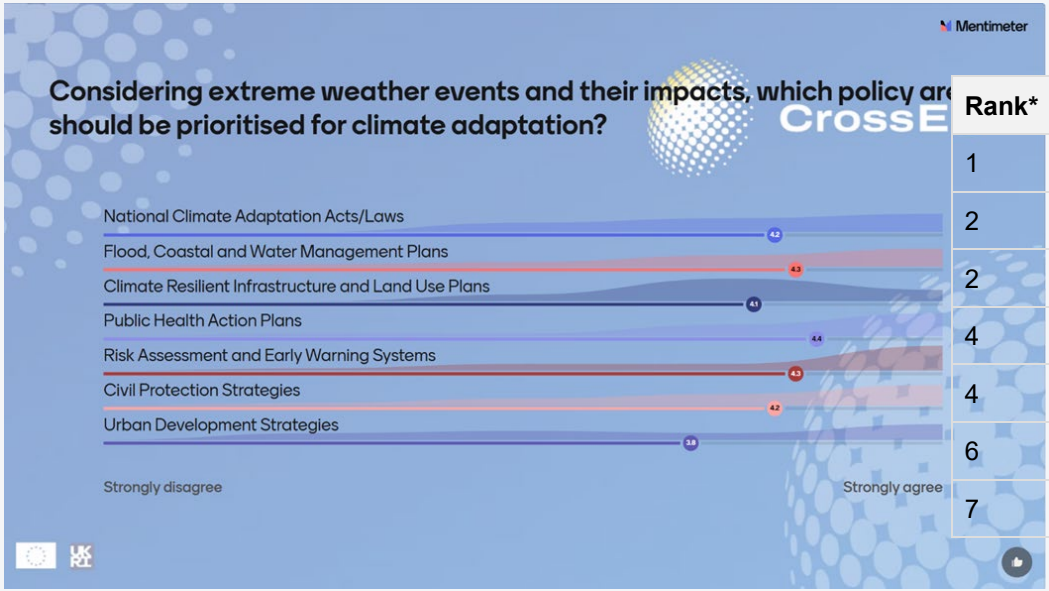
A renovation subsidy helps only those who can pre-finance works; a heat warning reaches only those who can act on it.

Safeguards built into D4.9 packages

- Affordability and distributional assessment before approval
- Targeted grants and pre-financing for low-income households
- Simple, assisted application routes for small actors
- Gender- and intersectionality-aware monitoring
- Participation and accessible complaints procedures

Source: CROSSEU D4.6 —analysis of social aspects and consequences of climate-change-related policies (internal project report).

Stakeholders put health, water and early warning first



Adaptation ranking

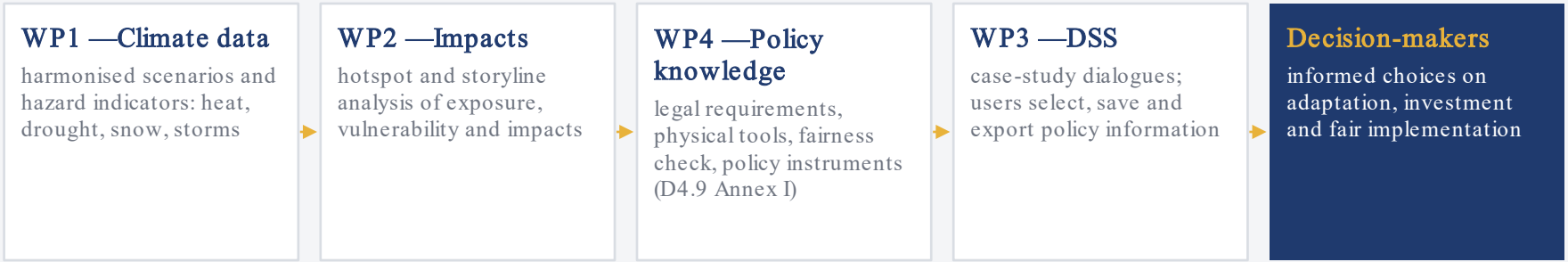
Rank*	Adaptation policy area	Displayed s
1	Public Health Action Plans	4.4
2	Flood, Coastal and Water Management Plans	4.3
2	Risk Assessment and Early Warning Systems	4.3
4	National Climate Adaptation Acts/Laws	4.2
4	Civil Protection Strategies	4.2
6	Climate Resilient Infrastructure and Land Use Plans	4.1
7	Urban Development Strategies	3.8

Scores are aggregate stakeholder priorities, not effectiveness ratings —they guide emphasis, not budget shares.

Source: CROSSEU stakeholder workshop, 29 September 2026 (Mentimeter consensus ranking, aggregate displayed scores).

LINKING WPS 1–3 TO THE POLICY RESPONSE

Climate data and the DSS connect risk evidence to policy options



Two-way exchange: WP4 supplies structured policy information to the DSS; DSS development and user feedback sharpened how D4.9 presents recommendations —targeted instruments with defined users, safeguards and maintenance responsibilities, not generic advice.

Climate models inform the need for action; they do not choose the instrument —governance, cost and fairness evidence does.

Source: CROSSEU D1.2/D1.6 (WP1), D3.3 (WP3), D4.9 Annex I (internal project reports).

Eight priorities structure the targeted recommendations

1. Strengthen multi-hazard and cross-sectoral planning
2. Prioritise prevention and long-term resilience
3. Align mitigation and adaptation investments
4. Make climate finance accessible
5. Apply social safeguards throughout implementation
6. Combine ecosystem restoration with resilient infrastructure
7. Strengthen climate services and co-production
8. Monitor outcomes and adjust instruments

Every recommendation has an owner, a financing route and indicators

Priority	Responsible actors	Financing	Safeguards & indicators
Heat-health protection	Health ministries, municipalities, social care	Multiannual public budgets	Outreach to isolated groups; heat-mortality and warning-response times
Water & agriculture	Basin authorities, agri ministries, farms	CAP eco-schemes + national grants	Abstraction monitored; support by farm size
Resilient recovery	Civil protection, insurers, compensation bodies	Pooled funds, prevention-linked insurance	Affordable cover; rebuilt-not-restored share

Actor assignments and financing routes are proposals for validation —not confirmed institutional commitments.

Source: CROSSEU D4.9 —implementation framework (internal project report).

European investment planning needs three financing categories

1

Socially targeted support

Grants, pre-financing and compensation for households, farms and municipalities without repayment capacity —protects participation and fairness.

2

Investment-enabling finance

Concessional loans and guarantees where returns are feasible — renovation, heating, efficiency, adaptation-ready infrastructure.

3

Public-good & prevention investment

Shared protection, ecosystem restoration, monitoring and early warning —public budgets, because benefits are collective.

Financing must also cover project preparation, technical assistance, maintenance and evaluation —the functions that let smaller actors actually use the money.

CONCLUSIONS

From ambitious targets to implementable action

Integrate

climate risks cross sectors and levels —so must the policy response

Deliver

close the implementation gap with funded mandates, capacity and review

Protect

build equity in from the start; safeguards make policy effective and legitimate

Learn

monitor outcomes, not expenditure —and adjust as risks change

D4.9 offers a validated framework to move from strategic commitments to funded, fair and monitored delivery across the CROSSEU sectors.

Source: CROSSEU D4.9 synthesis (internal project report).

Thank you

Deliverable 4.9 —Climate policy response: targeted policy instruments and European investment planning

Available via the CROSSEU project library

contact@crosseu.eu

crosseu.eu

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ACCREU
Assessing Climate Change Risk in EUrope

CrossEU

THE ACCREU AND CROSSEU FINAL EVENT

CLIMATE RISK ACROSS EUROPE: KNOWLEDGE, TOOLS AND PATHWAYS TO RESILIENCE

Brussels and online, 13 November 2026

Organised by:

cmcc Centro Euro-Mediterraneo sui Cambiamenti Climatici

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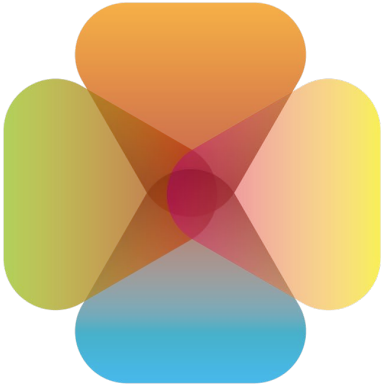


ACCREU
Assessing Climate Change Risk in EUrope

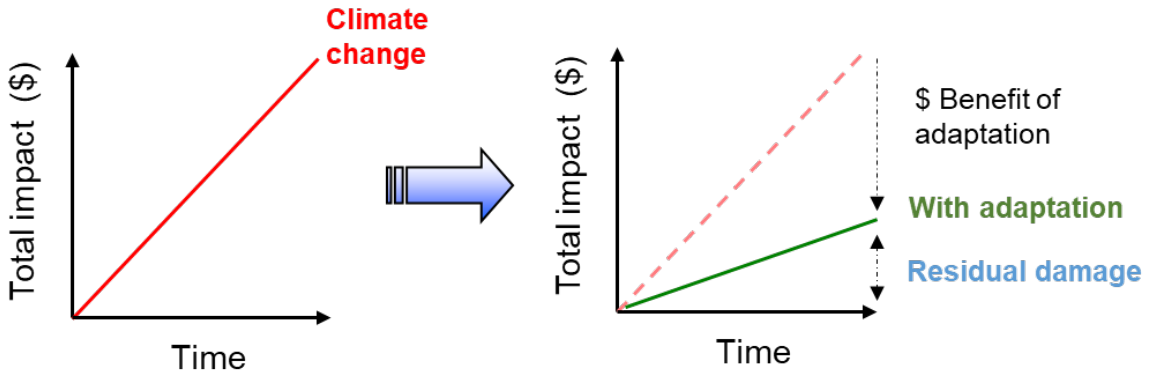
Findings on adaptation economics in the ACCREU project

Anoek van Tilburg- Deltares
Paul Watkiss – PWA

Brussels, November 2026

Adaptation economics

- Adaptation reduces the rising economic costs of climate change
- But there are nearly always residual damage after adaptation, and so a trade-off between benefits, costs and residual impact
- In policy, different objectives (decision paradigms) for adaptation will balance these differently, e.g. economic optimal versus acceptable risk strategies
- These influence costs and benefits, but also prioritisation and who benefits



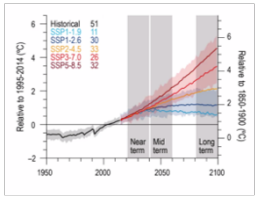
There are different ways to assess adaptation

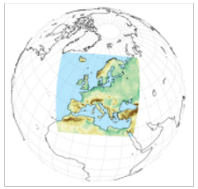
Science first - impacts

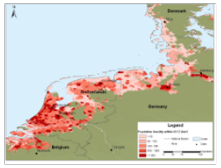
What are the economic costs of climate change in Europe in 2050 and 2100, under different warming scenarios?

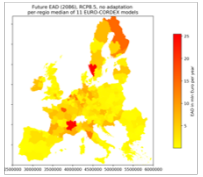
Science first - adaptation

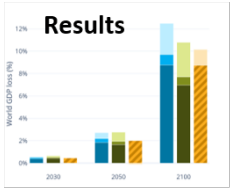
What are the modelled costs and benefits of adaptation in 2050 and 2100, for each of these warming scenarios?











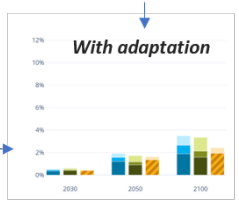
RCPs (scenario) → Climate model → Socio-econ. (Exp., Vul.) → Impact model → Economic model

Run for each scenario [with different models]

Results for each scenario [with different models]

Modelled adaptation (technical options)

Reduced impact
Additional cost



Policy first – adaptation

What are the costs and benefits of adaptation for the next national adaptation plan?

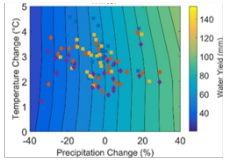
What are the costs to climate proof a new infrastructure project being built today?

Objectives → Assess risk → Options → Decision support → Implement

Structure policy question and objective



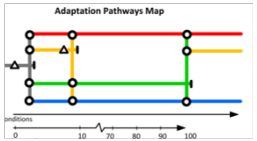
Assess current risks and future risks with uncertainty



Identify all options and develop strategies

A1: Policy instruments
A2: Management and planning
A3: Coordination,
B1: Financing instruments
B2: Insurance and risk sharing
C1: Grey options
C2: Technological options
D1: Green options
D2: Blue options
E1: Information and awareness raising
E2: Capacity building,

Assess options and strategy (including costs and benefits)



Design, finance, implement, monitor

Adaptation Economics in ACCREU

ACCREU has undertaken science-first and policy first analysis of adaptation

- ACCREU ran a number of sector models using harmonised and consistent approach to look at future climate change and adaptation (WP2)
- The sector model results were fed into two economic models to assess the economic impacts and benefits of adaptation in Europe (WP4)
    - This also included analysis of the fiscal benefits of adaptation
- The sector results were used to produce functions for for three integrated assessment models to look at impacts, mitigation and adaptation globally (WP4)
- This was complemented with adaptation case studies (WP3), to provide bottom-up and policy-first insights on economic decision-making, for key European actions

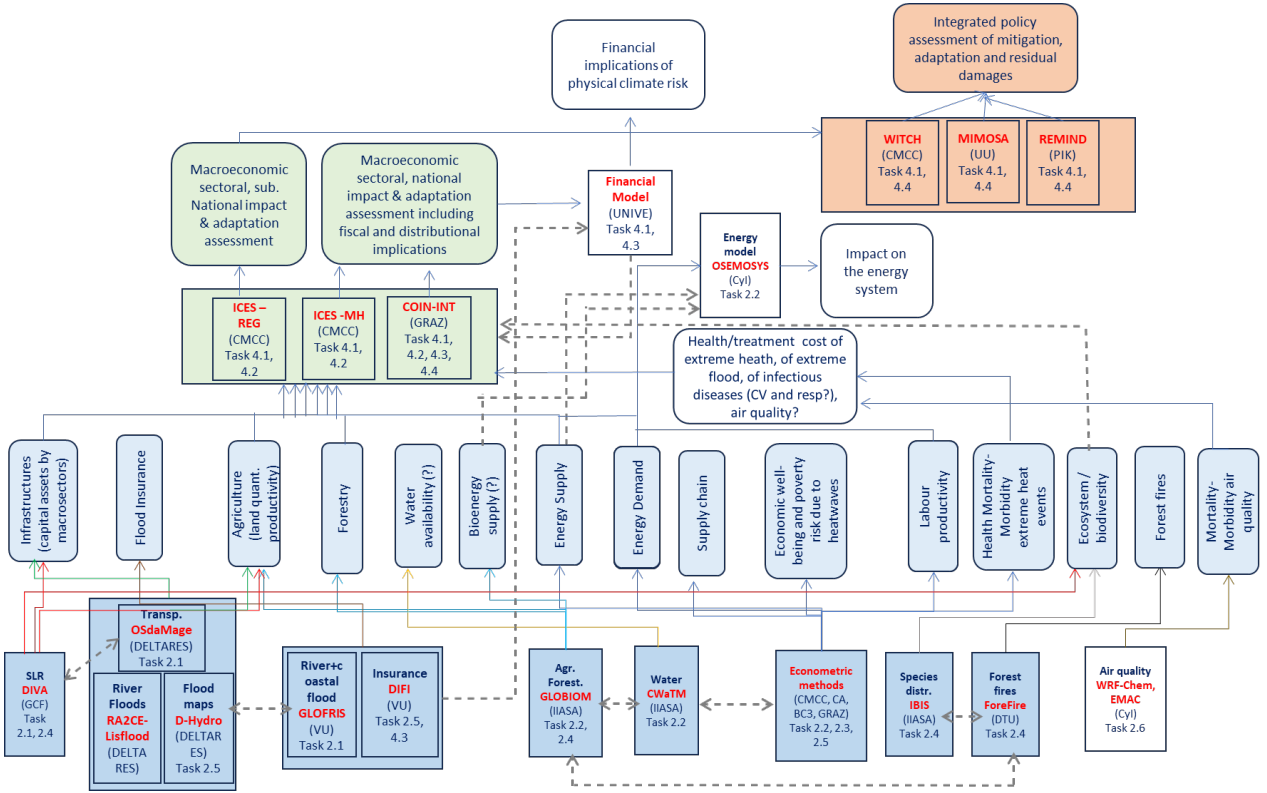
Modelling of adaptation in ACCREU

3 Global Integrated assessment models
-functions from sectors

2 European macro-economic CGE models
-use sector outputs

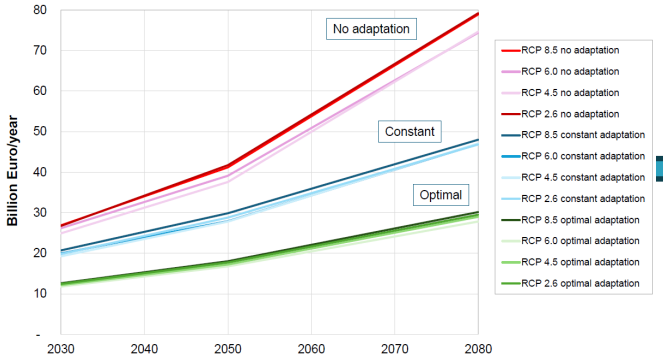
Sector models
-directly assess adaptation

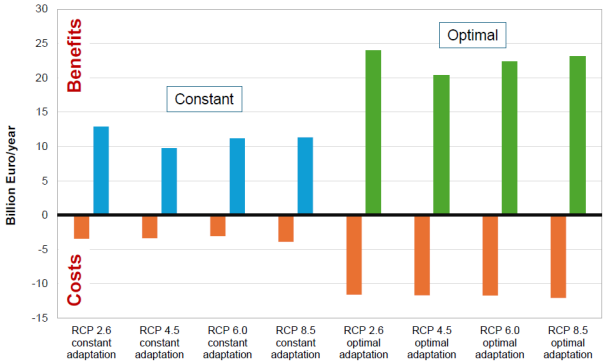
Integrated modelling analysis at multiple scales



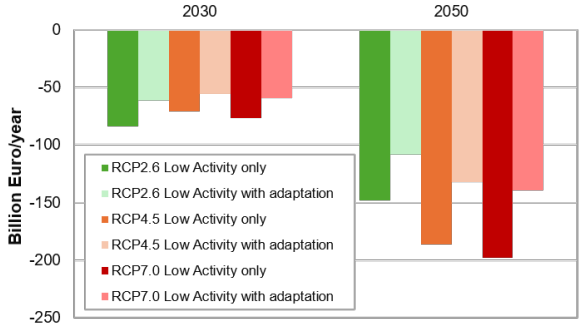
Sectoral adaptation modelling

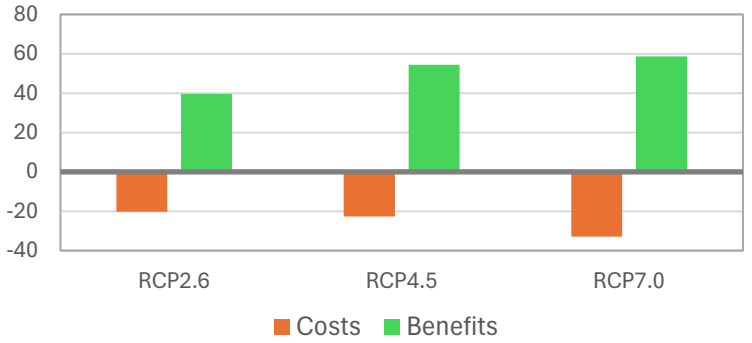
- ACCREU assessed adaptation in a suite of sectoral models – using science-first analysis
- These shows adaptation can significantly reduce impacts and positive benefit to cost ratios





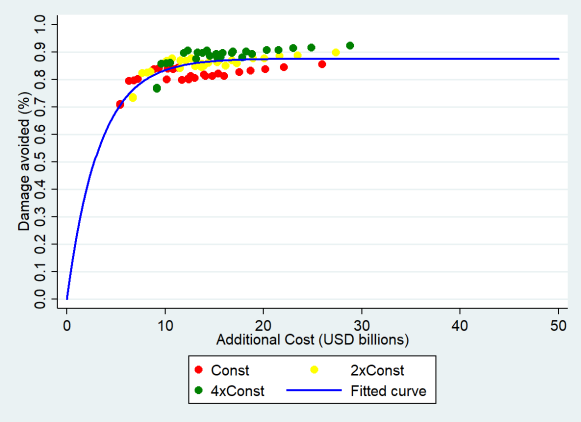
In 2050

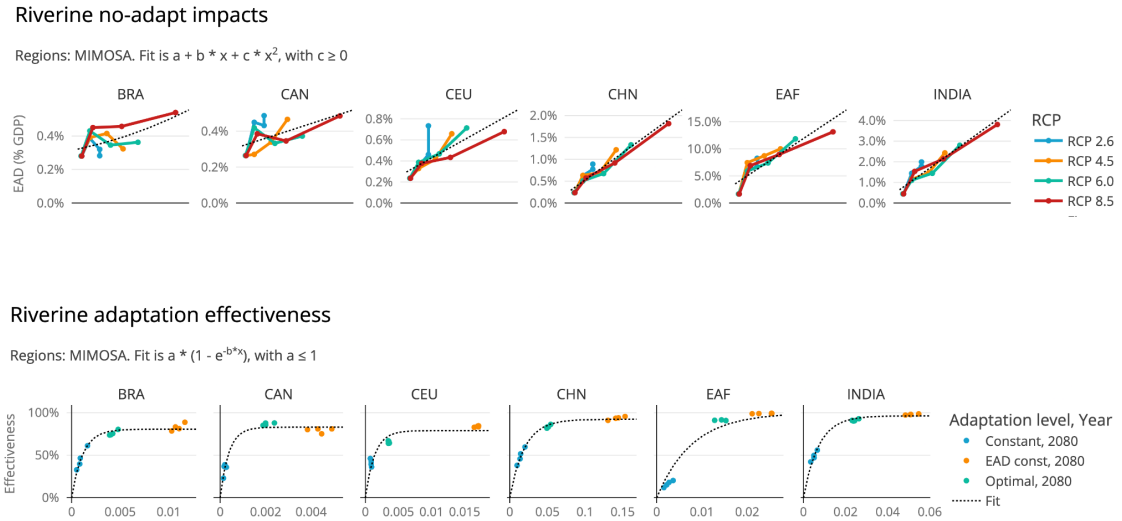




Adaptation functions for IAMs

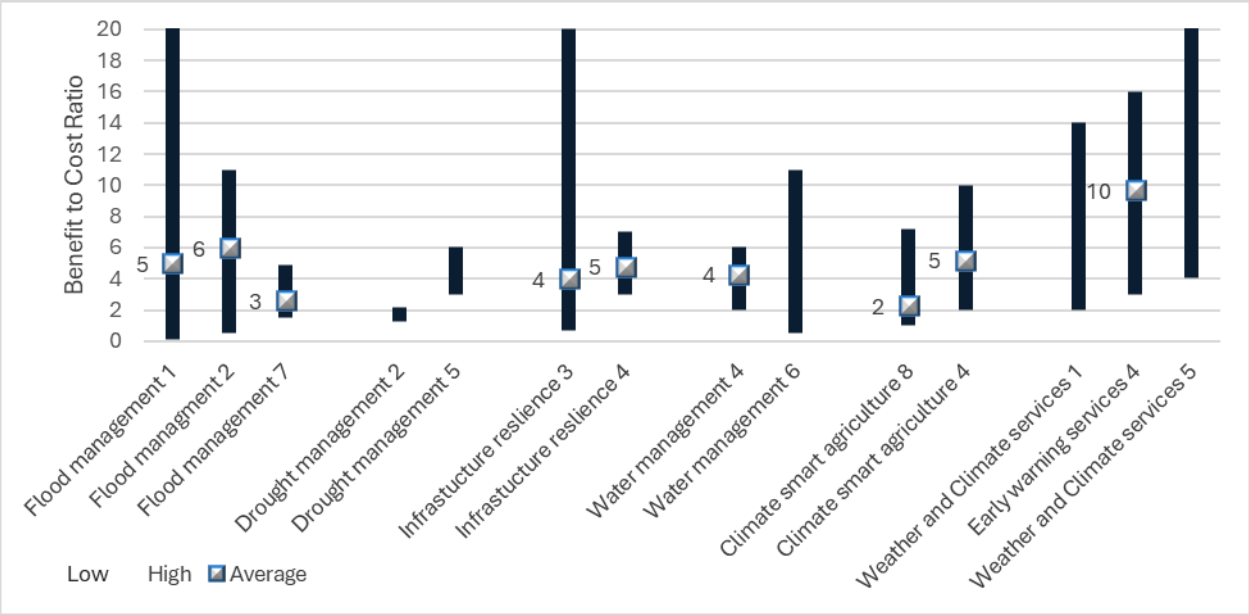
- ACCREU has taken these sectoral results and used to derive functional relationships between benefits and costs
- Generate functions disaggregated at country level, for IAMs





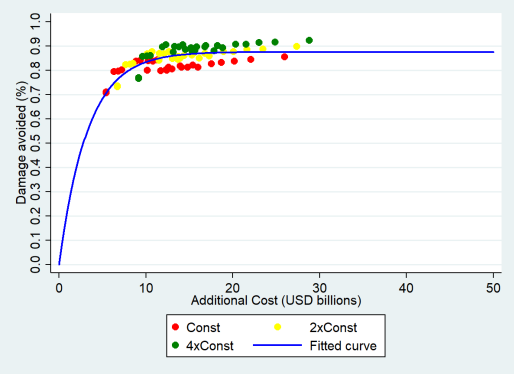
Review of the evidence for adaptation economics

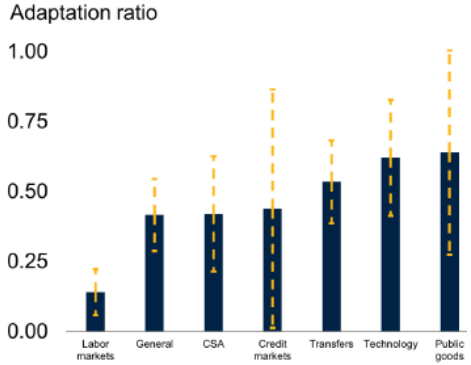
- Complemented with bottom-up literature review of adaptation options
- Adaptation generally has high economic returns (4:1) but site- and context-specific
- But financial returns are lower – highlighting will still be challenging to deliver

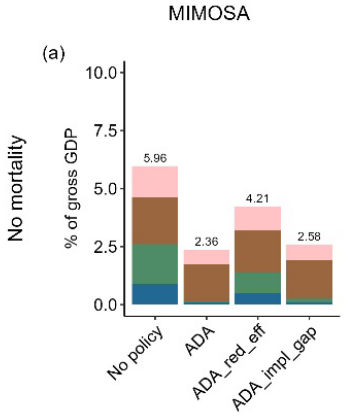


Insights

- Comparing science-first and policy-first analysis leads to different conclusions
- Science-first models show very effective adaptation – this leads to very low adaptation costs and generates high economic benefits
- Bottom-up and policy-first studies show lower effectiveness and limits to adaptation
- For this reason, we introduced some constraints in modelling – significantly affects results

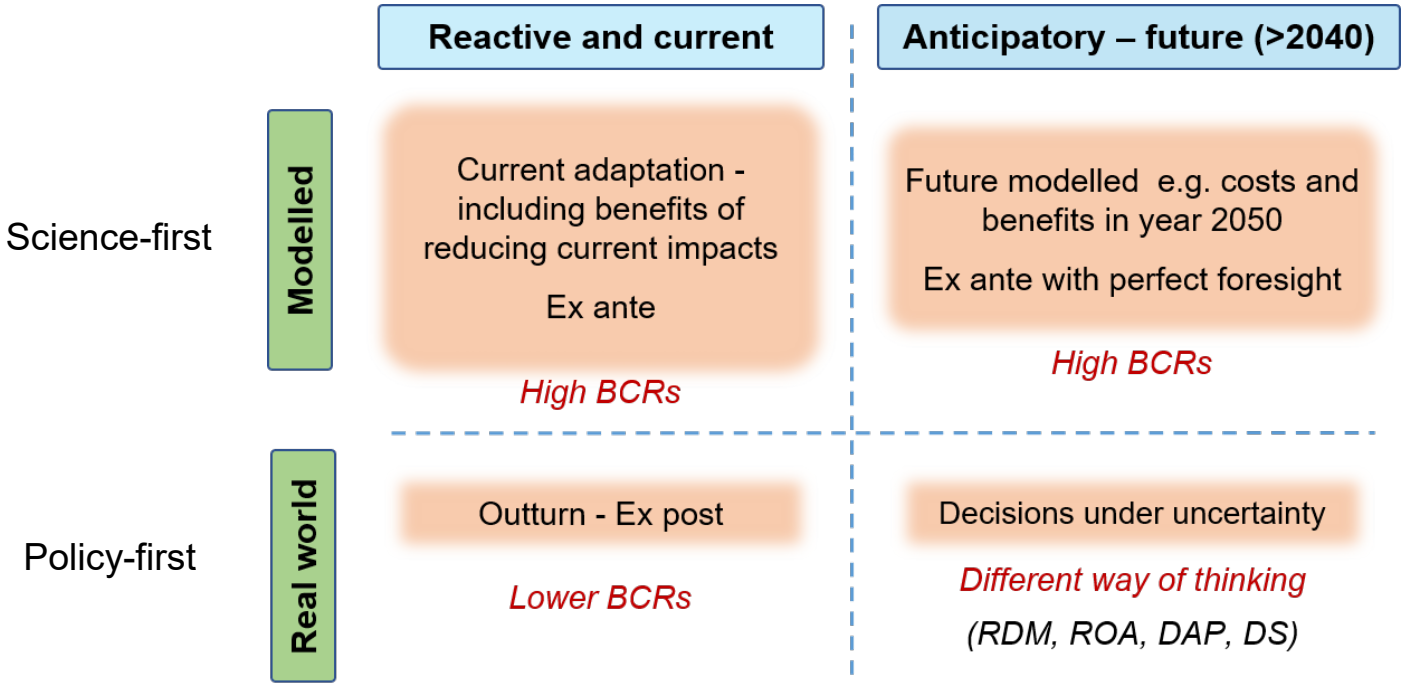






Insights – lessons for future analysis

- Careful when looking at the economic returns of adaptation
- We identify four evidence lines, which give different results

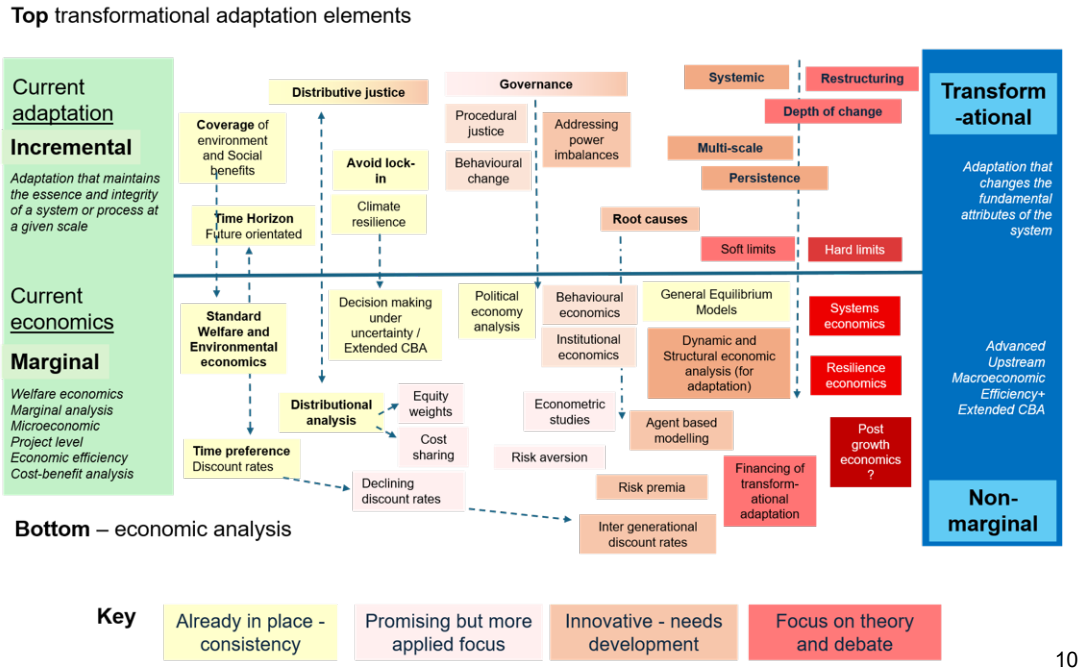


Transformational adaptation

- ACCREU held a reflexive workshop to investigate the new topic of the **economics of transformational adaptation**
- Day of discussion and debate – to produce a research agenda for this topic

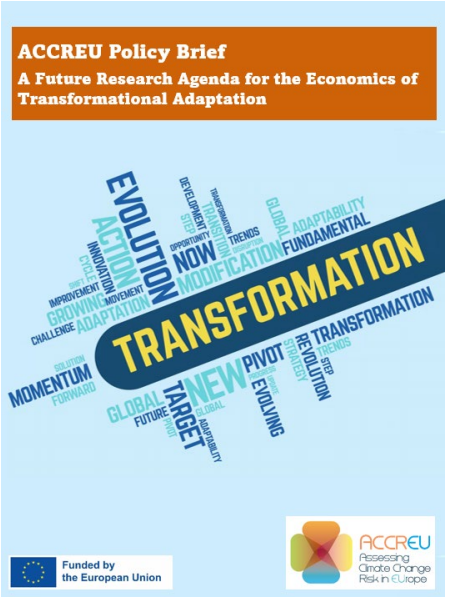
Key findings

- Need to move beyond CBA
- Will involve multiple economic disciplines
- Might be a role for radical transformational adaptation implemented incrementally



Research agenda

- Defining the use of economics in transformational adaptation, as well as the economics of societal change.
- Improving the evidence on the economics of transformational adaptation and assessing what works.
- Understanding how preferences inform the attractiveness of transformational adaptation.
- Improving microeconomic tools and methods.
- Developing macroeconomic tools and methods.
- Advancing political economy, institutional and behavioural economics.
- Analysing the financing of transformational adaptation and the role of private sector.
- Opening a discussion on the economics of adaptation to catastrophic climate change.



https://www.accreu.eu/policy-briefs/

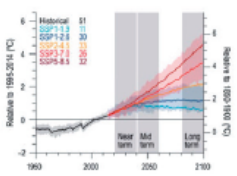
Policy-first approach to complement modelling

Science first - impacts

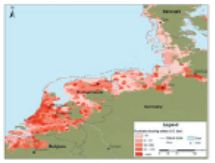
What are the economic costs of climate change in Europe in 2050 and 2100, under different warming scenarios?

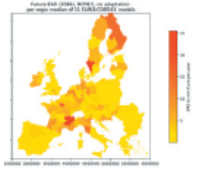
Science first - adaptation

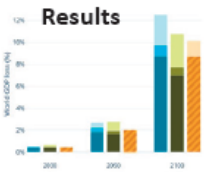
What are the modelled costs and benefits of adaptation in 2050 and 2100, for each of these warming scenarios?









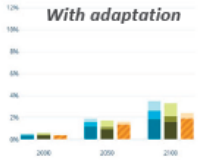


RCPs (scenario) → Climate model → Socio-econ. (Exp., Vul.) → Impact model → Economic model

Run for each scenario [with different models]

Results for each scenario [with different models]

Modelled adaptation (technical options) → Reduced impact / Additional cost



Policy first – adaptation

What are the costs and benefits of adaptation for the next national adaptation plan?

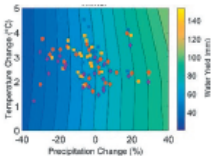
What are the costs to climate proof a new infrastructure project being built today?

Objectives → Assess risk → Options → Decision support → Implement

Structure policy question and objective



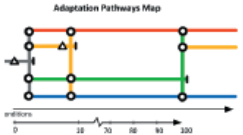
Assess current risks and future risks with uncertainty



Identify all options and develop strategies

A1: Policy instruments
A2: Management and planning
A3: Coordination,
B1: Financing instruments
B2: Insurance and risk sharing
C1: Grey options
C2: Technological options
D1: Green options
D2: Blue options
E1: Information and awareness raising
E2: Capacity building.

Assess options and strategy (including costs and benefits)

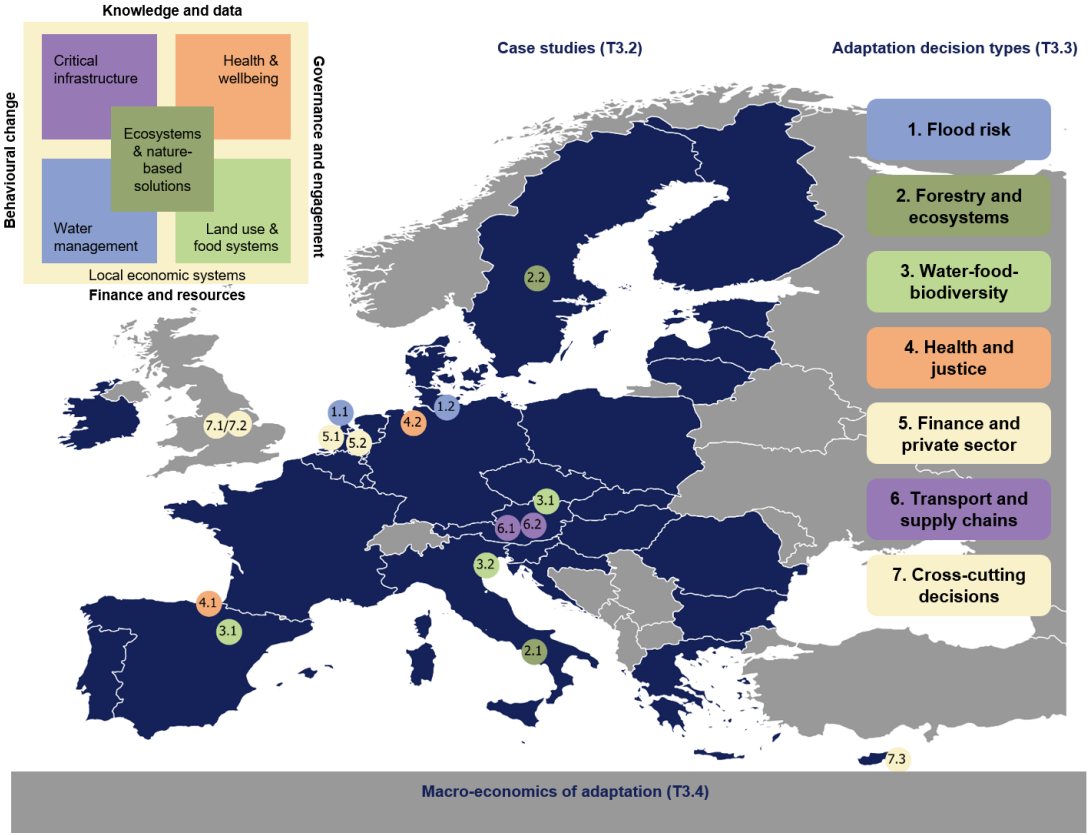


Design, finance, implement, monitor

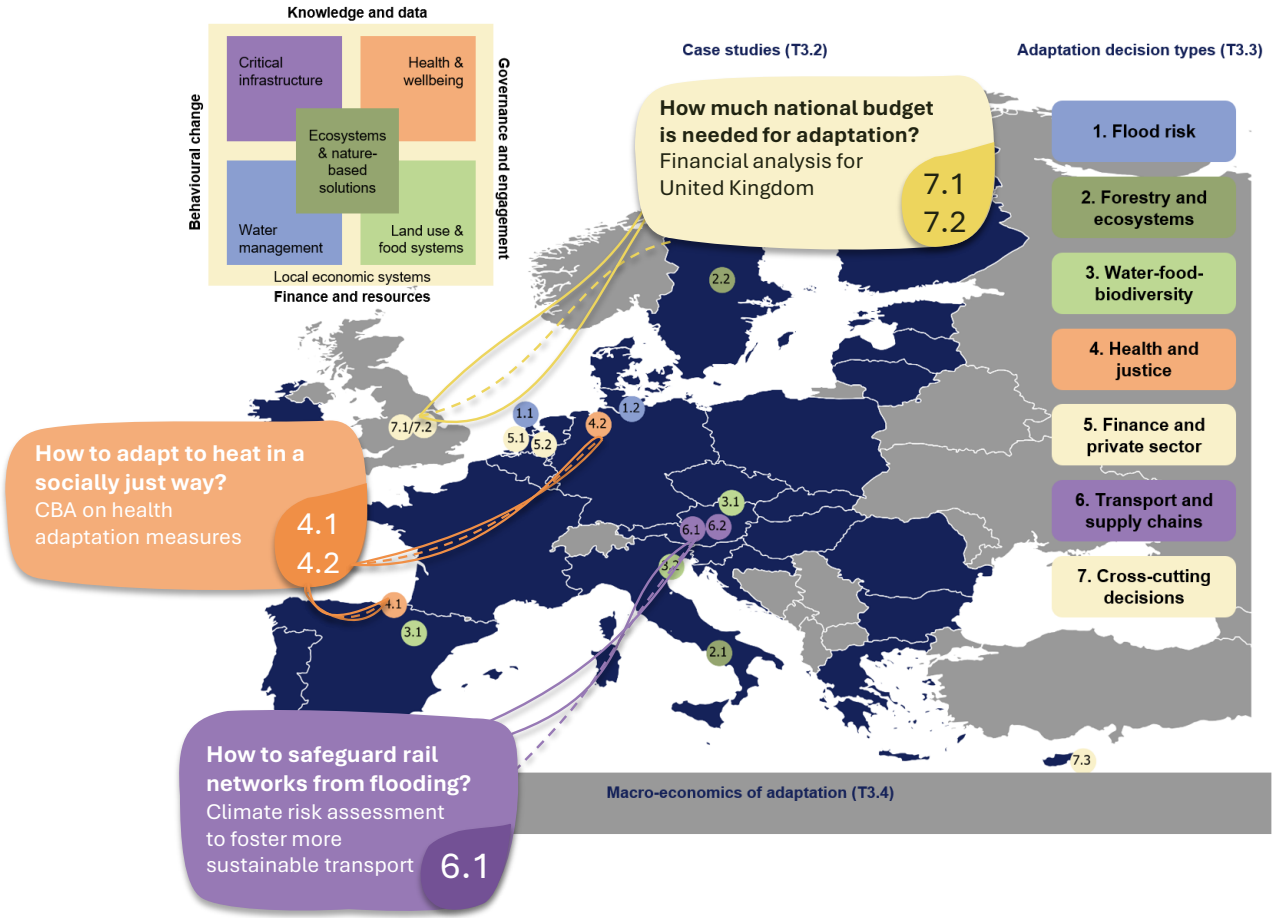
Economic appraisal of adaptation options in case studies

Case studies

- Learning through policy-first approach: **co-creation with local, regional and national stakeholders**
- **15 EU case studies**, across **seven hazards/themes,** aligning with mission on adaptation



Examples of policy questions in case studies



Case studies: Key findings

01 **Narrow vs broad appraisal matters for outcomes**

02 **Need for comprehensiveness dependent on type of measures under evaluation**

03 **Appraisal focus can help prioritize and broaden the scope of measures considered**

Illustrative cases: why narrow vs broad appraisal matters

Heat adaptation in Basque Country



Result:
Consideration of non-economic benefits (i.e. mortality reduction) result in highly positive benefit-cost ratios

Housing & coastal protection combined in Den Helder, the Netherlands



Result:
Consideration of lock-in and long-term effects can change the ranking of the adaptation options

Illustrative case: why comprehensiveness relates to types of adaptation measure – green vs grey measures

Lesson learnt:
Consideration of social and ecological effects, even qualitatively, matters for building case for adaptation

Case study:
How to conserve the dune system in context of sea-level rise?



Results
Economic benefits of dune protection and management are relatively small (does not protect a lot of assets), but social and ecological benefits (e.g. biodiversity) more considerable.

	Summary scorecard
Costs	+
Economic benefits	0
Ecological benefits	+++
Social benefits	++

Illustrative case: why comprehensiveness relates to types of adaptation measure: incremental vs transformative adaptation

Lesson learnt:
Comprehensive appraisal can make transformative options more attractive

Case study:
Wildfire risk reduction in Sorrento (Italy) and Leksand (Sweden)



Photo by Oskars Sylwan on Unsplash

Sorrento (Italy)

- Drones perform well as adaptation option also with a narrow appraisal
- Wildfire resilience also requires other, more transformative, adaptation options. This requires more comprehensive appraisals (co-benefits and ecological risk reduction).

Leksand (Sweden)

- More transformative options like fire breaks and fire-resistant species also do well with a narrow appraisal.
- Consideration of co-benefits would further strengthen the case for these measures

Illustrative case: appraisal broadening the scope of measures considered & helping prioritization

Case study Bremen:
(Ex post) analysis of the Bremen heat adaptation plan on the social justice aspects

Lesson learnt:
Considering social justice broadens the palette of adaptation options

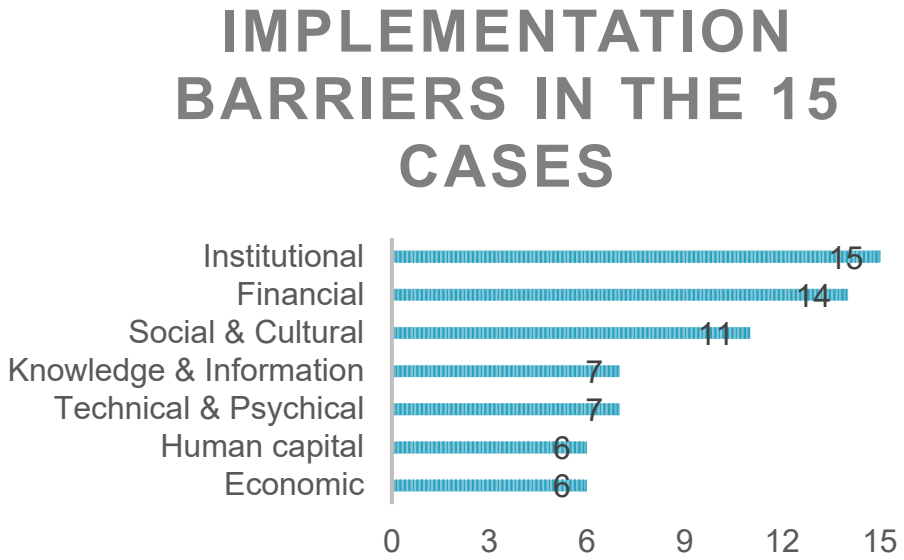
Types of targeted measures included:
- Training people working with vulnerable people
- Heat protection in school playgrounds
- Protection measures for unhoused and substance-using citizens
- Support for pediatric facilities



Adaptation barriers and enablers across the 15 cases

Institutional and financial barriers are the most prevalent constraints on adaptation implementation

Recommendations:
Clear responsibilities, long-term funding, stakeholder engagement were consistently identified as critical success factors, alongside comprehensive economic appraisals





ACCREU Report: economic appraisal in 15 climate adaptation case studies

10-12-2025 - News

In a recent ACCREU deliverable, we report on the results of 15 co-produced climate adaptation case studies from across Europe....



CrossEU

Social Dimensions and Equity Associated with Climate Risks and Adaptation Options

Kirsten Halsnæs DTU Denmark, Sorin Cheval National Meteorological Administration Romania

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

UK participants in this project are co-funded by UK Research and Innovation (UKRI).

UK Research and Innovation

Climate Hazards are Happening

- EU has experienced several climate hazards. Economic losses in the past 4 years has been around 50 bill. EUR annually.
- Investments in climate resilience are estimated to be around 70 bill. EUR per year. Returns of 2-10 times in terms of avoided damages
- Examples of hazards with high damages in 2026:
  - Heatwaves
  - Drought in agriculture
  - Wildfires
  - Electricity shortage
  - Flooding
- People in vulnerable situations, regions and communities are affected disproportionately. Fairness is requested



Source: EU resilience strategy 2026

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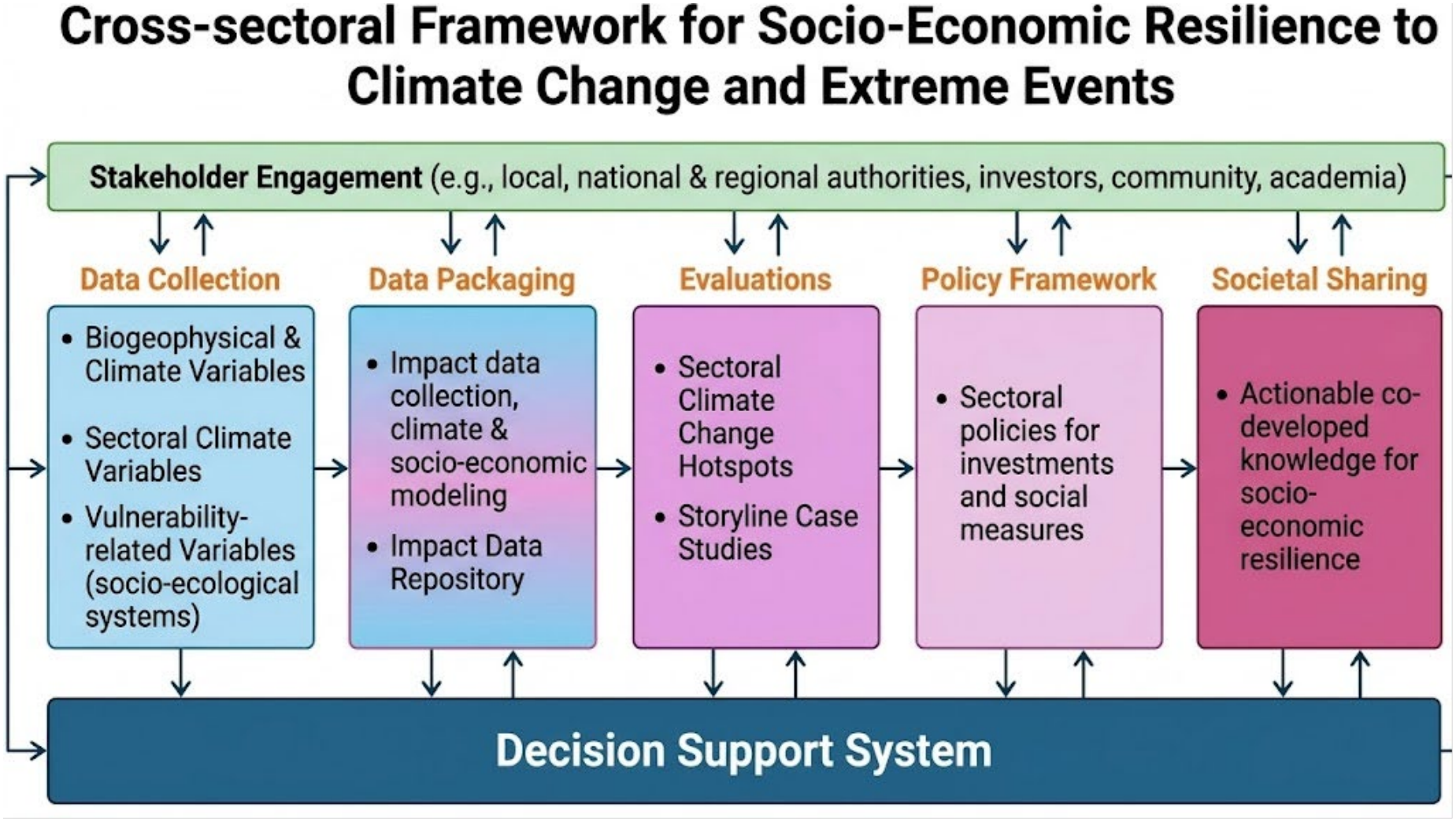
The CROSSEU Project



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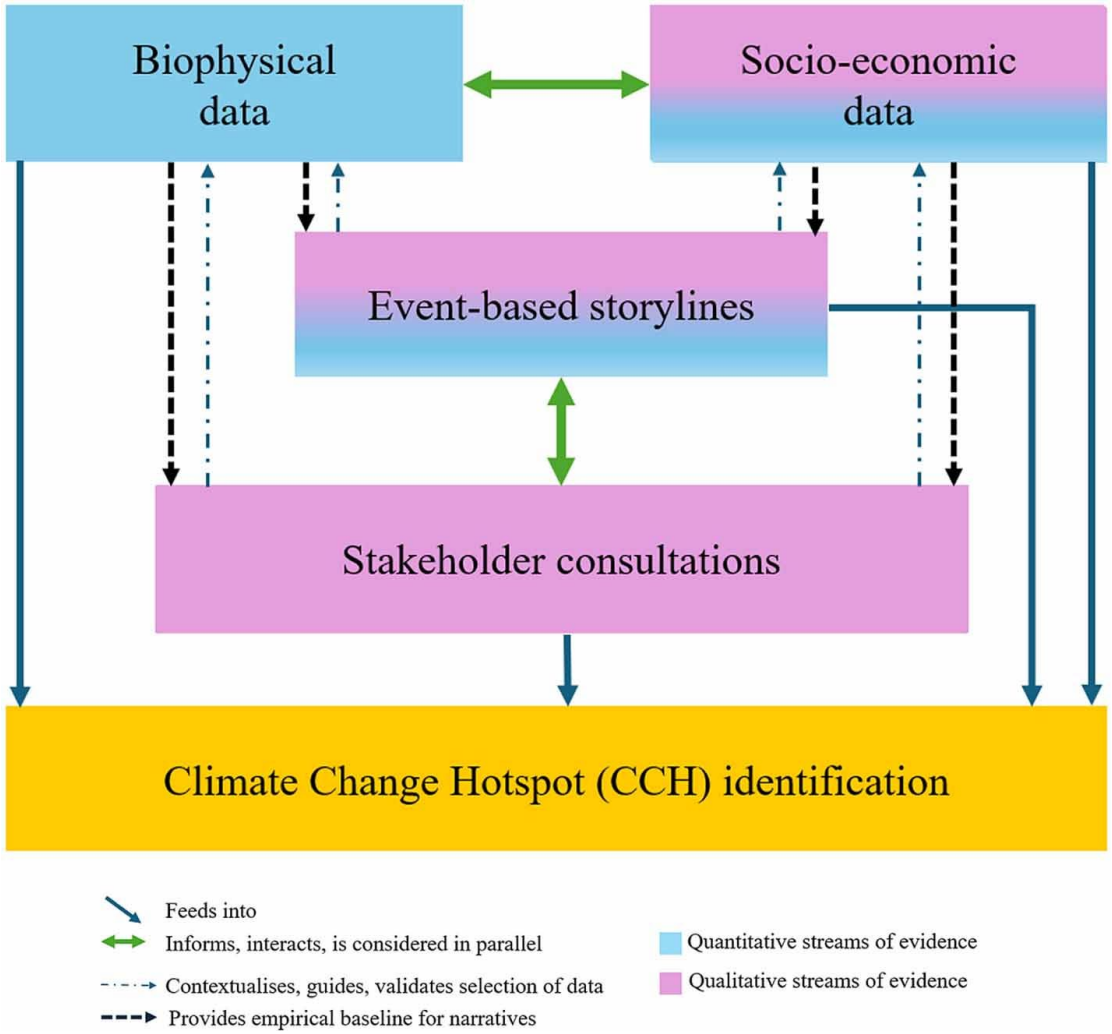
Bottom up Hotspot Identification



Source: Some et al. 2026

CrossEU

CS1 - #HEAT - CZU

Study focus

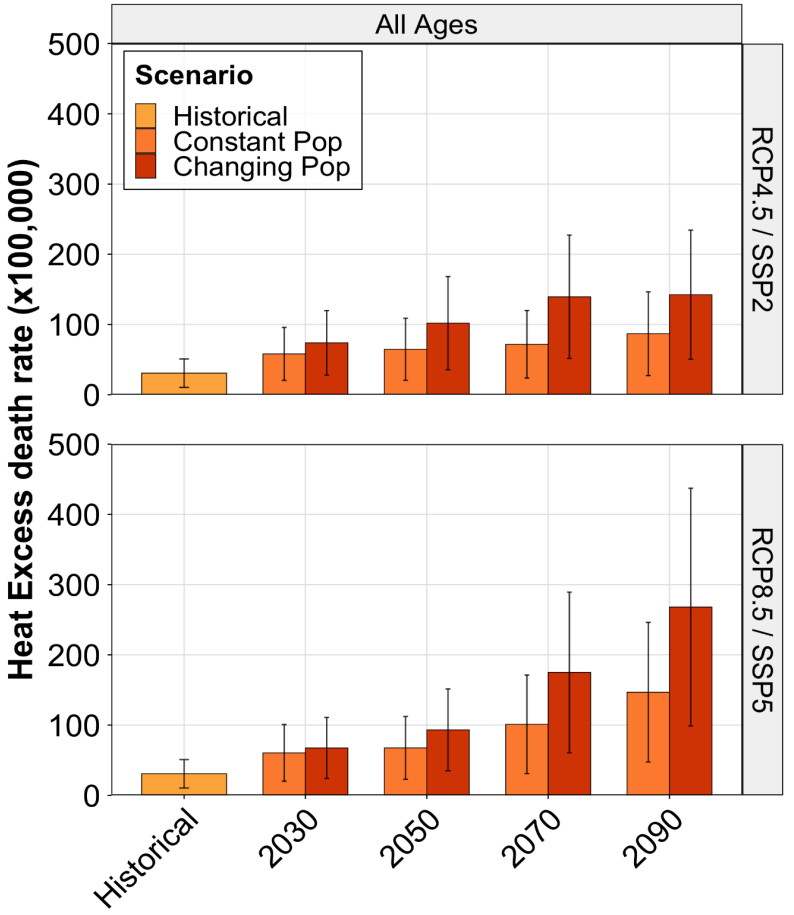
- Czech Republic (and United Kingdom)

Objectives

- Quantify the future impacts of heat on excess mortality at the NUTS 3 level
- Assess the role of different socioeconomic and demographic scenarios (SSP storylines) in the impact estimates
- Identify most vulnerable regions in the present and future climate

Major results

- The future (end of 21st century) burden of heat-related mortality burden in Czech Republic will increase 2 to 5 times (depending on the scenario) compared to the 2000s if no adaptation takes place
- The burden of heat-related mortality will be substantially aggravated by aging populations
- Implementation of heat prevention plans (HPP) reduced the heat-related mortality risk by 25% in 16 European countries. This encourages further development of heat-adaptation strategies and heat-focused public health measures



CS2 - #DROUGHT (MeteoRo)

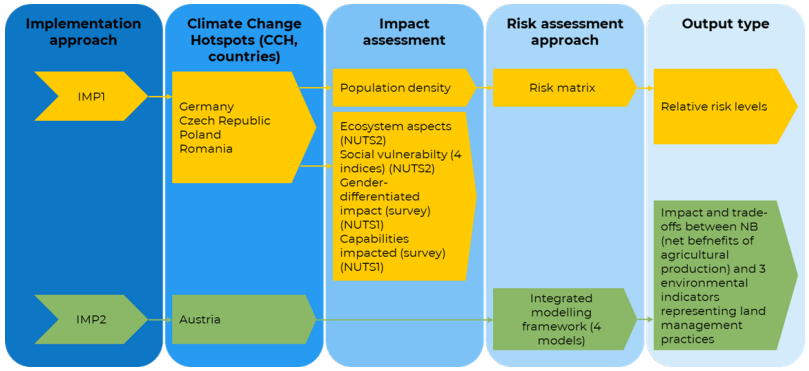
Study focus: Comprehensive assessment of *drought hazard and impact dimensions* in selected climate change hotspots, translated into *actionable knowledge.*

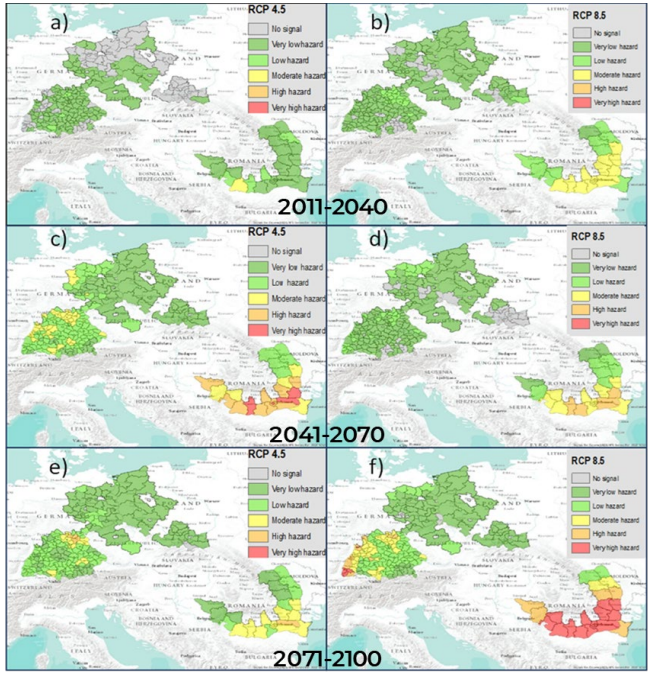
Objectives: **(*)** evaluate the physical characteristics and socio-economic impacts of the 2018–2023 multi-year drought; **(*)** analyze how competition for resources and societal interventions shaped food security amid climate change, post-COVID-19 recovery, and geopolitical crises.

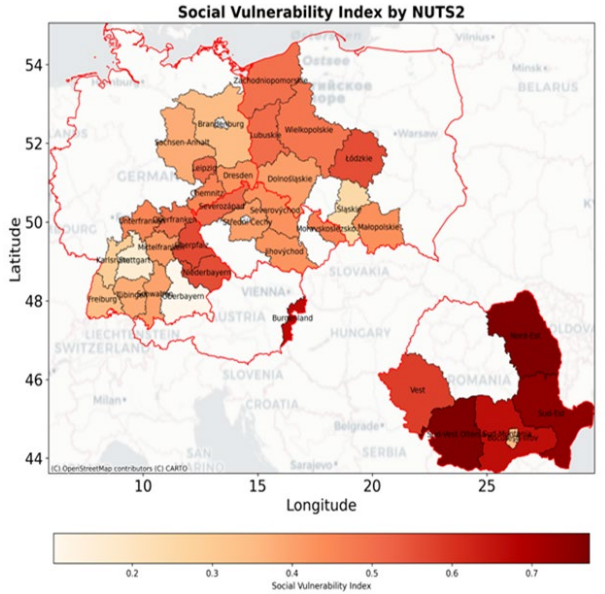
Major results:

- Integrated framework for drought risk assessment with focus on agriculture and social vulnerability.
- New insights into the gender and social dimensions of drought impact, underlining the stronger impact on rural communities.
- Integration of results into the CROSSEU DSS, supporting targeted and optimized decision-making at the local level, as well as regional risk assessment and long-term adaptation planning.









Hazard levels in the future climate relative to the present climate, related to 4 drought intensity classes ('mild', 'moderate', 'severe', 'extreme)', expressed through the share of NUTS3 area affected.

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CS3 – Storm# - Technical University of Denmark (DTU)

Study focus

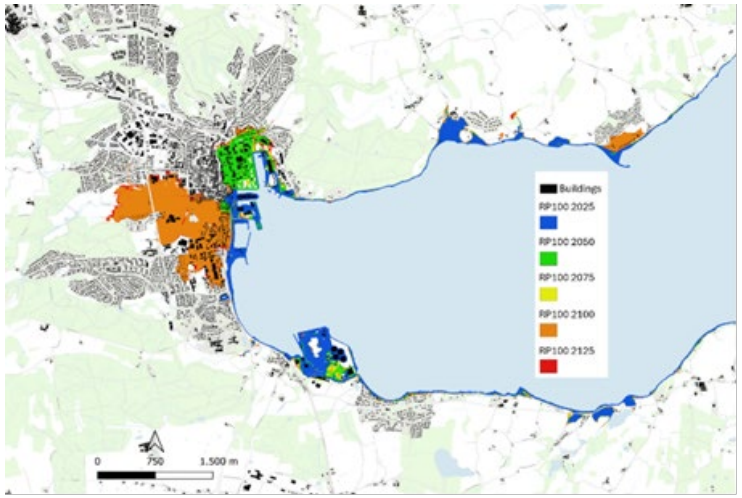
- Assessment of storm surge economic and social damages in South West Denmark

Objectives

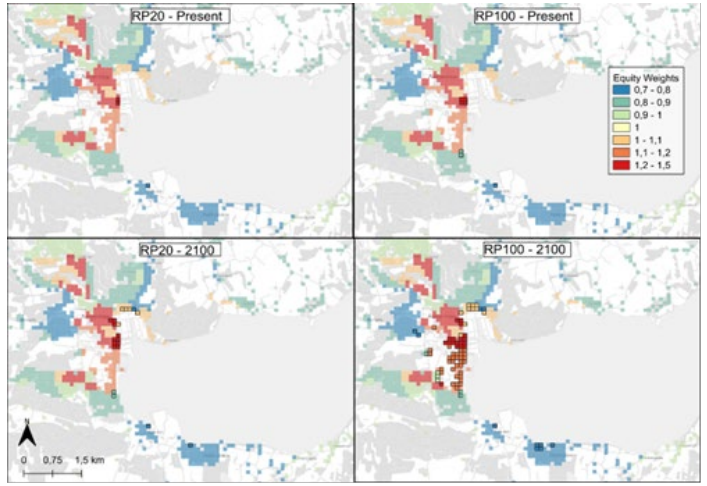
- Develop and test a methodology for assessing economic and social impacts at local level of storm surges
- Investigate the impacts of flooding events on various sectors including buildings, business, agriculture, infrastructure, transport, health, tourism, ecosystems, and historical/cultural values

Major results

- Economic damages of storm surges on permanent houses, summerhouses and industry are large and recent events in 2023 provide evidence of risks
- Flooding risks are largest in Aabenraa for low income families
- Burden sharing of adaptation could involve large contributions from the private sector



Aabenraa flooding with high and low climate scenarios



Equity incidence of flooding in Aabenraa

CrossEU

CS4 – Flood# - University of Padova (UNIPD)

Study focus: flood and flash-flood risk in the valley areas of Trentino-Alto Adige (north-eastern Italian Alps). Convection-permitting climate projections and hydrological impact modelling are combined with a Discrete Choice Experiment (2,000 residents) to value reductions in flood impacts across five land-use domains.

Objectives:

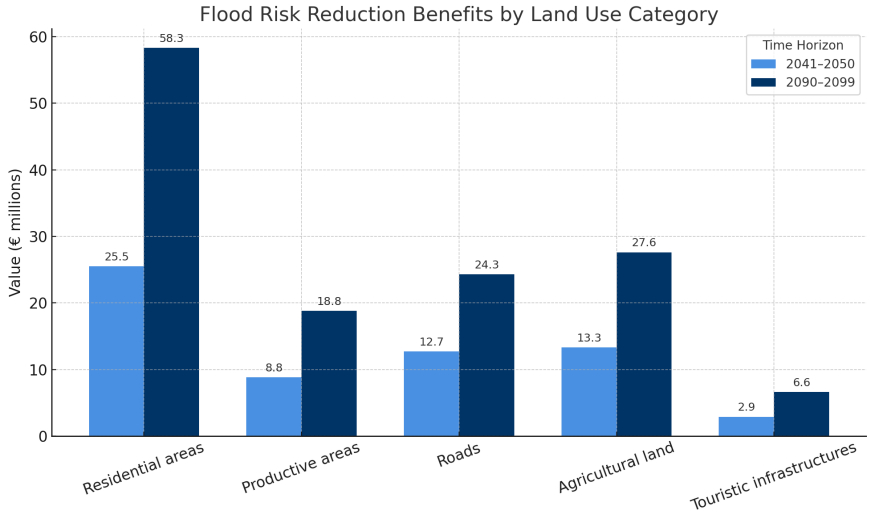
- Assess the magnitude of current and future flood impacts (2041–2050 and 2090–2099, RCP8.5)
- Monetise the societal benefits of mitigation and adaptation strategies under alternative impact scenarios
- Investigate how these benefits are distributed across population groups, with a focus on social equity

Major results:

- Flood impacts increase across all land-use categories, most strongly in mountain areas: by 2090–2099 flooded surfaces reach 21% for roads and 25% for agricultural land
- Residents attach the highest value to reducing impacts in residential areas. Aggregate social benefits of reducing future flood impacts amount to about €63 million (2041–2050) and €136 million (2090–2099), with residential areas the largest share in both periods
- Benefits differ across population groups, notably by income and gender, which brings distributional and equity considerations into adaptation planning



Flood and debris-flow damage, Trentino-Alto Adige (Vaia storm, 2018)



Aggregate social benefits of reducing projected flood impacts by land use, Trentino-Alto Adige (€ millions)

CrossEU

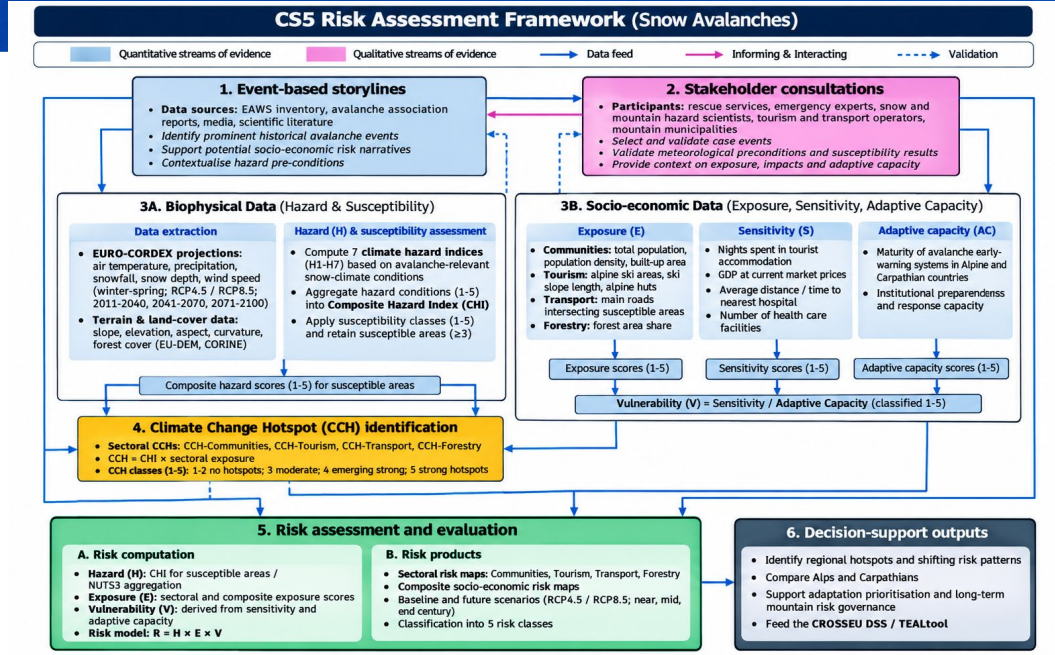
CS5 - # SNOW (MeteoRo)

Study focus | target sectors: European Alps and Carpathian Mountains | Tourism, transport, forestry, communities

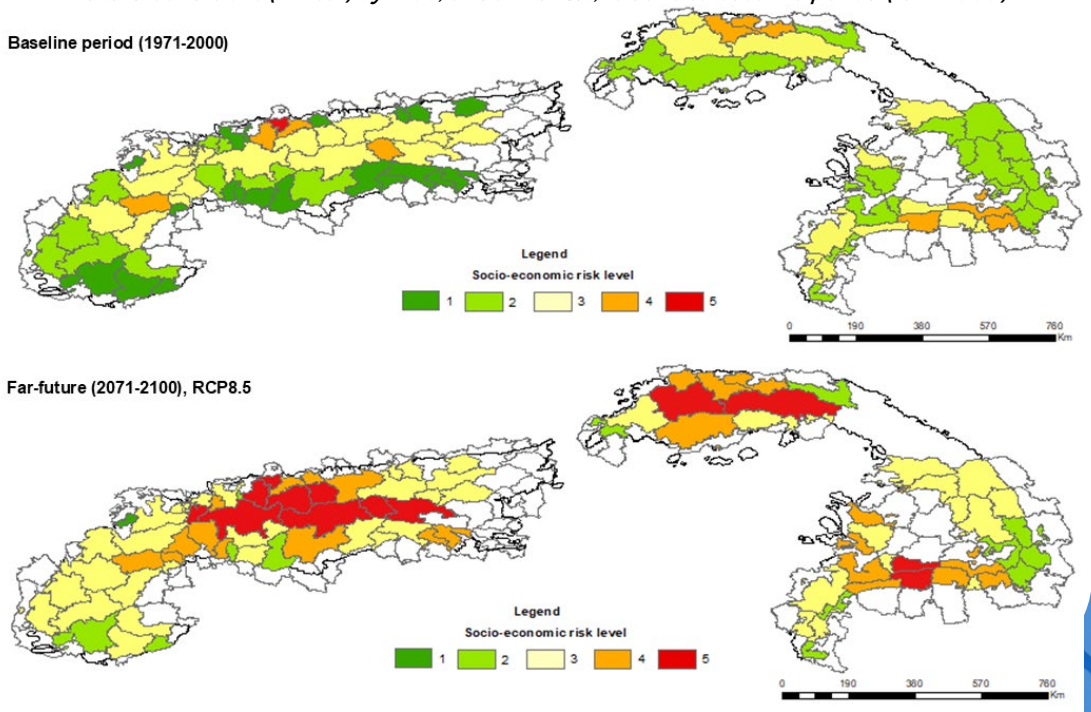
Objectives: (1) Assess the present and future changing avalanche-relevant snow-climate hazard conditions, socioeconomic vulnerability and potential risk for tourism, transport, forestry and communities under climate change, (2) To identify climate change hotspots for the target sectors and communities; (3) Develop a transferable and upscaling framework for the socioeconomic risk for adaptation planning on long-term

Major results:

- Developed an integrated, multi-sectoral avalanche risk framework (adapted from ESPON-Climate 2022), combining seven climate hazard indices with exposure and vulnerability at 12.5 km and NUTS3 scales
- Identified shifting snow-climate hotspots, with declining snow persistence at lower elevations and increasing rain-on-snow and melt-related hazards
- Revealed contrasting socio-economic risks: higher exposure in the Alps versus greater vulnerability and adaptation challenges in parts of the Carpathians
- Integrated results into the CROSSEU DSS, supporting regional risk screening and long-term adaptation planning



Changing socioeconomic risk level (tourism sector) associated to the composite snow-climate hazard conditions (winter) by 2100, under RCP8.5, relative to baseline period (1971-2000)



CS6 - # Cross-Sectoral Multi-Hazard Risks (UB)

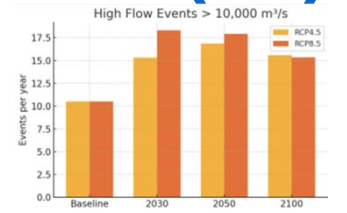
Study focus: Lower Danube floodplain, Romania

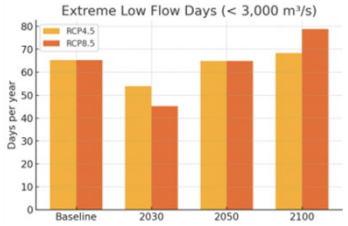
Objectives:

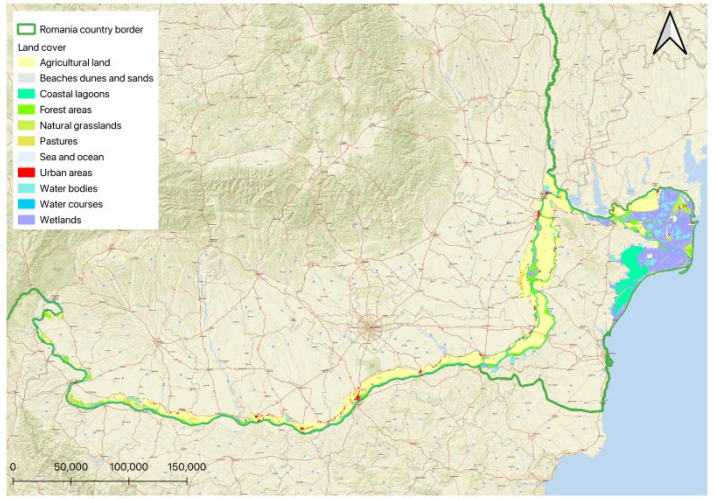
- Analyse the trend and the seasonal shifts of high and low-flow hydrological data extremes for historical and mid-century (2030, 2050) and late-century (2100) scenarios.
- Assess sector-specific risk.
- Perform an integrated socio-economic vulnerability analysis.

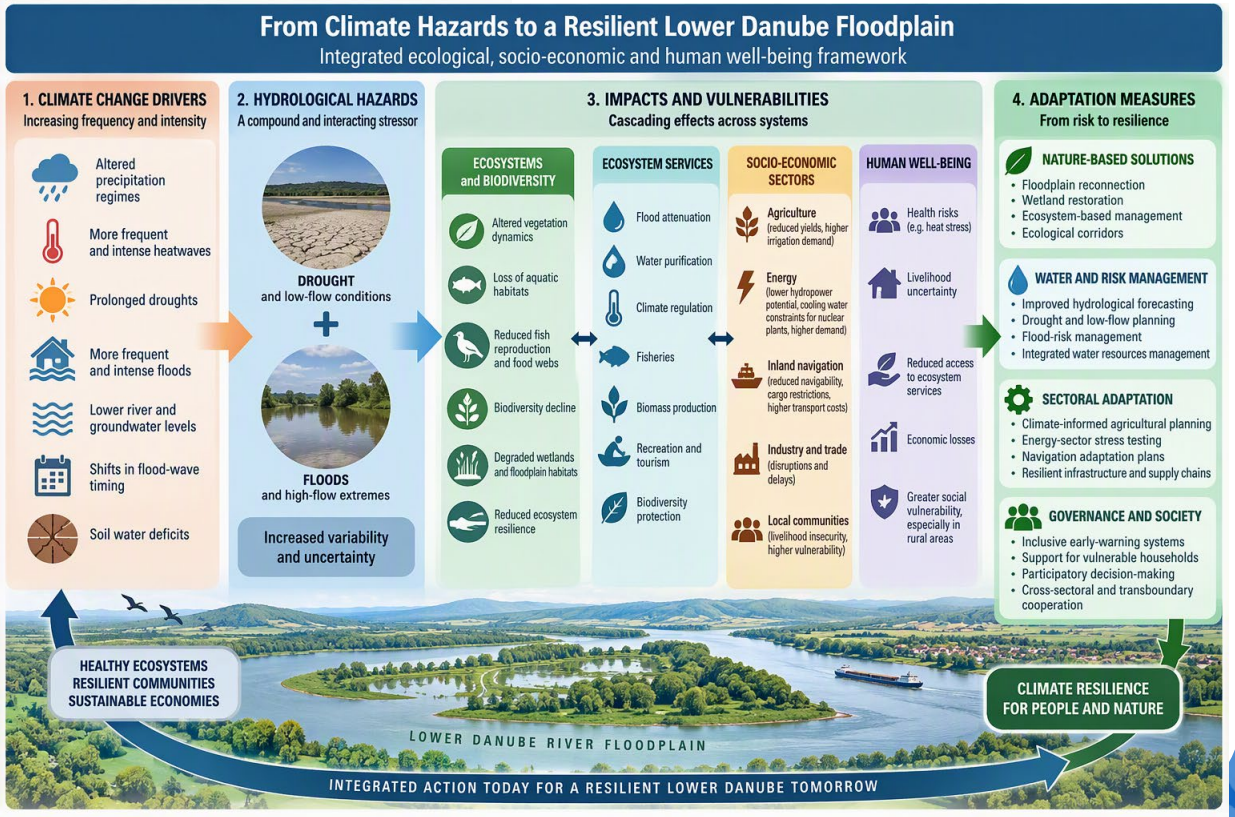
Major results:

- Developed an integrated ecological, socio-economic and human well-being framework for a resilient Lower Danube floodplain.
- Climate projections under RCP4.5 and RCP8.5 point towards increasing flood and drought risks.
- Floods and droughts affect more than water resources. They impact biodiversity, agriculture, energy security, navigation and local communities
- Effective adaptation requires combining nature-based solutions, including wetland restoration and floodplain reconnection, with improved forecasting, climate-informed agricultural planning and stronger coordination across sectors.









CS7 – Electricity# - WEMC / EDF

Study focus

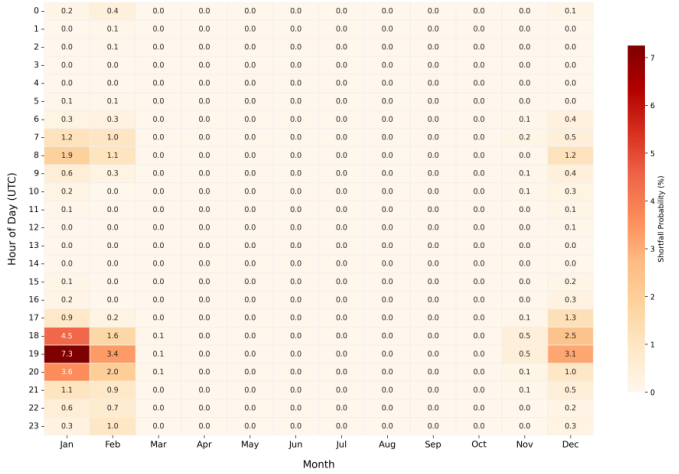
- How climate change will influence the role of renewable energy in the electricity systems?

Objectives

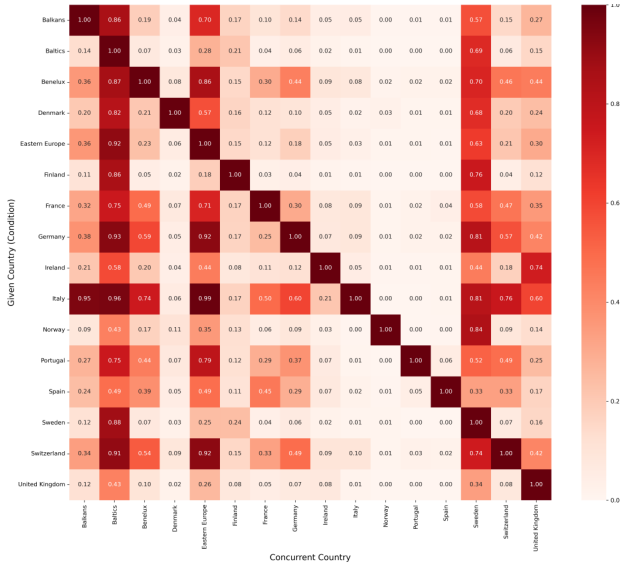
- Analyse the trend in and quantify the impacts of concurrent heatwaves, droughts and wind droughts on electricity production and demand.
- (partly) estimate (part of) the cost of necessary operational adjustments and investments in mitigation and adaptation strategies for a renewable-dominated system under different climatic and socioeconomic scenarios.
- analyse the dispersion of the marginal costs of electricity, and the risks of non-served energy events linked to the meteorological scenarios.

Major results

- The ensemble-based assessment reveals that climate-driven stresses on the power system arise from the interaction of meteorological variability, system design constraints, cross-border dependencies, and societal vulnerabilities



Temporalal vulnerability: 5pm to 9pm



Simultaneous vulnerability of neighbouring countries

CrossEU

CS8 - # Spillover effects in Europe - UCL

Study focus | target sectors:

- EU27 + UK regions | Agriculture and labour productivity

Objectives:

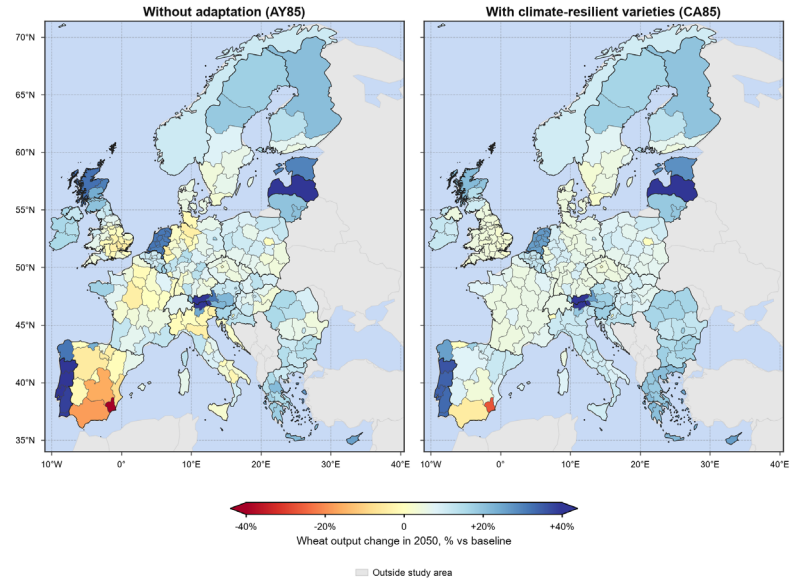
- Develop the Subnational-ENGAGE model at NUTS2 level for the EU27 and UK, considering their main trade partners
- Quantify the economic effects of rising temperatures on crop yields and labour productivity, tracing their effects through regional/global markets
- Identify regional vulnerabilities across the EU27 and UK, and analyse targeted adaptation strategies

Major results:

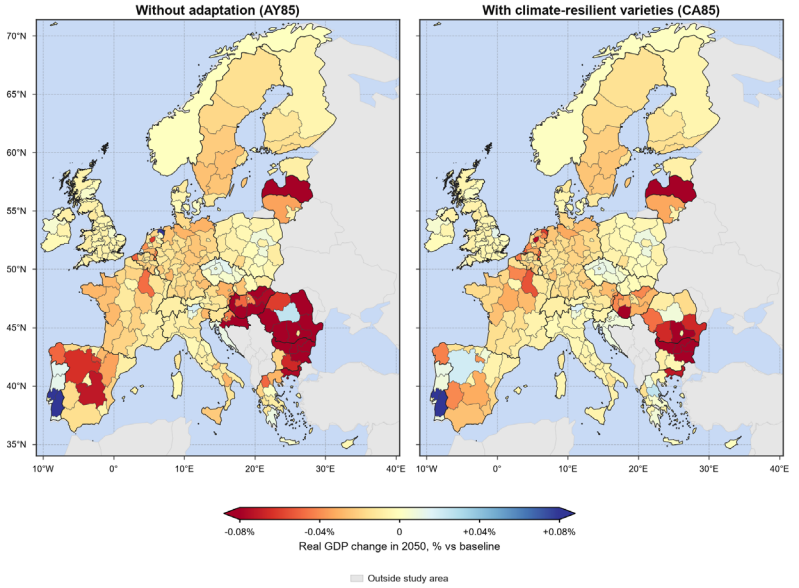
- Climate impacts generate gains and losses across European regions
- The strongest gains are generally observed in northern and central European regions, whereas the largest losses are concentrated in Mediterranean and western European agricultural systems
- The spatial redistribution reflects changes not only in climatic suitability but also in comparative advantage and competitiveness, highlighting the importance of regional economic structures and their exposure to interregional and international trade
- The adaptation scenarios show that crop-focused measures can reduce part of the regional economic losses, but they do not eliminate climate damages. Irrigation generates the largest average GDP improvement among the three individual adaptation measures

Climate change impacts		Adaptation strategies		
Agricultural productivity	Labour productivity	Crop management	Irrigation	Mechanisation

Wheat output



GDP



Methods for Measuring Social Impacts – Capability Approach

- Focuses on what individuals are able to do and be – capabilities – rather than just their economic wealth or ressource avaliablity
- **Functions:** What you actually do
- **Individuals wellbeing** (and therefore capabilities) is deeply influenced by the circumstances in which individuals are living

Research question: How can Armartya Sen's capability approach be applied to develop human well-being consequence indicators of climate events?



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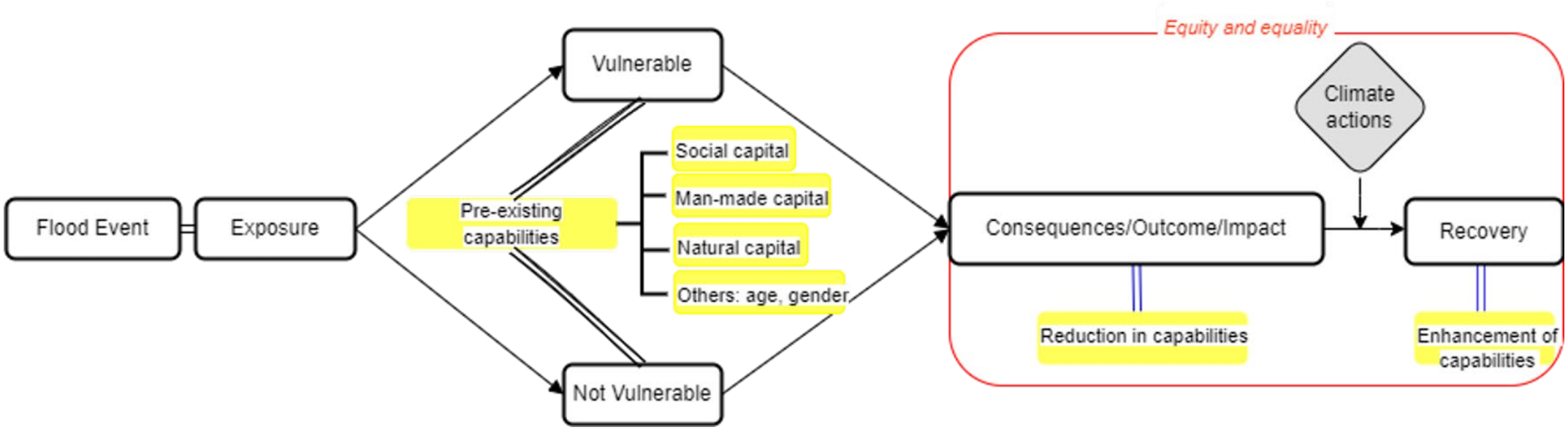
Measuring Climate Impacts on Capabilities



Indicators reflecting capabilities affected by climate events:

- Health (access to clean water, sanitation)
- Security
- Ability to move or stay where you like to live
- Education (access to schools after the flood)
- Disruption of social networks
- Mental health affecting well-being and ability to function

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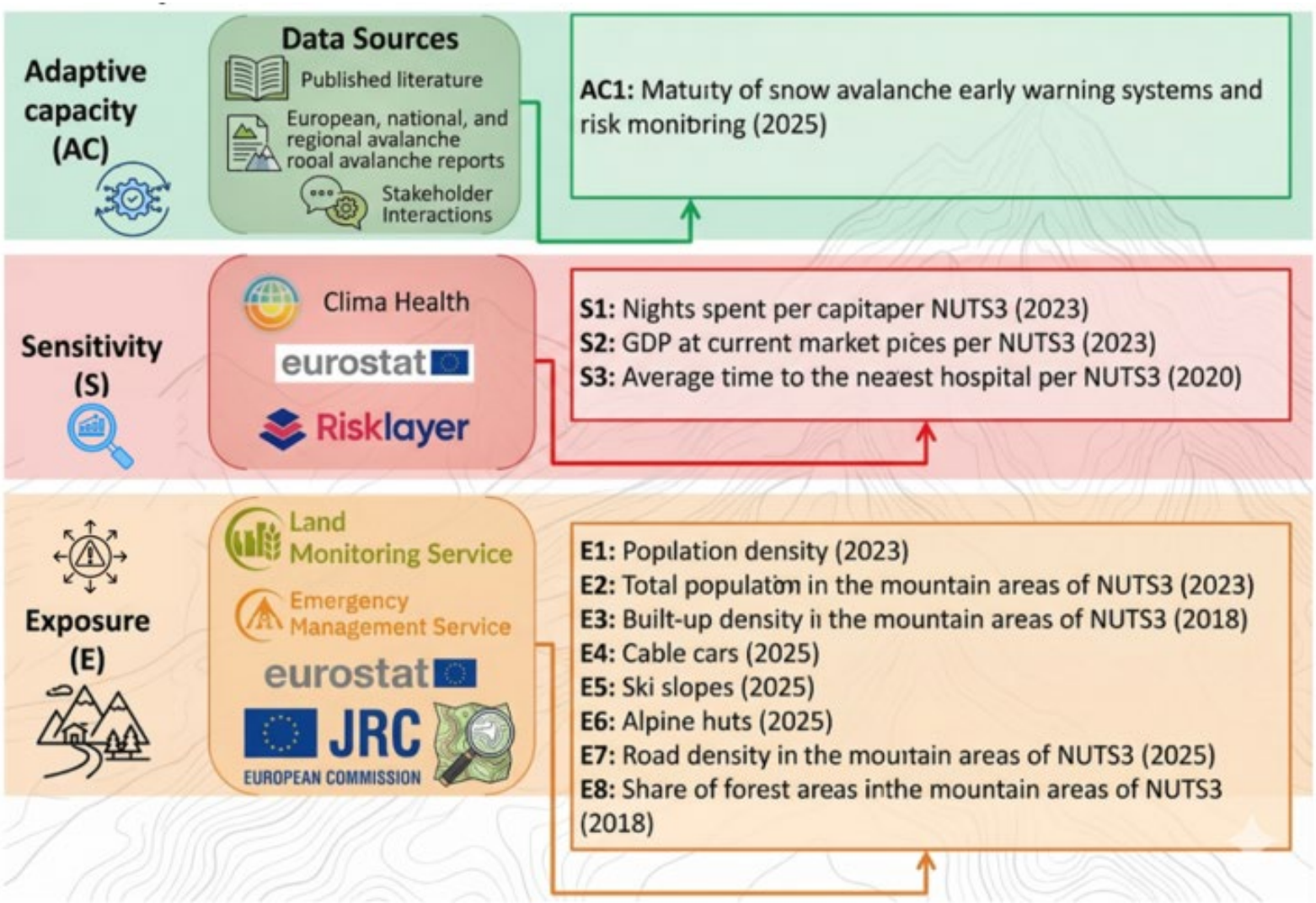
Social Indicators Applied to Snow avalanche in the Alpine and Carpathian area



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Snow Avalanche in the Alpine and Carpathian Social Impacts/indicators

Aspects	European Alps	Carpathian Mountains
Institutional capacity	Advanced (formalized hazard mapping, monitoring, EWS)	Fragmented, limited to local initiatives
Data and monitoring	Daily use of sensor networks and GIS	Sparse data, voluntary records, limited national framework
Economic exposure	High (dense tourism and infrastructure networks, often important for cross-border trade, as well as for local trade)	Moderate, but locally concentrated
Risk awareness	Strong institutional culture, high technical literacy; strong preparedness, including initiatives and tools for increasing tourists' awareness,	Low awareness, limited training
Climate adaptation	Active implementation (e.g., barriers, snowmaking	Passive adaptation, reactive measures

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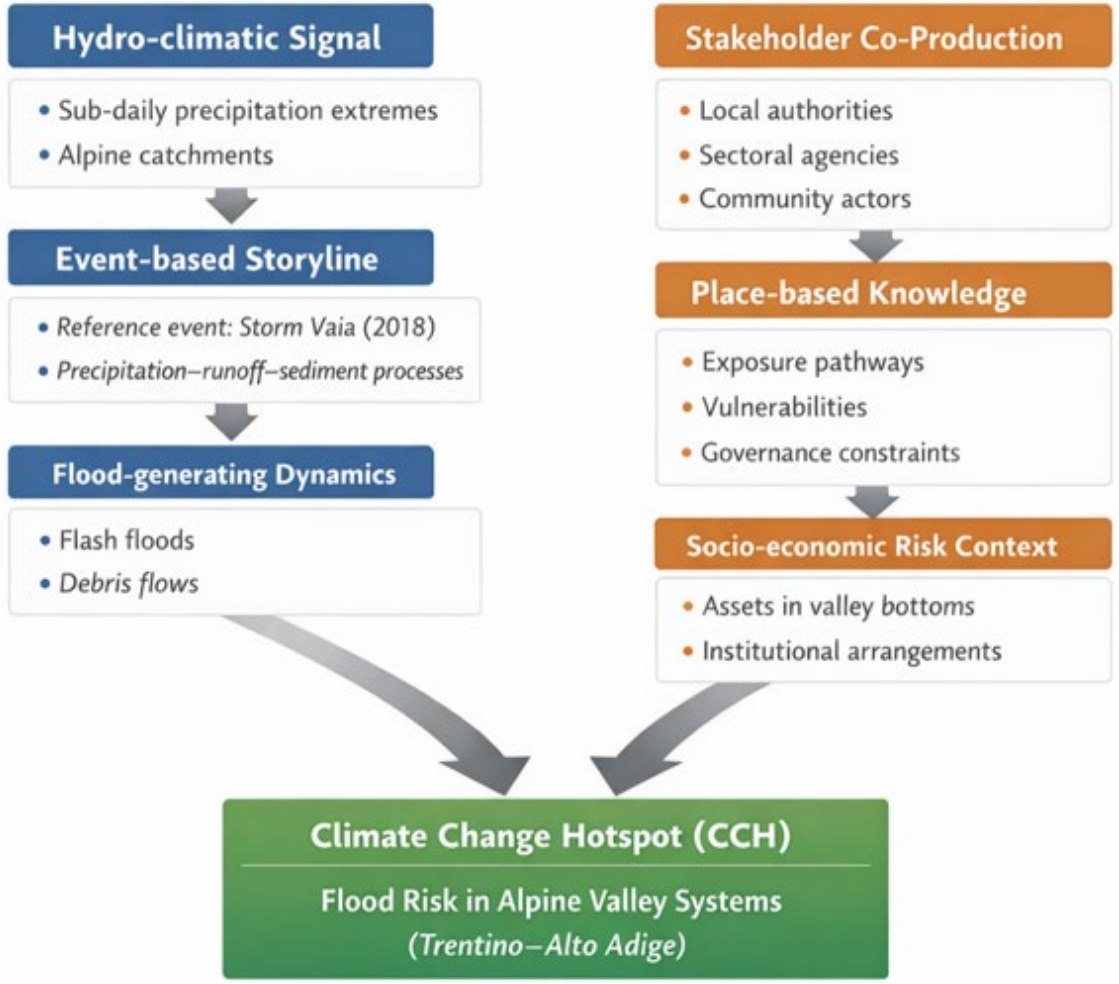
Flash flood in the Trentino-Alto Adige region, Italy



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Italy Social Impact Results

Damage categories	Respondents reporting damage (%)
Damage to the home (e.g. roof, walls, windows)	30.18
Damage to personal belongings (e.g. furniture, appliances, valuables)	27.45
Damage to personal vehicles	20.87
Damage to agricultural or forest property (e.g. garden, trees, smallholding)	20.06
Work interruption or loss of income	19.74
Health problems (e.g. injury or flood-related illness)	2.25
Psychological stress	37.24
No damage reported	26.65

Incidence of flood damage among survey respondents who experienced flood.
Representative sample of 2,000 residents of the Triveneto area (North-Eastern Italy), using quota sampling to ensure balance in terms of gender, age, education and income

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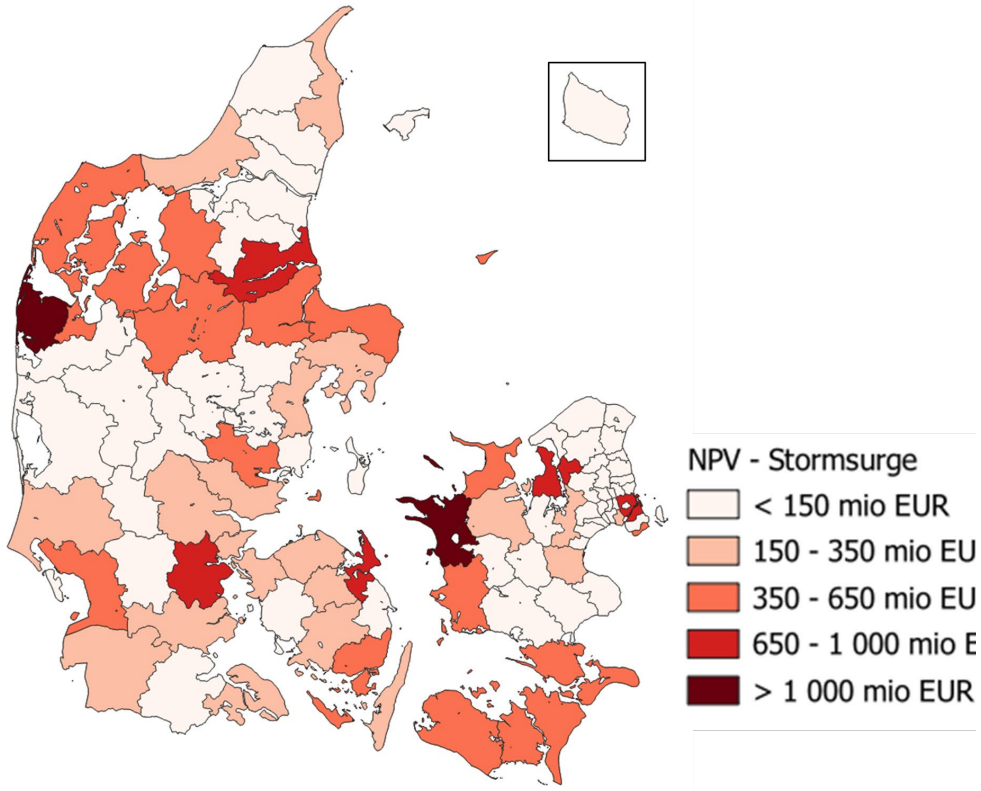
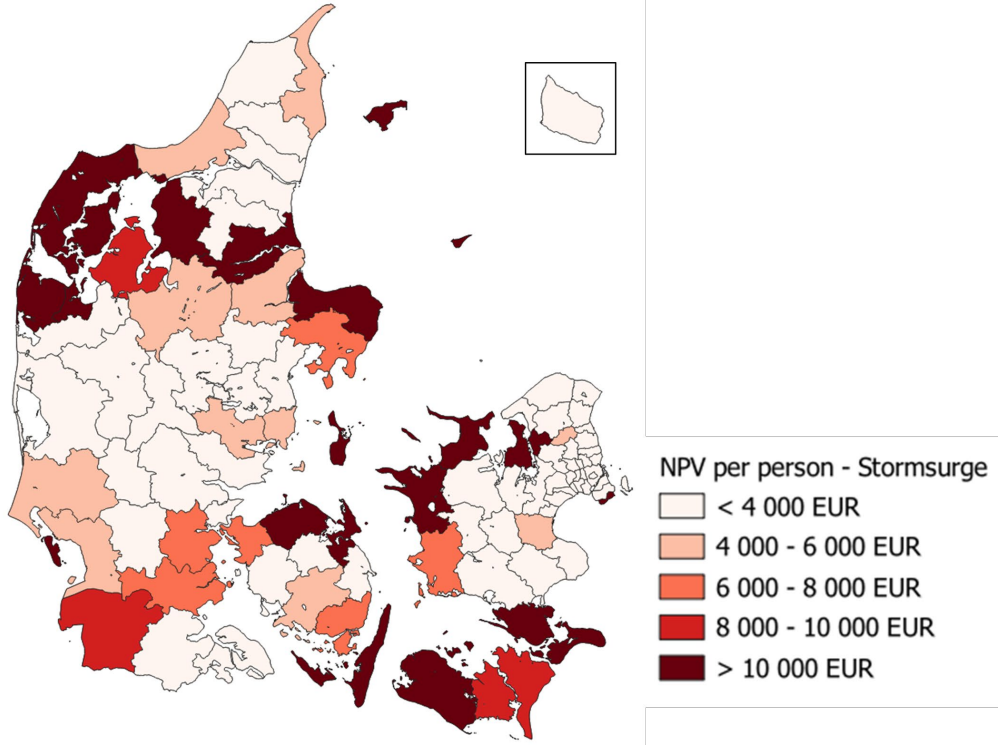
Damage Assessment of Storm Surges in Denmark SSP2-4.5 2024 to 2124





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Social Impacts of Storm Surges in Denmark -Survey of Flooded Households

- In 2025, an online survey was distributed to almost all households living less than 1 km. from the coast in areas impacted by a storm surge in 2023
- The survey addressed flood experience, flood risk perception, preparation, etc.
- 16,286 completed the survey (response rate 13.2 %)
- Sample is representative with respect to gender, education and household types, however people with higher income and age are overrepresented



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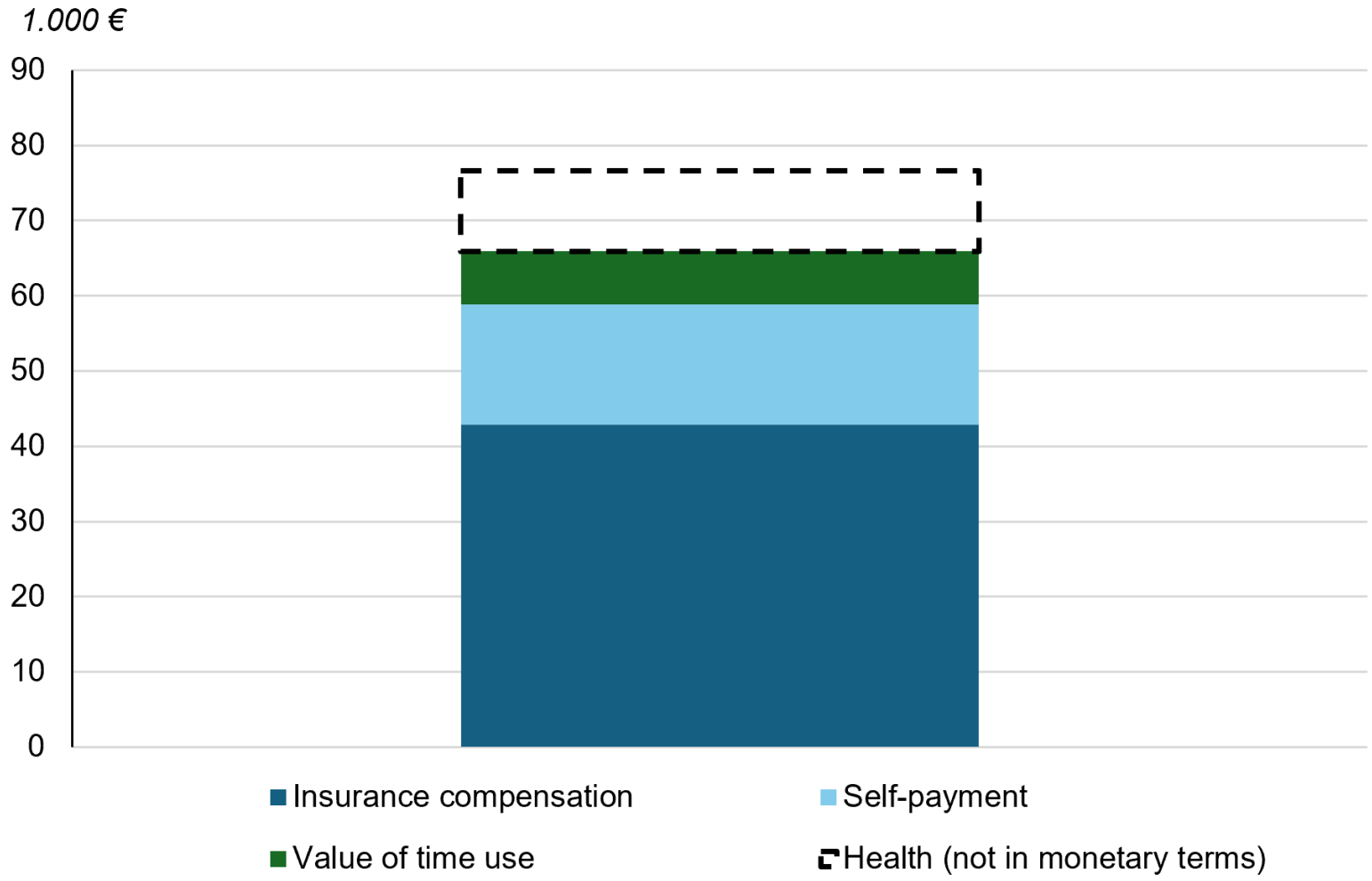
Damages to Households Measured



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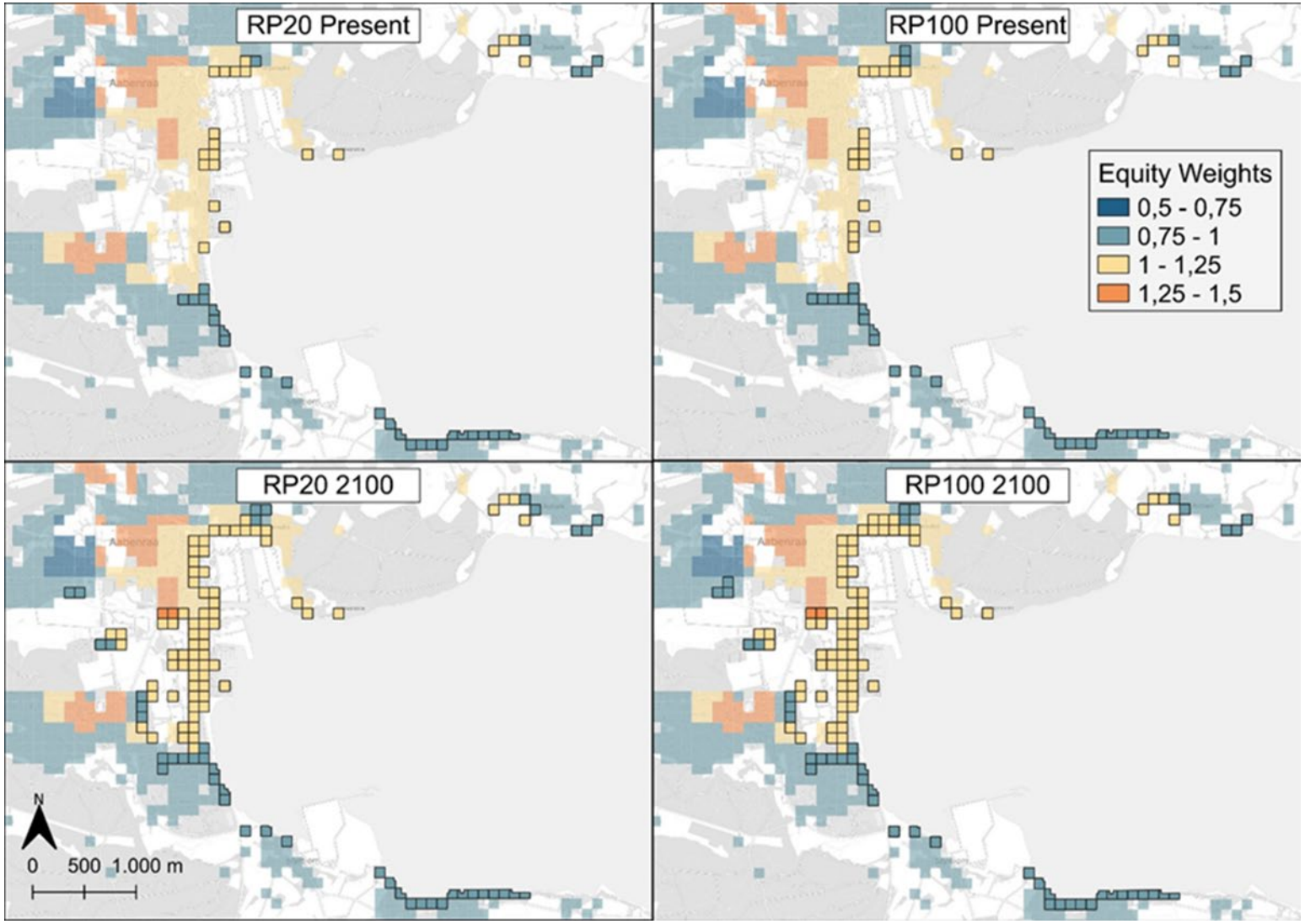
Aabenraa Income Equity Weights Applied to Damage Costs



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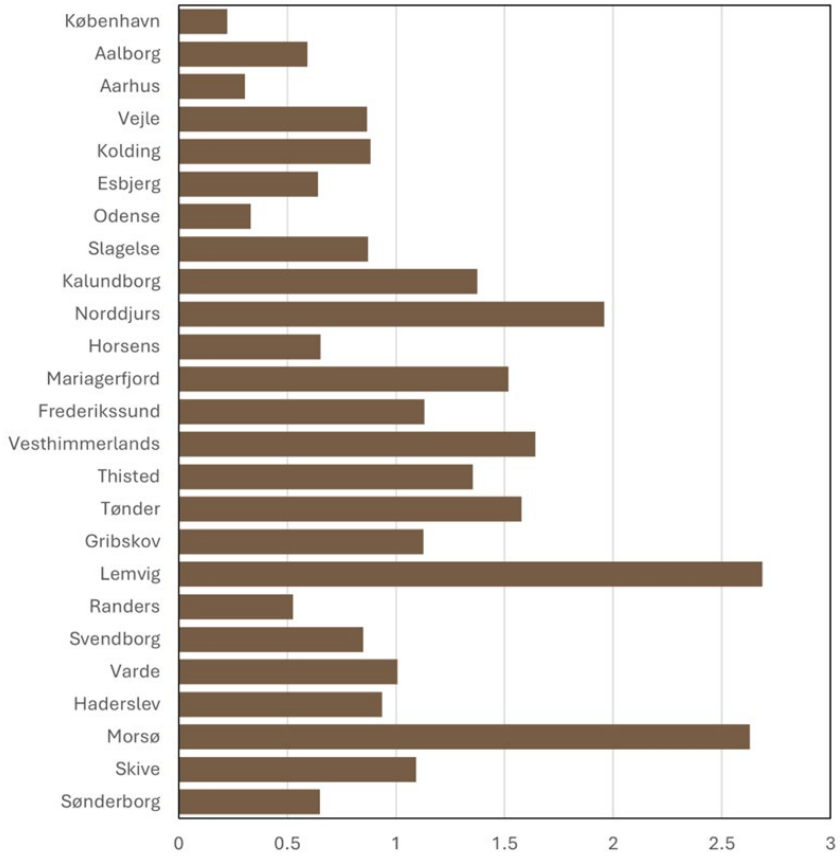
Damages Versus Disposable Income in Denmark - 25 Municipalities with Highest Damage



Expected stormsurge damage as % of total disposal income in municipalities for 100 RP in 2024

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Income Equity Method for Upscaling

Equity Weighted Loss = ~Î Ž› ZÎ ˇˇ · **W**

Dataset	Source	URL
Total losses	Climate-Adapt	*https://climate-adapt.eea.europa.eu/en/knowledge/economic-losses/economic-losses-and-fatalities?activeTab=31d4b1fa-94dc-47ee-81bd-5b80fb3909f9*
Mean equivalised income by educational attainment level	Eurostat	*https://ec.europa.eu/eurostat/databrowser/view/ILC_DI08/default/table?lang=en*
Distribution of the population by educational attainment level	Eurostat	*https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Educational_attainment_statistics*

$$Y_{avg} = \sum_i \frac{P_i}{100} \cdot Y_i$$

$$\omega_i = \left(\frac{Y_i}{Y_{avg}}\right)^{-\gamma}$$

$$W = \sum_i \frac{P_i}{100} \cdot \omega_i$$

Y_{avg}: Population-weighted national average income
i: Index representing the specific educational subgroup (primary, secondary, or tertiary)
P_i: Population percentage of subgroup i
Y_i: Mean equalised income of subgroup i

ω_i: Equity weight for a specific subgroup (i)
γ: Elasticity of the marginal utility of income (here, 1.2)
EWL: Equity Weighted Loss
W: National Composite Multiplier

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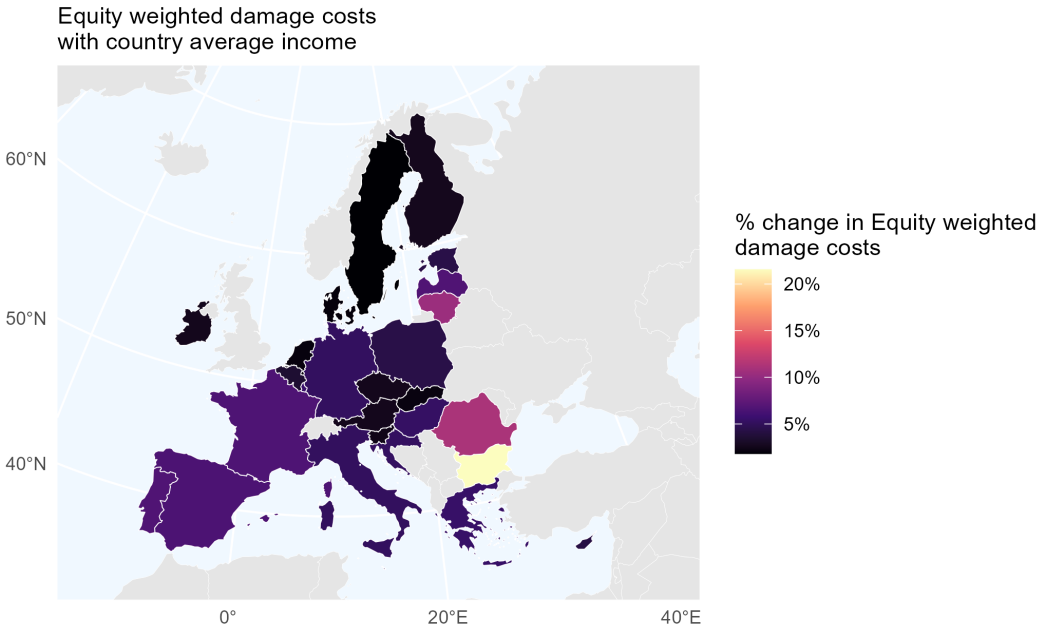
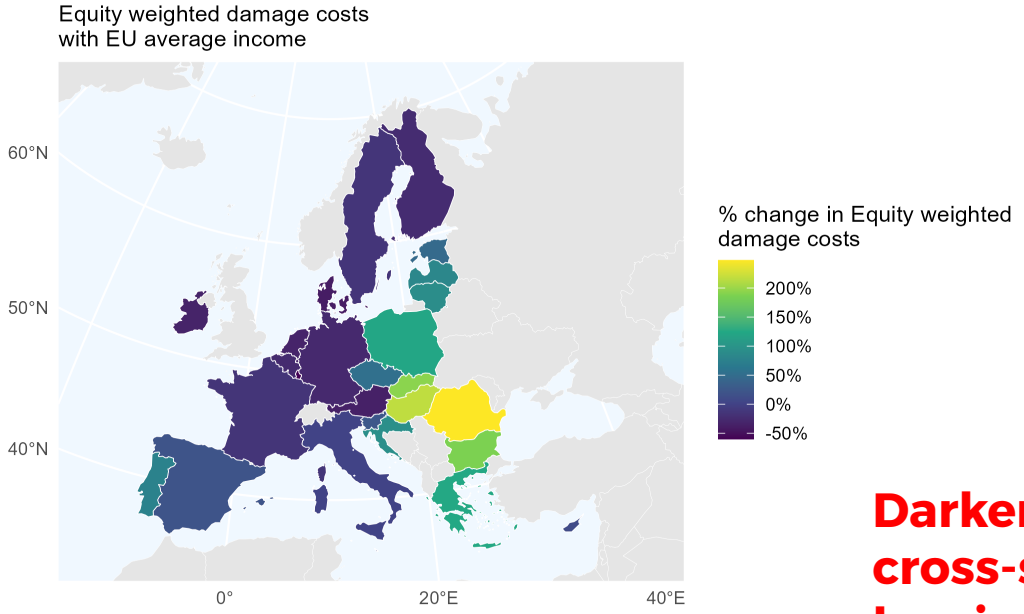
Equity Upscaled to EU level

EWL when adjusted against domestic average incomes produces moderate upward adjustments (typically 5–20%), highlighting how flood impacts disproportionately affect lower-income countries within EU





EWL when adjusted with a uniform European income standard drastically reweights the distribution of impact, shrinking the relative loss for wealthier Northern and Western nations while amplifying the assessed damages in lower-income Eastern and Southern member states by over 100-200%.

Darker-shaded, higher-capacity/ income regions can cross-subsidise adaptation costs in lighter-shaded, low income/ more vulnerable regions.

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Conclusions

- Climate Hazards are becoming more frequent and people affected and damage costs rise in the EU
- The CROSSEU hotspot analysis are addressing major areas in the EU resilience strategy
- Insights from localized studies can generate key insights on risks and adaptation options to be used in other locations and upscaled to EU sector level
- Social impacts including equity and impacts on peoples life can be quantified and integrated in risk modelling
- Research contributions in CROSSEU are contributing to widening and deeping of the understandings of climate hazard impacts including non-market values like city life, culture, and nature

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Partners

Meteo Romania

University of East Anglia

World Meteorological Organization

Università degli Studi di Padova

TESAF

UCL

K&I Conoscenza e Innovazione

Helmholtz-Zentrum hereon

LGI sustainable innovation

EDF

BOKU

DTU

WEMC World Energy & Meteorology Council

UKRI UK Research and Innovation

University of Bucharest Virtute et Sapientia

CZU

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UK participants in this project are co-funded by UK Research and Innovation (UKRI).



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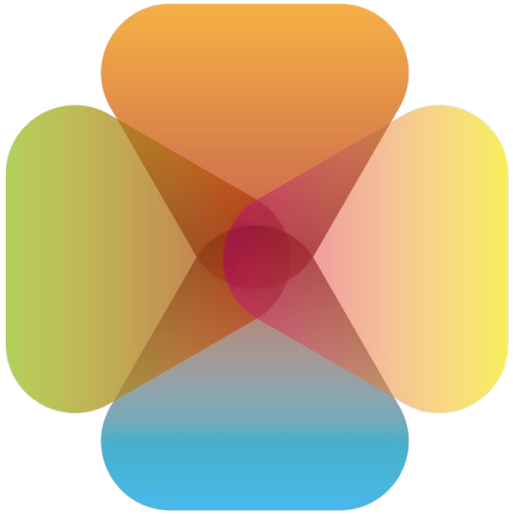
UK Research and Innovation



ACCREU
Assessing Climate Change Risk in EUrope

The macroeconomic dimension of adaptation in the EU: fiscal and distributional Implications & integrated policy assessment

Brussels, November 13 2026

Eva Preinfalk
University of Graz

Kaj-Ivar Van der Wijst
Utrecht University

Lorenza Campagnolo
CMCC Foundation

on behalf of the WP4 team

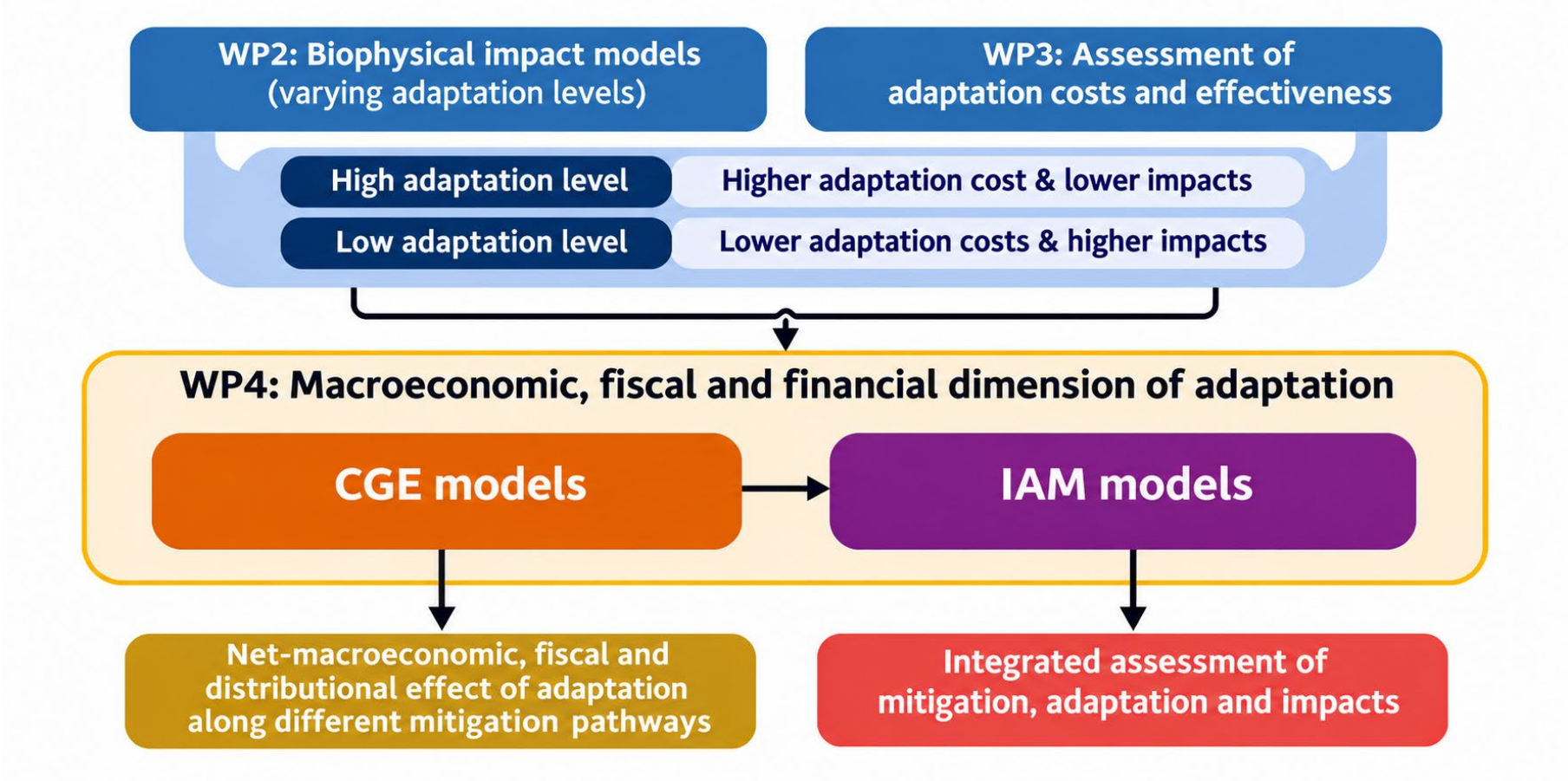
Main objectives of WP4

Goal 1: Deliver **ready-to-apply methods to integrate different levels and types of adaptation into macroeconomic models**

Goal 2: Develop the **integrated, macroeconomic analysis** of climate risk and adaptation, accounting for the **distributional, fiscal, and financial implications** across households, sectors, and regions

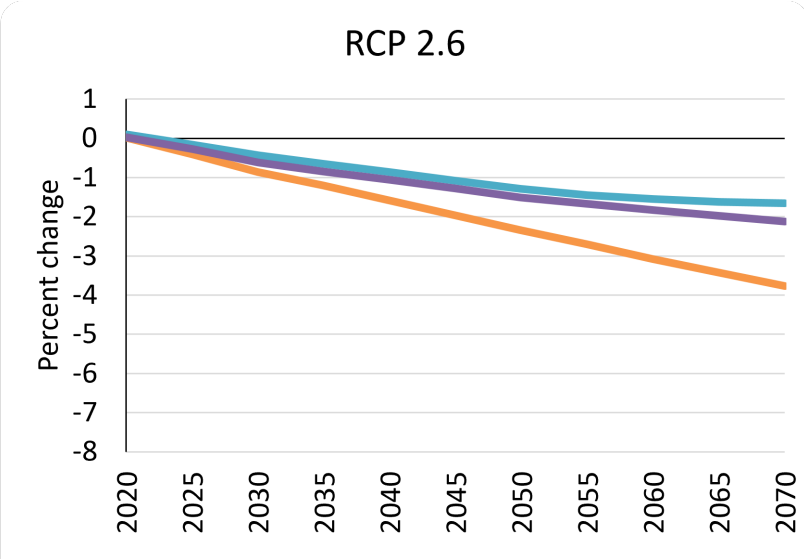
Goal 3: Identify **optimal, cost-effective and robust adaptation-mitigation policy combinations**

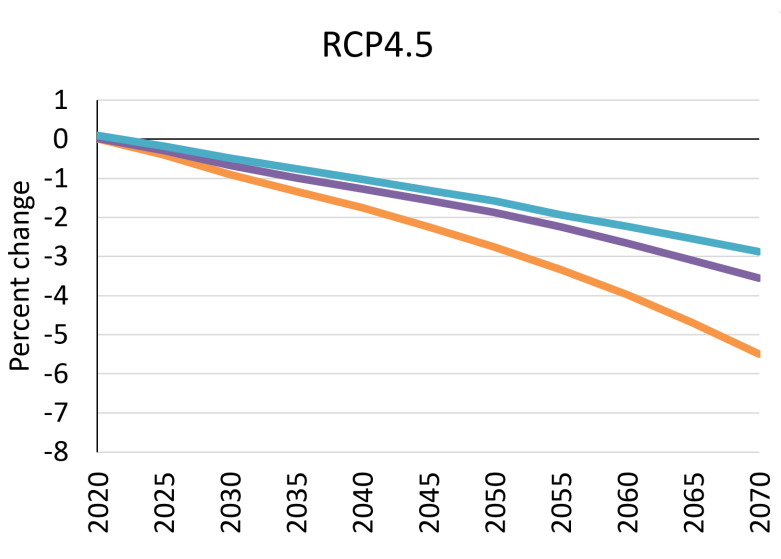
ACCREU workflow

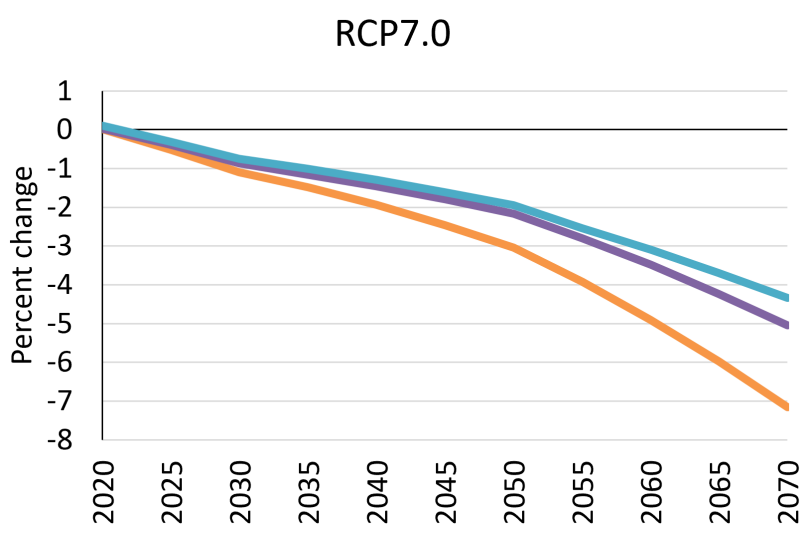


Analysis of macroeconomic and fiscal effects

Aggregate GDP effects EU27+UK





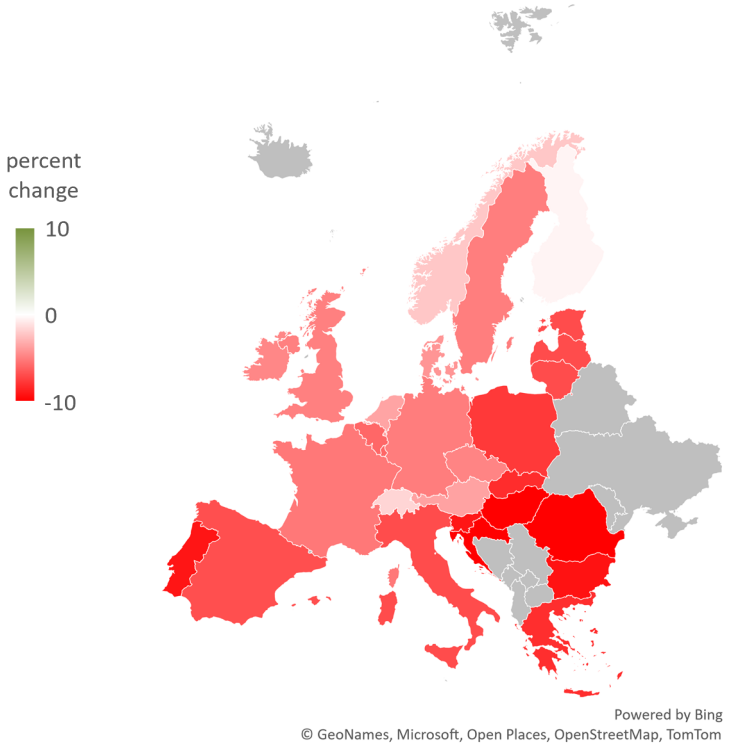


- GDP losses occur across all climate and adaptation scenarios
- Losses increase over time
- Macroeconomic effectiveness of high adaptation levels
- Higher warming scenarios are associated with higher losses & residual costs

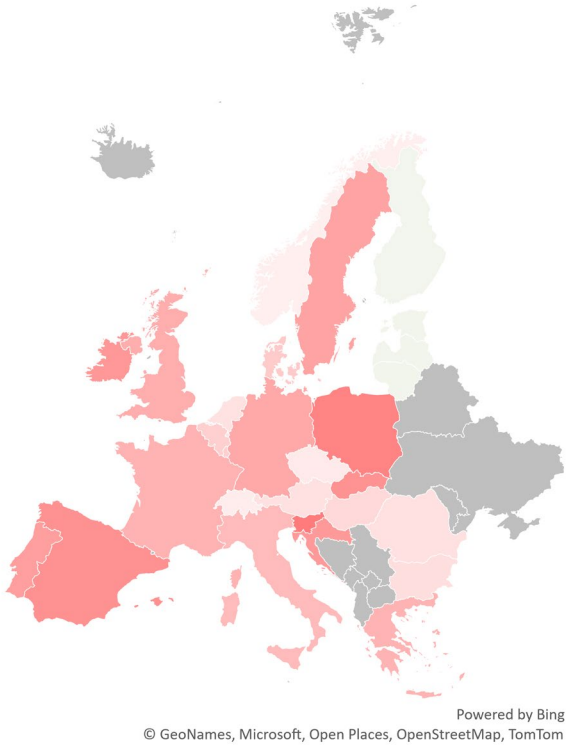
Adaptation levels:
low medium high

GDP effect by country in 2070 for RCP4.5

Low adaptation



High adaptation

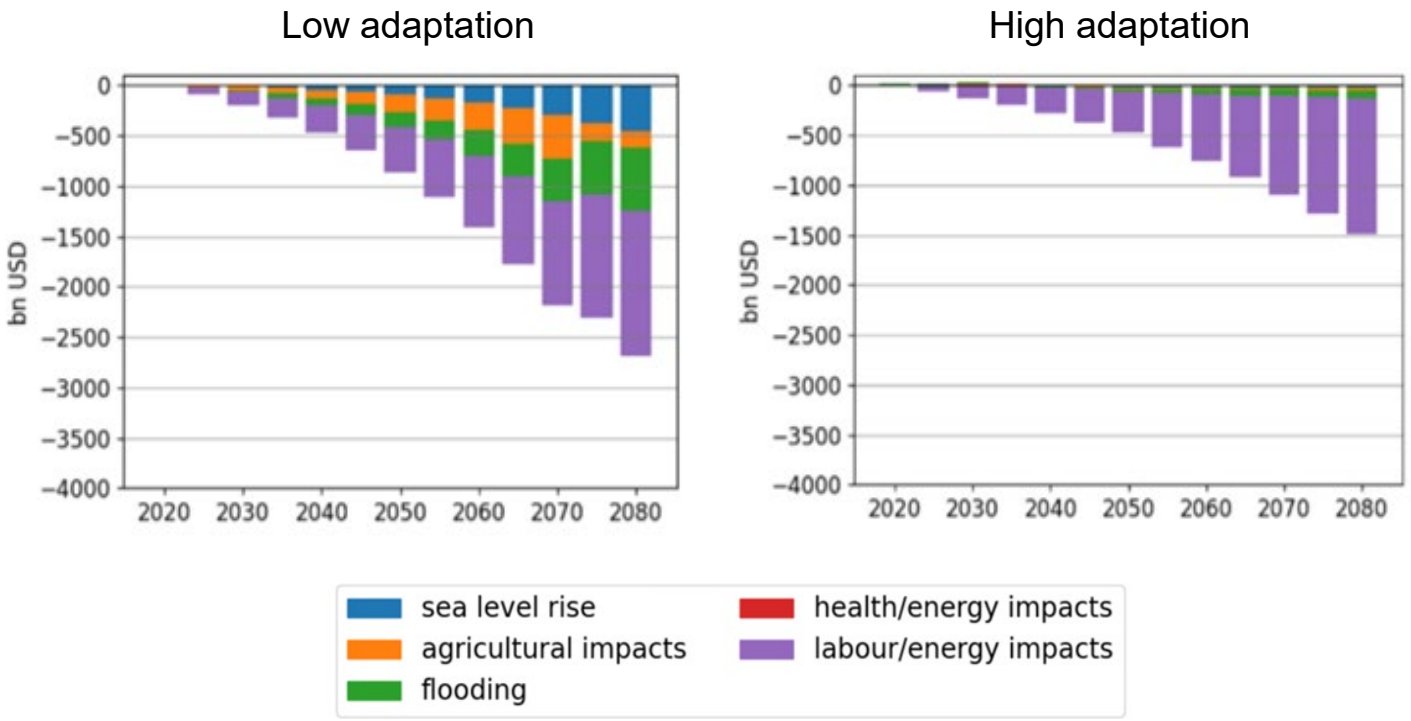


- High adaptation is consistently better in terms of GDP in all countries

- Significant regional differences

→ Central-Eastern Europe and Southern Europe are most at risk from climate change impacts

Aggregate GDP effect by impact chain for RCP4.5



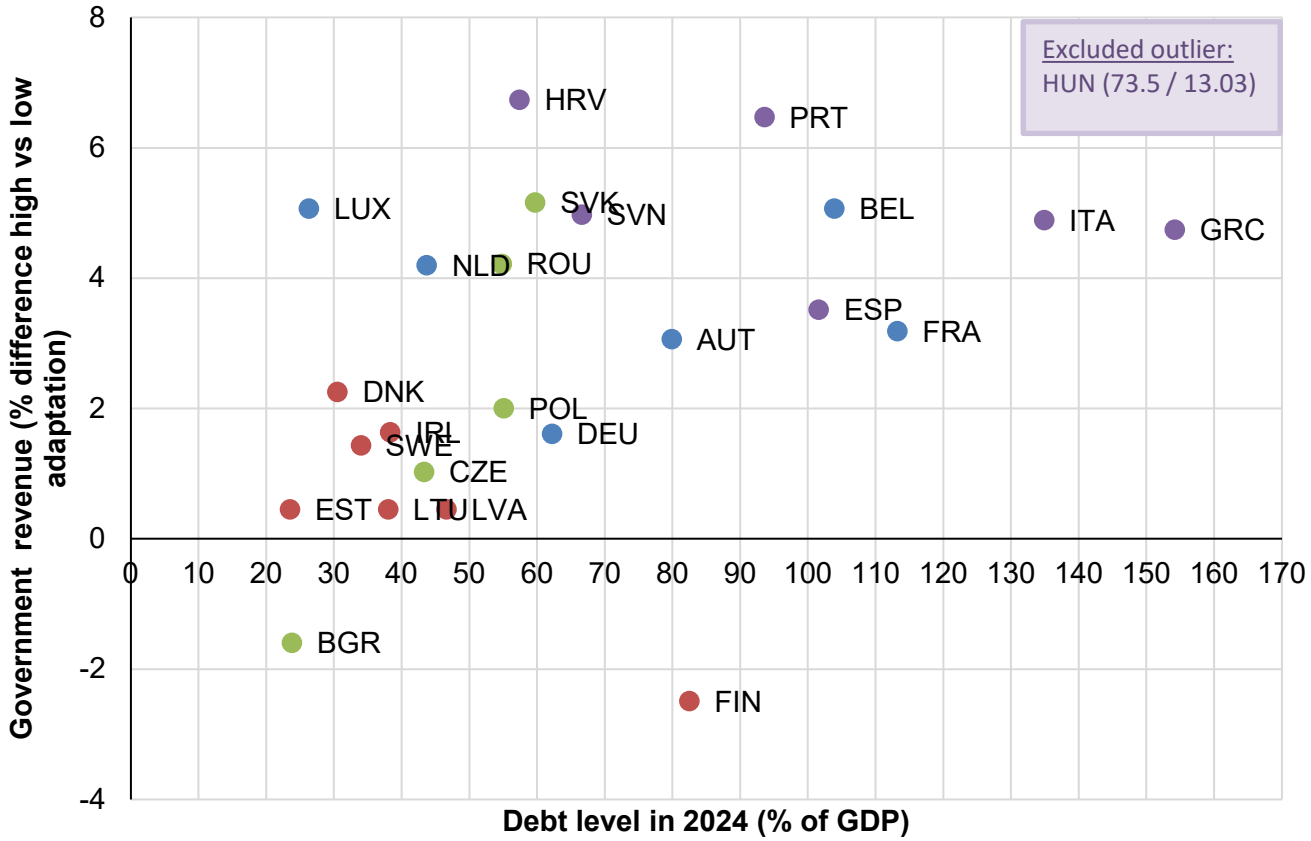
- Losses in labour supply and productivity, moderated by cooling, are the most prominent driver
- Impacts from sea level rise, river flooding and agriculture can be reduced considerably through high levels of adaptation

Fiscal effects: revenue and expenditure side



- Climate impacts reduce the tax base and thereby government revenue
- Given a balanced budget this reduces government expenditures
- Adaptation investment limits other spending options, especially in 2050
- By 2070, there are significant net-benefits of high adaptation on fiscal space relative to low adaptation

Net fiscal gains from adaptation relative to government debt



Debt-GDP-ratio: https://ec.europa.eu/eurostat/web/products-euro-indicators/w/2-22042025-ap

- All countries but BGR and FIN gain fiscal space by 2070 from high adaptation
- Role of adaptation in long term budget consolidation e.g., in GRC, ITA, FRA, ESP

Main take-aways

Significant macroeconomic costs of climate change, particularly under high warming scenarios by 2070

Strong regional disparities, with Central-Eastern and Southern Europe most vulnerable

Clear macroeconomic and fiscal benefits of adaptation, but residual damages remain

High adaptation levels enhance fiscal space, especially in 2070, as benefits of upfront investments materialize

Analysis of distributional effects

Deliverable 4.2 overview

D4.2 explores the **distributional implications of climate change impacts and adaptation measures** in the EU27+UK across three dimensions:

1 Between EU region inequality

- Regional inequality of climate impacts
- RCP7.0, 4.5 and 2.6

135
regions

2 Within countries inequality

- Climate impacts, mitigation and different adaptation levels
- RCP7.0 and RCP4.5

5
income quintiles

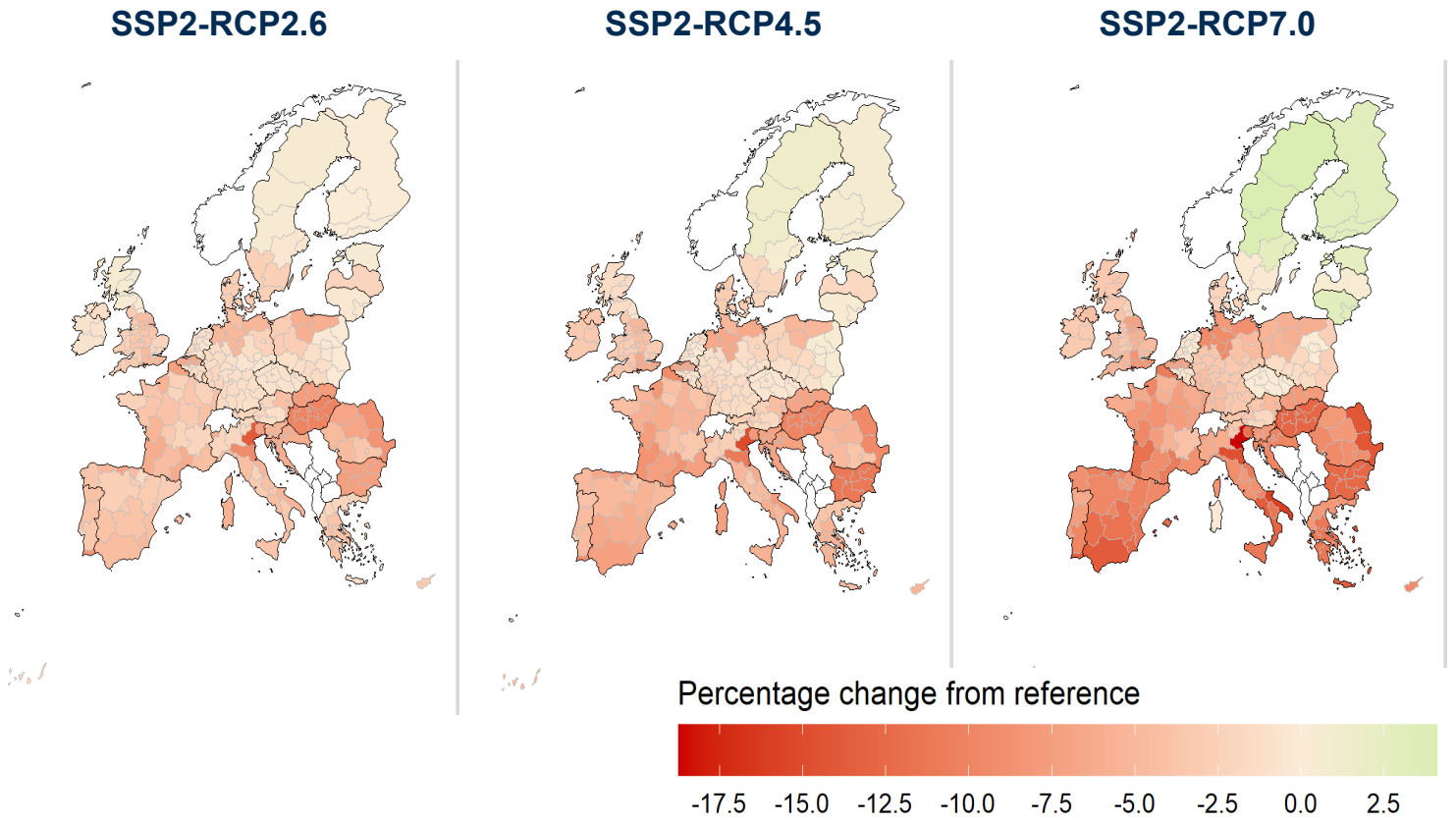
3 Within Austria: different financing schemes

- Flood risk and household impacts
- 3 risk recovery schemes

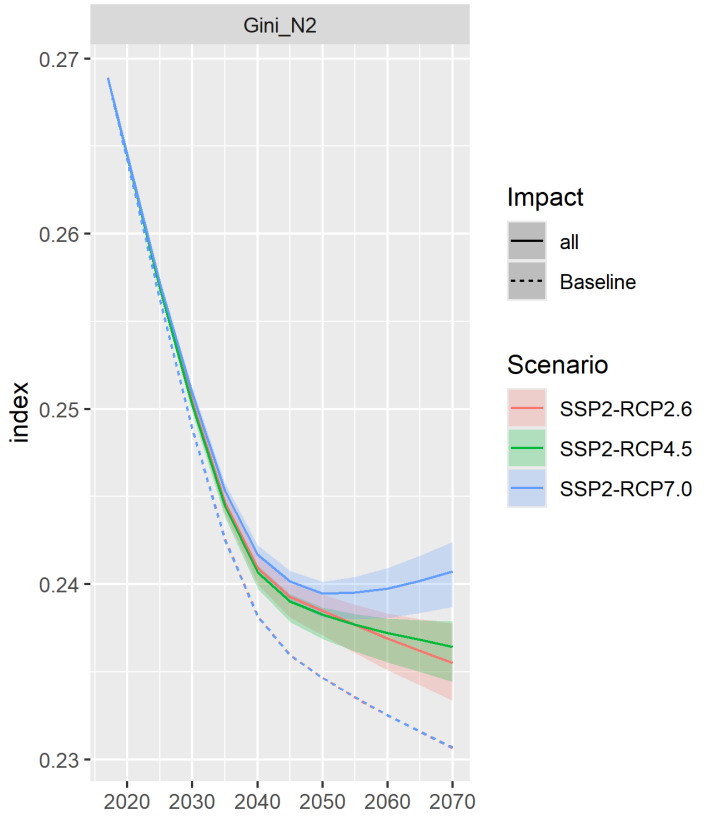
24
household groups

Climate change impacts and between-region inequality

GDP per capita change by 2070 (%)



Regional inequality (Gini)



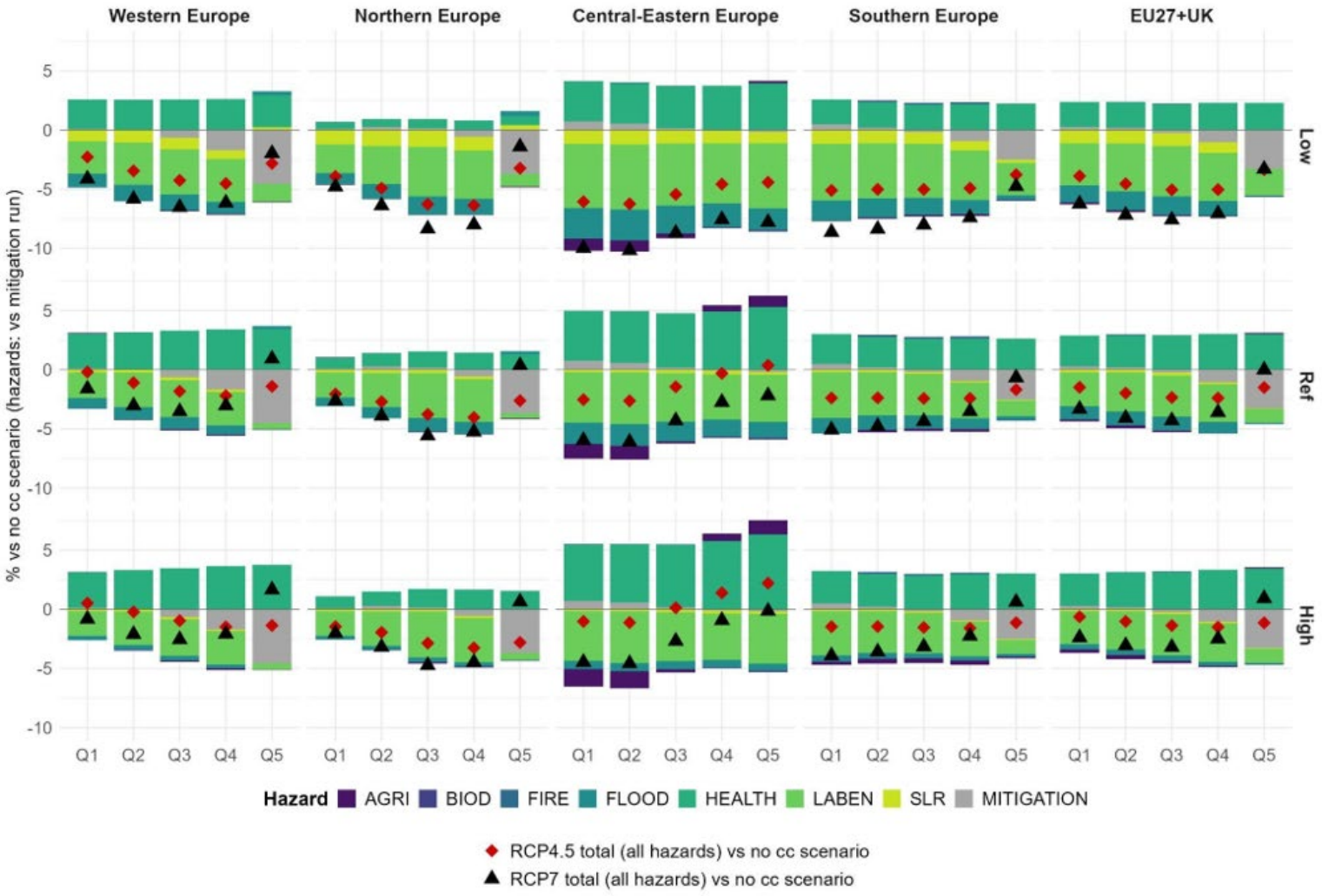
Poorer, southern and eastern regions lose most: up to −18.7% by 2070 (RCP7.0). Most affected regions are in Italy, Spain, Portugal, Greece, Romania and Croatia. Some northern regions gain.

Main drivers: labor impacts, riverine floods and sea-level rise.

Inequality is higher than in the no climate change scenario, especially under RCP7.0 after 2050.

Climate change impacts and adaptation: within-country inequality

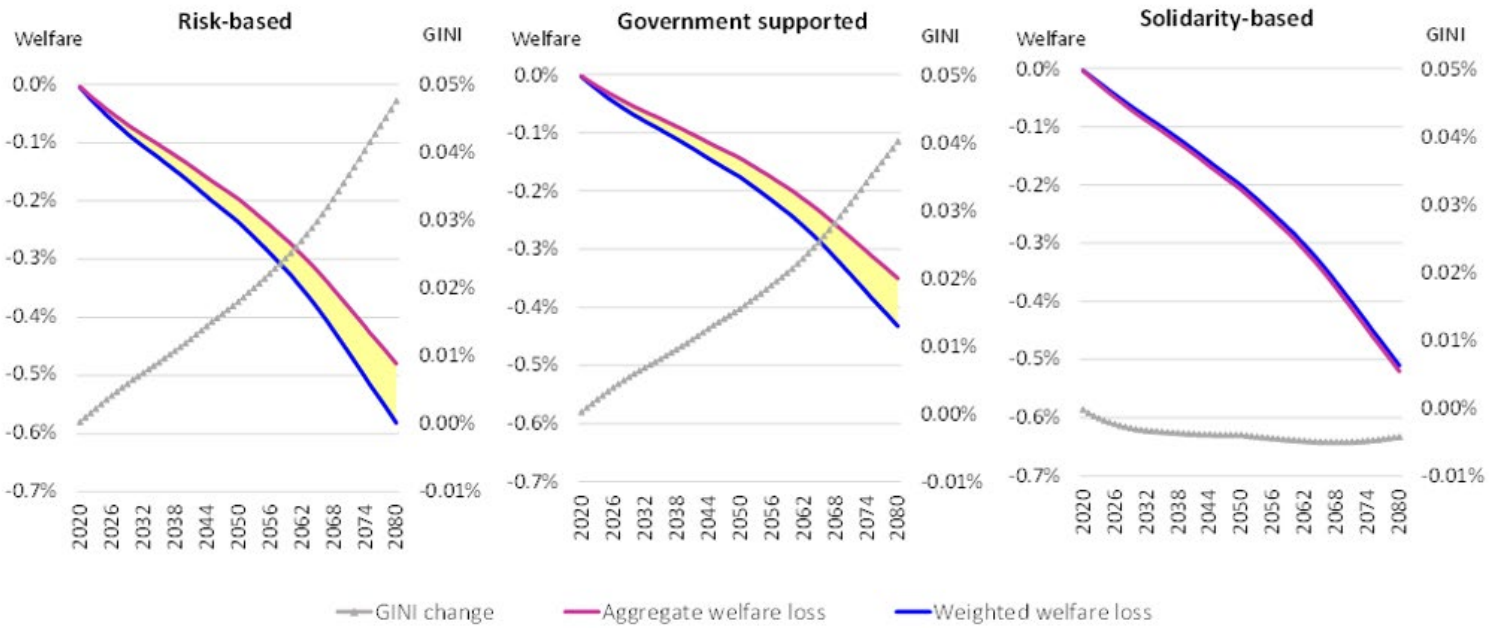
Income change by quintile and hazard, 2070 – RCP4.5 (%)



- **Household income in RCP4.5 (red diamonds) is on average higher than in RCP7 (black triangles).**
- **RCP 7 is regressive and RCP 4.5 slightly progressive**
- **Middle quintiles lose most in EU27+UK,** as their income depends heavily on labor earnings.
- **Adaptation shrinks losses for all quintiles** but not their regressivity in RCP7
- **Mitigation is progressive:** the richest quintile bears the largest income loss and inequality falls.
- **Combined RCP4.5 effect depends on adaptation:** inequality slightly up with low, slightly down with high adaptation.

Austria floods: 3 recovery schemes

24 household groups: income quartile × settlement type × flood exposure



RECOVERY SCHEMES:

- **Risk-based:** exposed households pay the full recovery cost.
- **Government supported:** 25% of costs covered by the public sector.
- **Solidarity-based:** costs shared by all households according to income, irrespective of exposure.

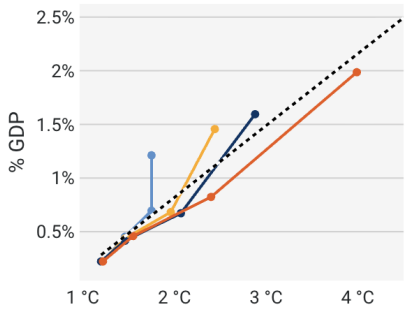
- **Risk-based:** Gini rises steadily
- **Government supported:** smaller losses, but Gini still rises.
- **Solidarity-based:** Gini stays flat
- **Trade-offs:** solidarity gives the largest GDP loss; risk-based is best for public finances; government support is best for GDP but weakest for public finances.
- **Targeted public support for low-income households** limits inequality at lower economic and fiscal cost.

Integrated Policy Assessment

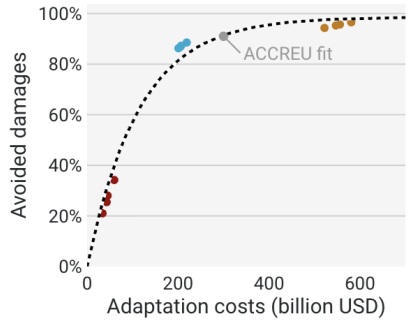
Sectoral damage and adaptation functions

Riverine flooding

GLOBAL DAMAGES (WITHOUT ADAPTATION)

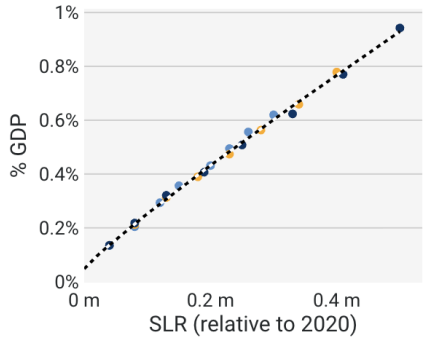


GLOBAL ADAPTATION COSTS

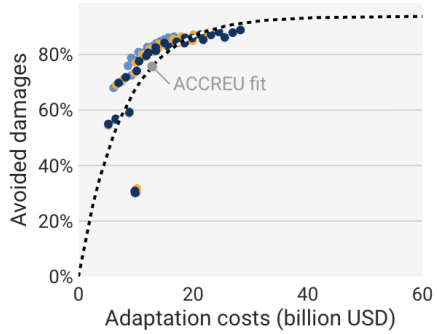


Sea-level rise

GLOBAL DAMAGES (WITHOUT ADAPTATION)

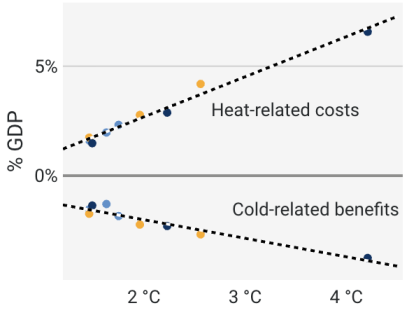


GLOBAL ADAPTATION COSTS

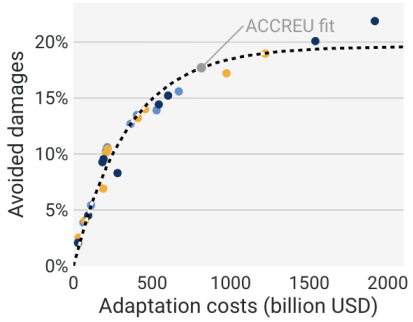


Labour productivity

GLOBAL DAMAGES (HEAT- AND COLD-RELATED, WITHOUT ADAPT.)

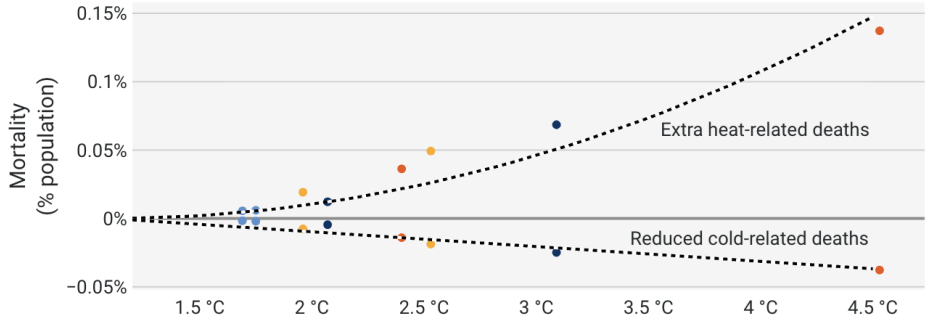


GLOBAL ADAPTATION COSTS (ONLY FOR HEAT-RELATED DAMAGES)



Mortality

GLOBAL MORTALITY (HEAT- AND COLD-RELATED, WITHOUT ADAPTATION)



Scenarios

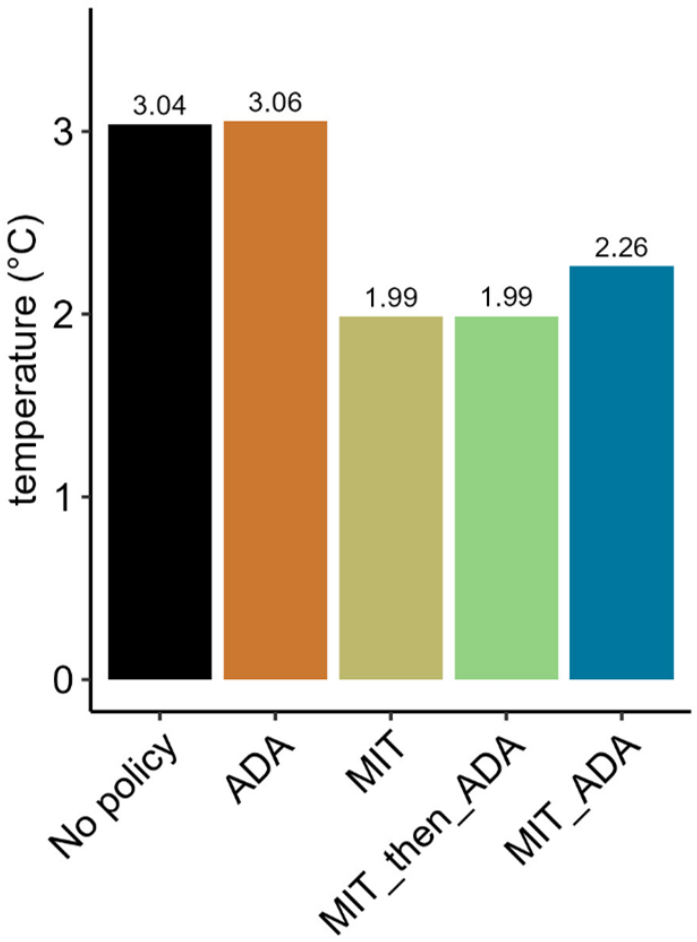
Adaptation assumption	No mitigation	Optimised mitigation
None	No policy	MIT
Optimised adaptation	ADA	MIT_then_ADA and MIT_ADA
Implementation gap	ADA_impl_gap	
Reduced effectiveness	ADA_red_eff	

Socio-economic limits to adaptation

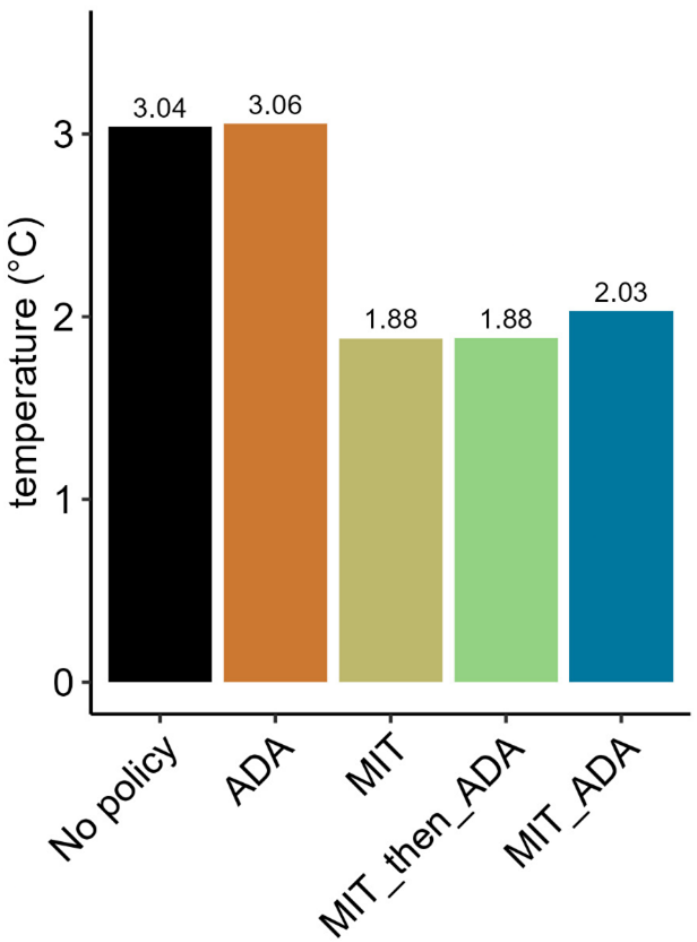
Unexpected failure of adaptation

Temperature

Without mortality

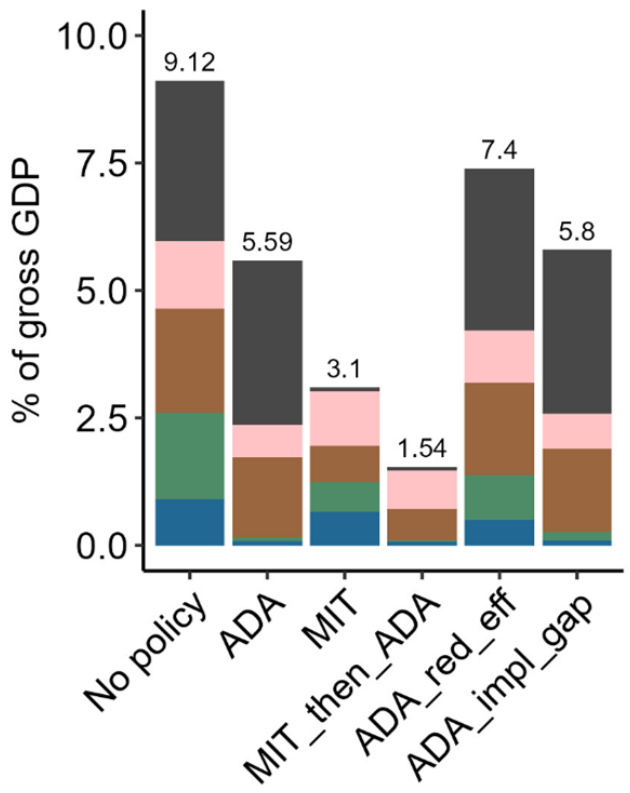


With mortality

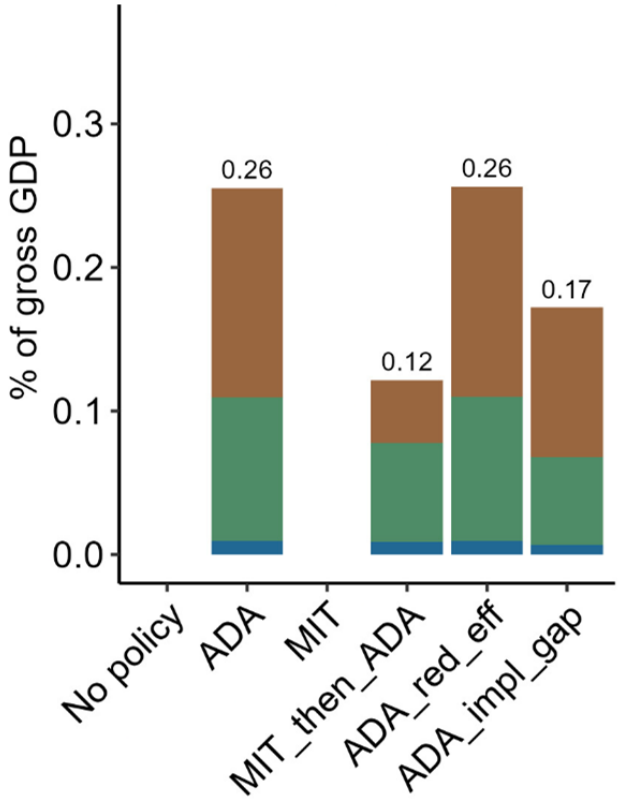


Damages and adaptation

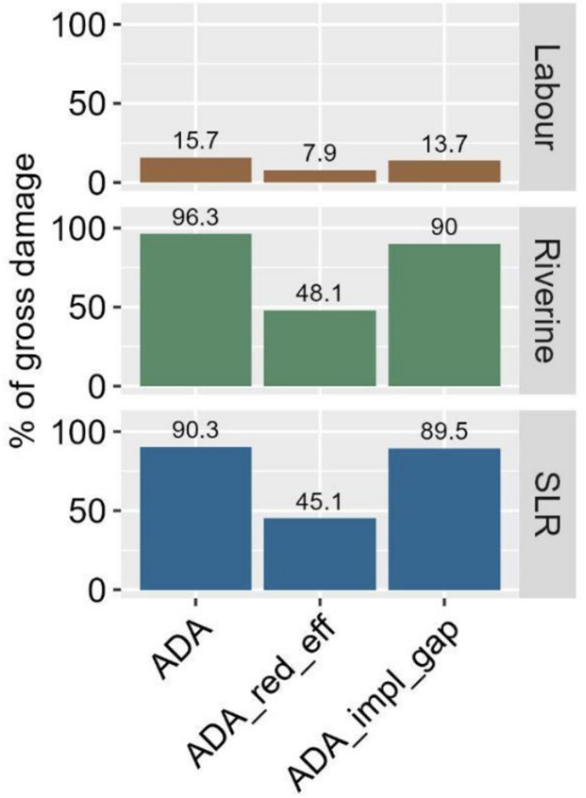
Damages (with mortality)



Adaptation costs



Adaptation level





Conclusion of IAM work

Novelty:

- Explicit sectoral decomposition
- Full adaptation effectiveness function
- Combined analysis mitigation vs adaptation
- Quantitative limitations to adaptation
- Non-market damages (mortality)

Limitations:

- Only 3 sectors
- Strong underestimation of total damages
- Adaptation much more optimistic than literature
- No full uncertainty range like COACCH
- CGE impacts vs direct impacts still needs research

Outcomes

Deliverables available on www.accreu.eu:

D4.1 Advancing impacts and adaptation in IAM and CGE models
D4.2 Integrated distributional analysis
D4.3 Fiscal and Financial Analysis
D4.4 Integrated analysis - Forthcoming

Manuscripts in preparation:

Campagnolo Lorenza, "Within-country distributional effects of climate change and adaptation in EU" Manuscript in preparation for submission to *Environmental & Resource Economics.*

Ingels, W.M., Tesselaar, M., Brusselaers, J., Aerts, J,C.J.H., & Botzen, W.J.W.B. (final round of revisions/reviews). Evaluation of flood insurance systems for businesses in a changing climate: an integrated model of flood risk and insurance markets. Under review at *Water Economics and Policy*.

Knittel, N., Campagnolo, L., Preinfalk, E., Bednar-Friedl, B., Lehner, A., Bacca, S., Haas, J., Hinkel, J., Lincke, D. Towards standardized adaptation modeling in CGE frameworks: Assessing sea level rise impacts and responses in Europe. Manuscript in preparation for submission to *Economic Systems Research*.

Lehner, A., Knittel N., Preinfalk, E., Bednar-Friedl, B., Watkiss, P., Hunt, A. Budgets in high water? Fiscal implications of flood adaptation in the United Kingdom. Manuscript in preparation for submission to *Environmental & Resource Economics.*

Van der Heyden M., Drouet L., Piontek F., Watkiss P., Sayer P., Hof A., Bosello F., De Cian E., Parrado R. & van der Wijst K., "Integrated Policy Assessment of adaptation, mitigation and residual damages" [TBD]

Preinfalk, E., Bachner, G., Knittel, N., Tesselaar, M. (2026). Spreading the risk, sharing the burden – A macroeconomic assessment of the distributional effects of flood risk financing schemes. In preparation for submission to *Risk Analysis.*



Climate change impacts and adaptation opportunities for European agriculture

Alvaro Calzadilla, Zein Khraizat & Olivier Dessens

UCL Institute for Sustainable Resources

ACCREU and CROSSEU Final Conference
13th November 2026

CrossEU

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Introduction / Motivation

Climate change impacts on agriculture

- Global crop yield reduction is around 1% per decade
- The effects on crop yield vary greatly within each crop, timeframe and Representative Concentration Pathway (RCP)
- Climate change will disproportionally affect crop yield among regions, with more negative than positive impacts

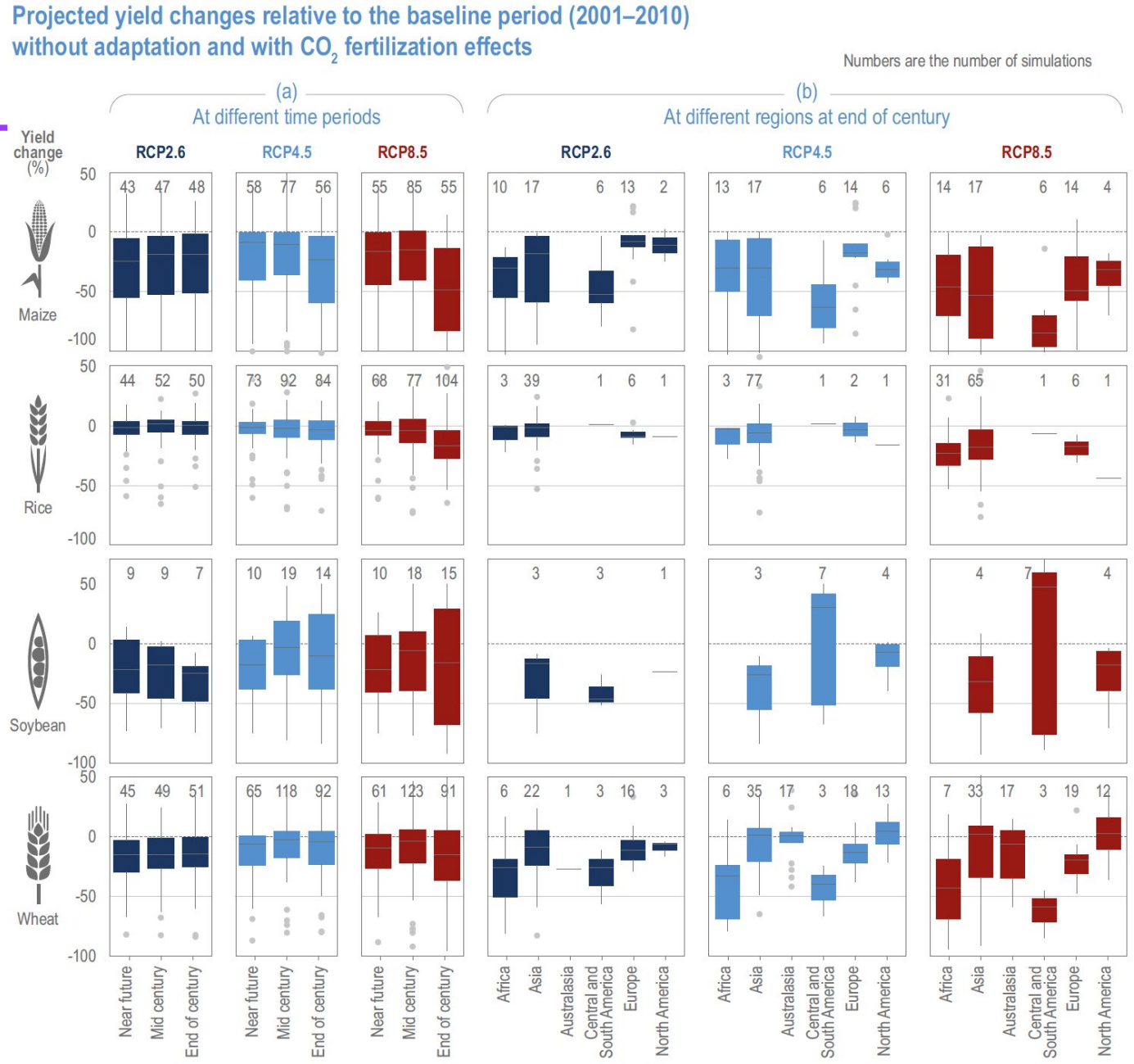
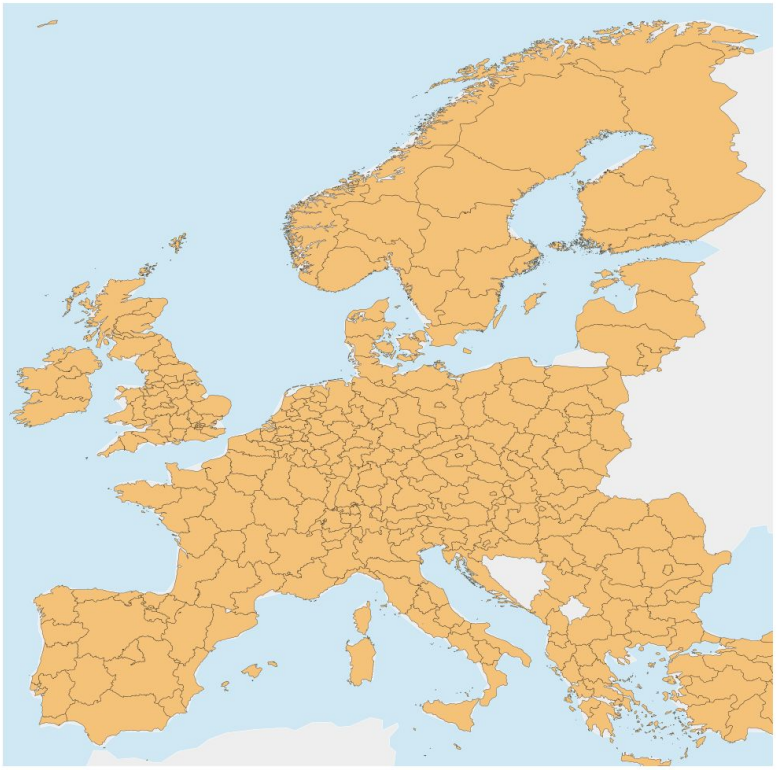


Figure 5.6 | Projected yield changes relative to the baseline period (2001–2010) without adaptation and with CO_2 fertilisation effects (Hasegawa et al., 2021b). The box is the interquartile range (IQR), and the middle line in the box represents the median. The upper and lower end of whiskers are median 1.5 × IQR ± median. Open circles are values outside the 1.5 × IQR. **(a)** At different time periods (near future, NF, baseline to 2039; mid-century, MC, 2040–2069; end-century, EC, 2070–2100) under three RCPs, and **(b)** at different regions at EC.

Methodology – Subnational-ENGAGE model (Dataset)

Spatial coverage (subnational heterogeneity)

- 237 NUTS-2 EU regions
- 46 NUTS-2 UK regions
- 17 main EU trade partners
- 1 Rest of the World



Agricultural production

- Agriculture is disaggregated into six primary commodity groups, including: Wheat, Rice, Oil Seeds, Other Cereals, Other crops, Other Agriculture

Industry and services sectors

- Extractive industries, Manufacturing, Construction, Transport and Services

Data and calibration

- Eurostat economic accounts
- Figaro tables
- FADN informing agricultural production and income composition
- 7 annual benchmark years (2018-2023)
- Million Euros

CrossEU

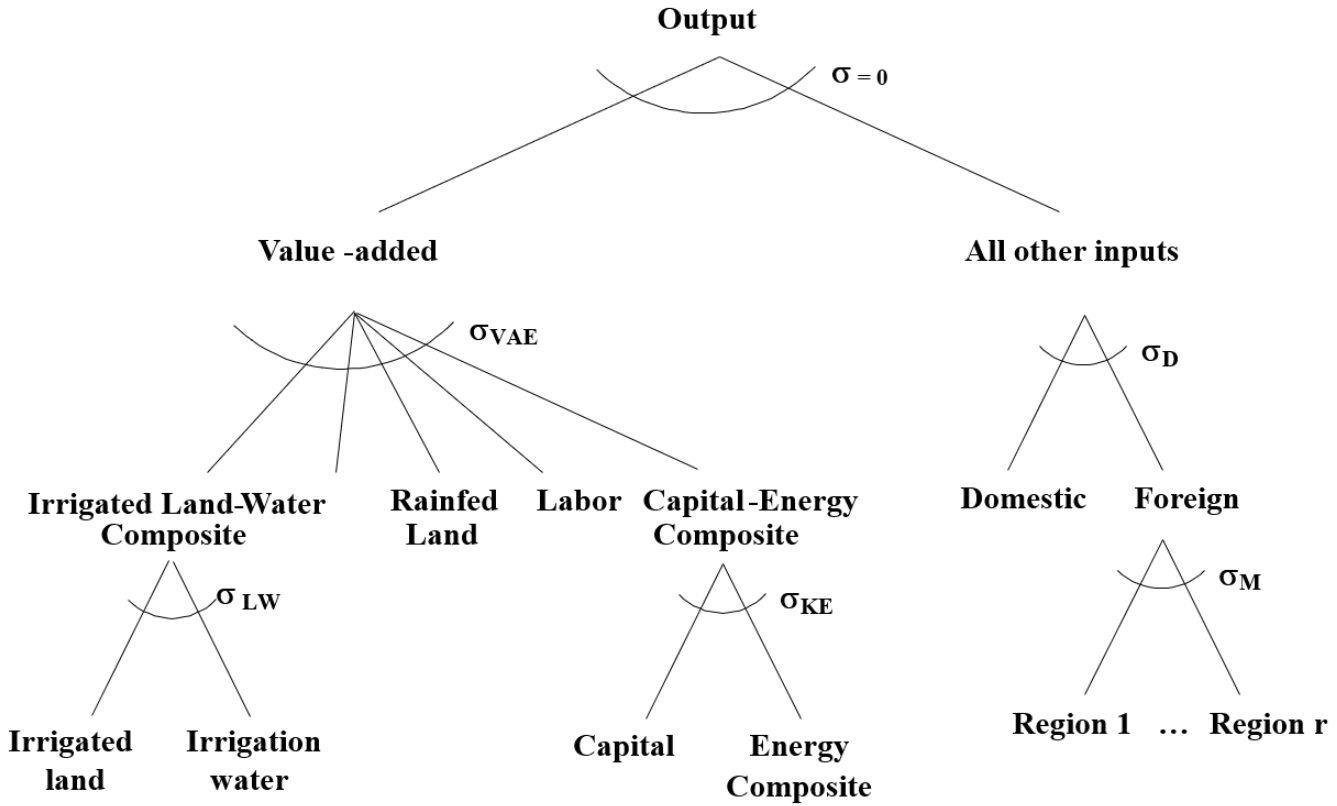
UCL

Methodology – Subnational-ENGAGE model (Model)

Subnational-ENGAGE model

- UCL Subnational Environmental Global Applied General Equilibrium model
- Standard static CGE model of the world economy (EU NUTS2 representation)
- Based on the GTAP6.2 version (Hertel et al. 2003) and GTAP-W (Calzadilla et all 2011)
- Calibrated to 2023 using the ENGAGE Nuts2 dataset (Million Euros)

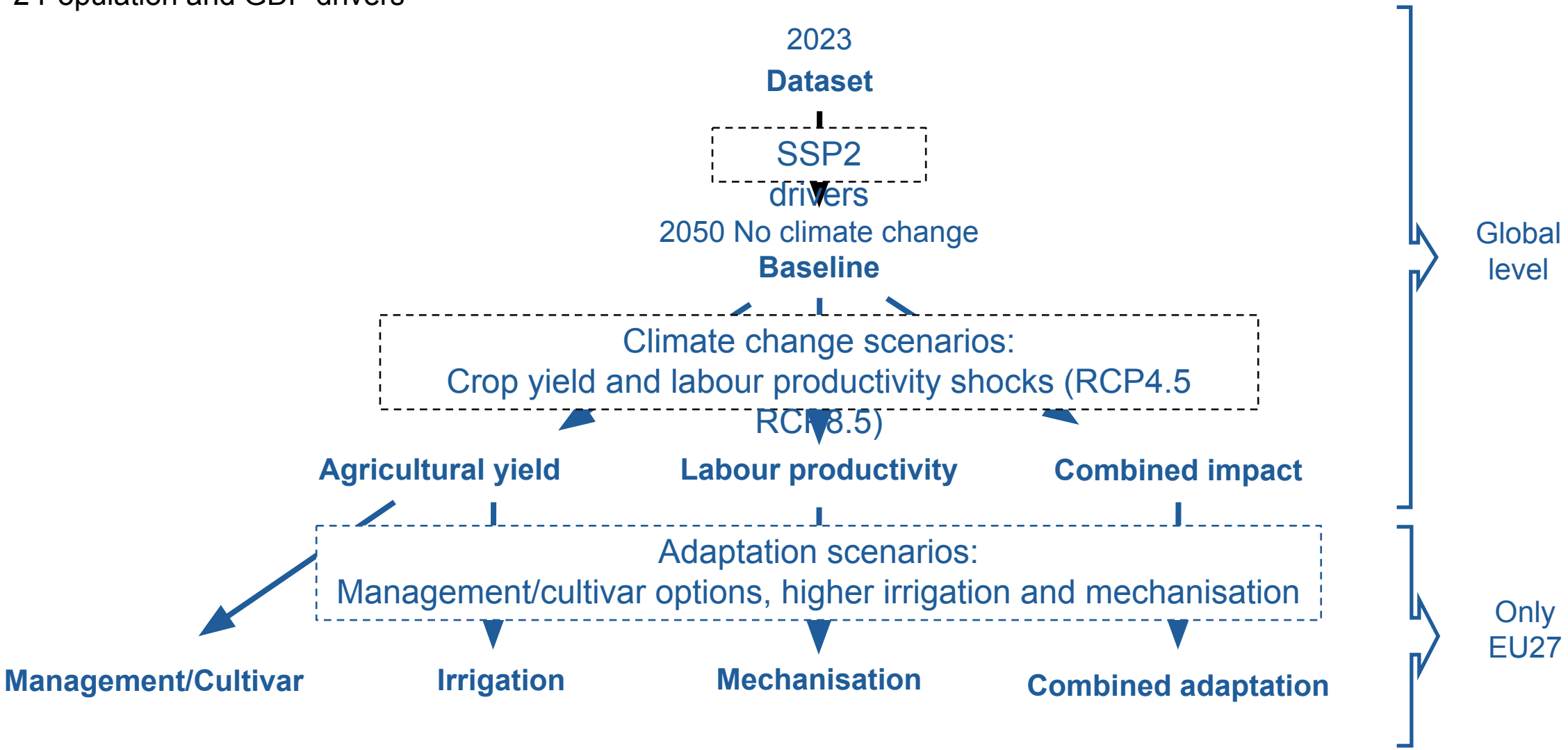
- Aggregation: - 301 regions
  - 11 Sectors (5 crops)
  - 5 factors of production



Scenarios

Baseline

- SSP2 Population and GDP drivers

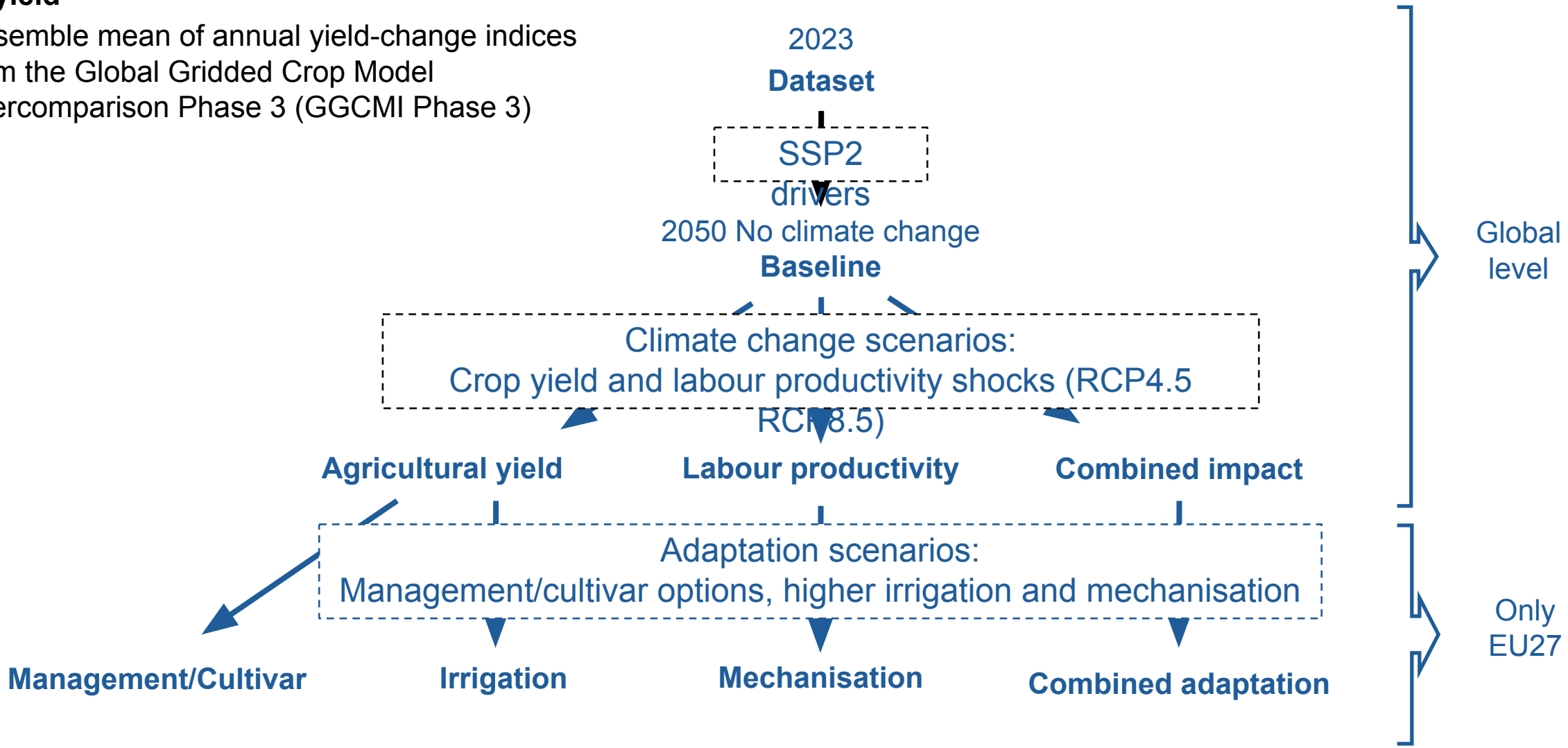


Scenarios

Climate change scenarios (RCP4.5 and RCP8.5):

Crop yield

- Ensemble mean of annual yield-change indices from the Global Gridded Crop Model Intercomparison Phase 3 (GGCMI Phase 3)

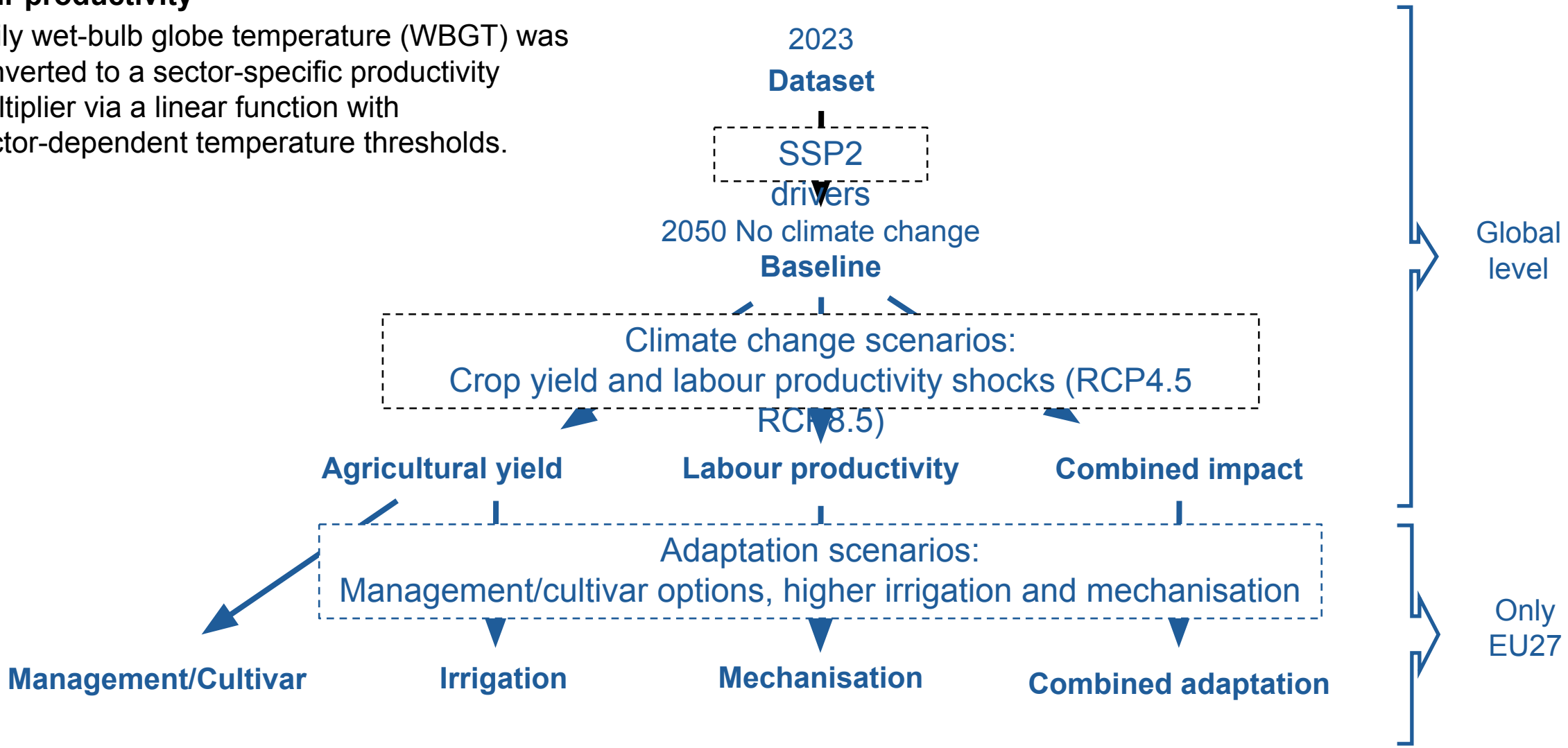


Scenarios

Climate change scenarios (RCP4.5 and RCP8.5):

Labour productivity

- Daily wet-bulb globe temperature (WBGT) was converted to a sector-specific productivity multiplier via a linear function with sector-dependent temperature thresholds.

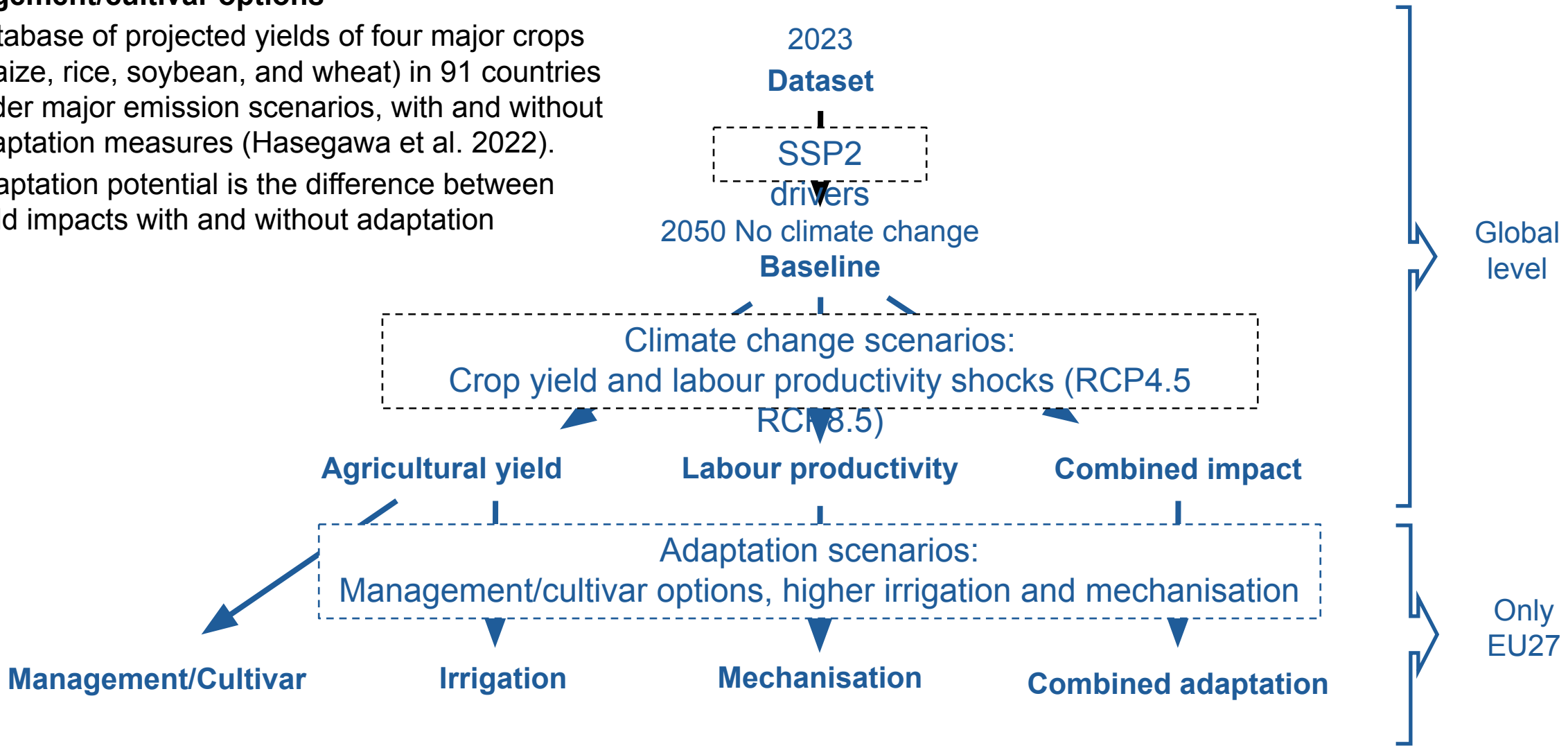


Scenarios

Adaptation scenarios (only EU27):

Management/cultivar options

- Database of projected yields of four major crops (maize, rice, soybean, and wheat) in 91 countries under major emission scenarios, with and without adaptation measures (Hasegawa et al. 2022).
- Adaptation potential is the difference between yield impacts with and without adaptation

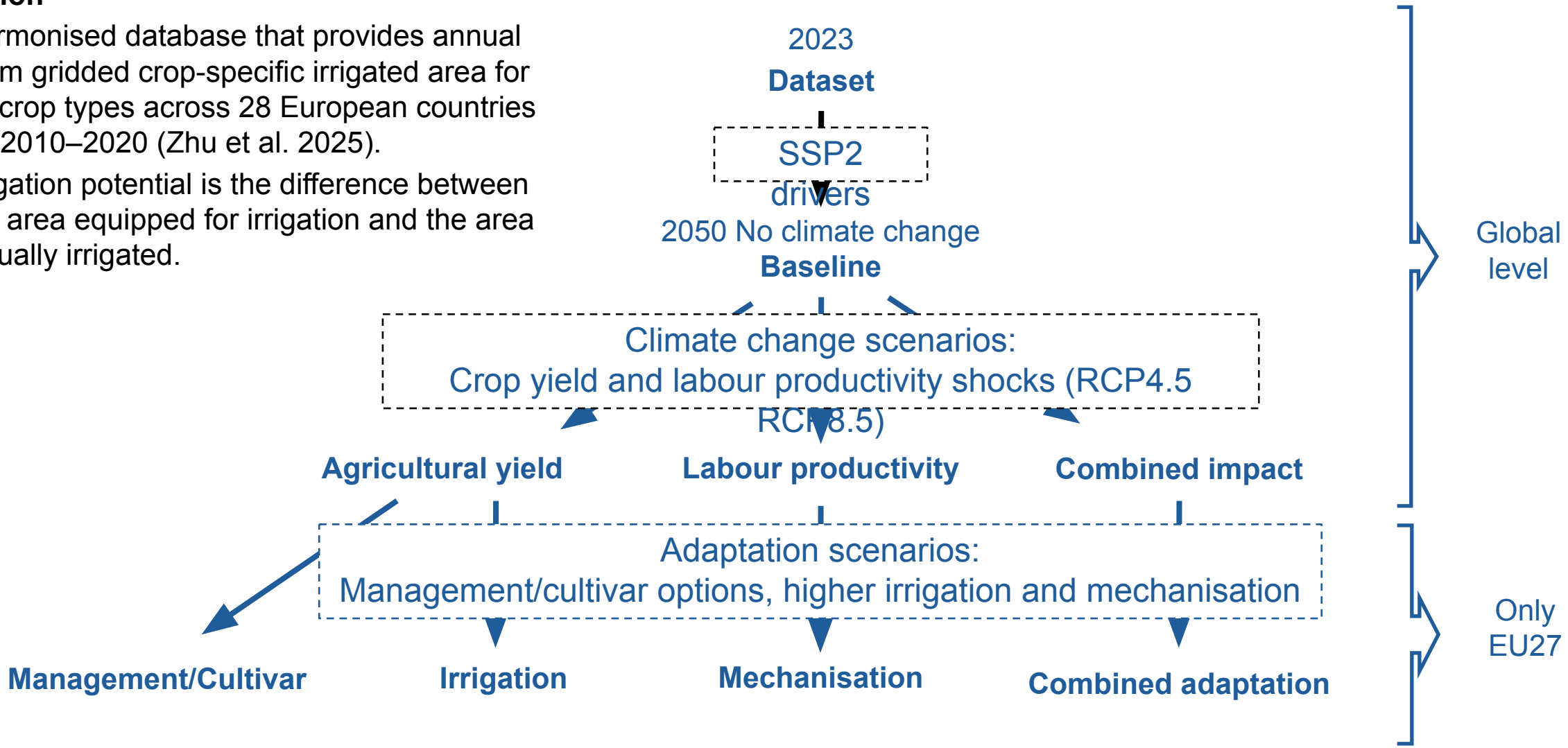


Scenarios

Adaptation scenarios (only EU27):

Irrigation

- Harmonised database that provides annual 1-km gridded crop-specific irrigated area for 16 crop types across 28 European countries for 2010–2020 (Zhu et al. 2025).
- Irrigation potential is the difference between the area equipped for irrigation and the area actually irrigated.

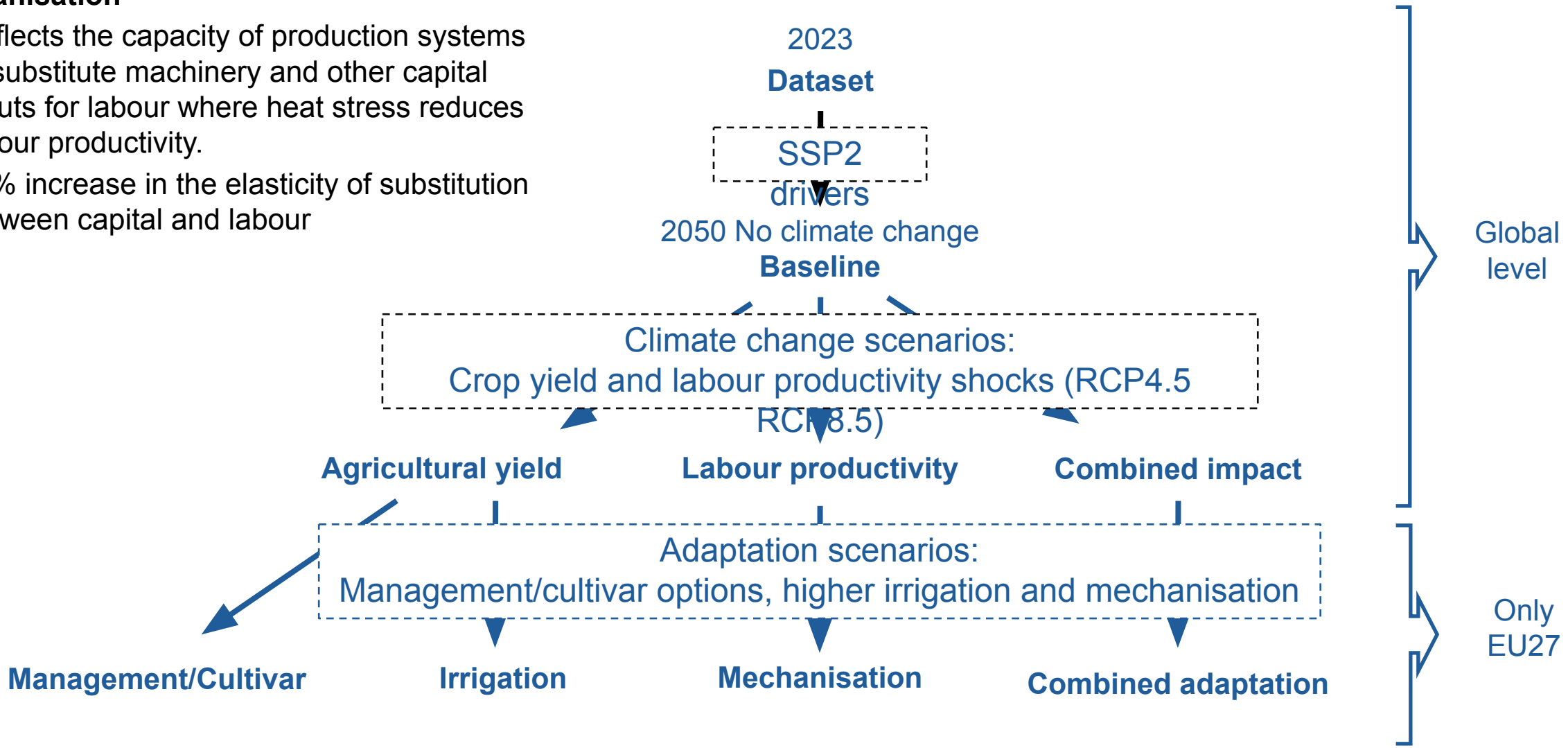


Scenarios

Adaptation scenarios (only EU27):

Mechanisation

- Reflects the capacity of production systems to substitute machinery and other capital inputs for labour where heat stress reduces labour productivity.
- 30% increase in the elasticity of substitution between capital and labour



Climate shocks – Crop yield changes

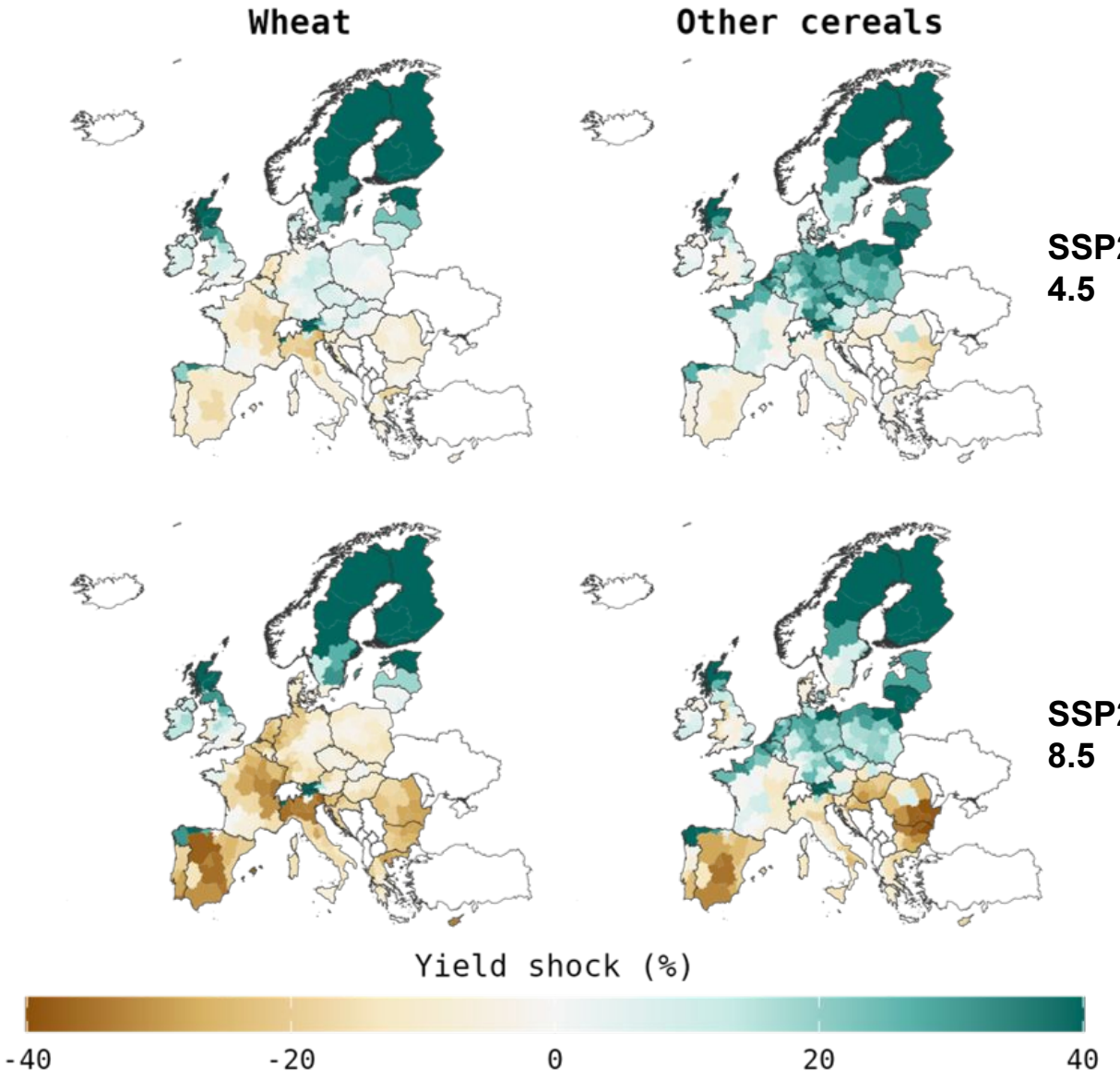


Figure: End-of-century yield changes for wheat and other cereals under SSP2-4.5 and SSP2-8.5 across EU27+UK NUTS2 regions relative to 1981-2010 baseline

Climate shocks – Labour productivity changes

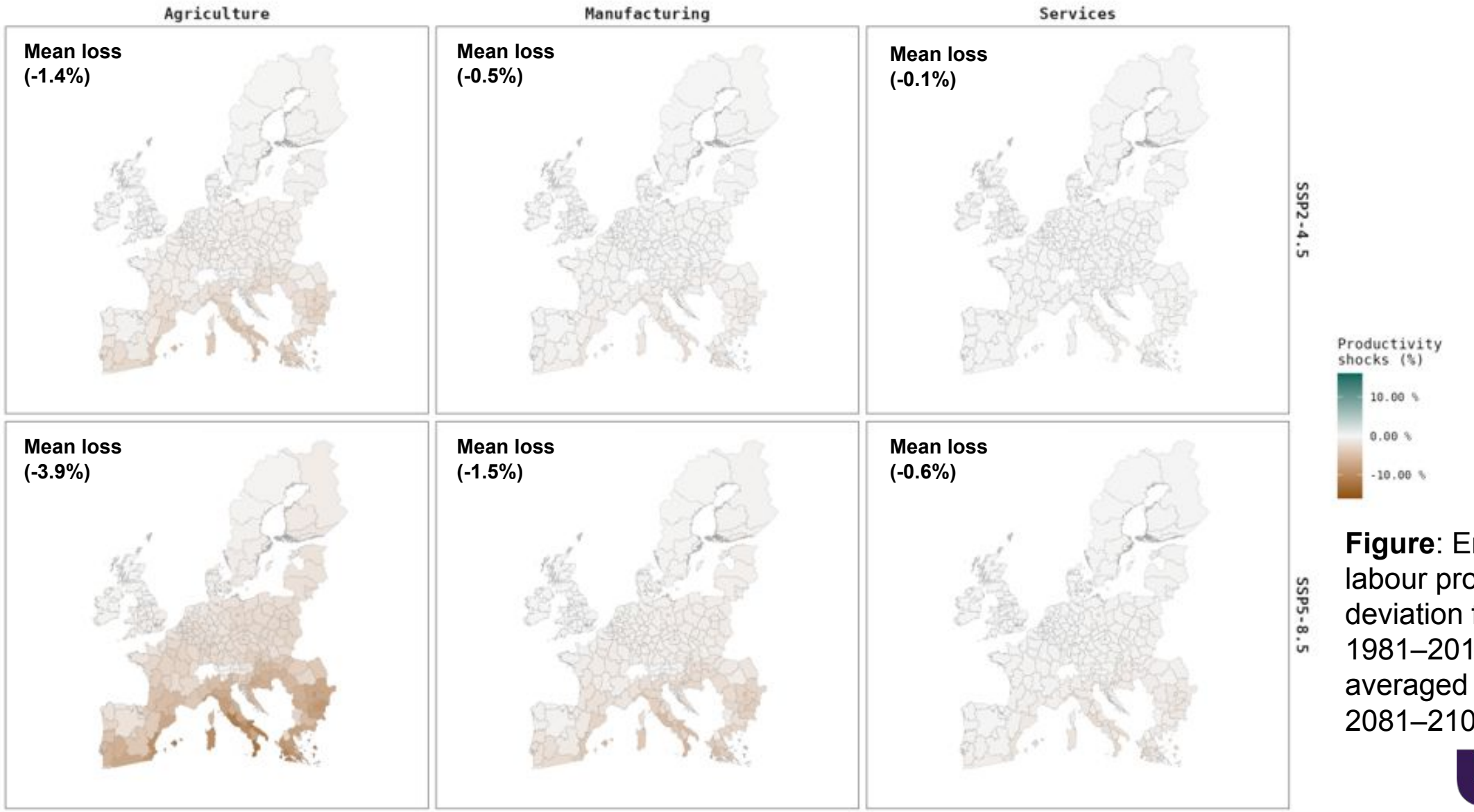
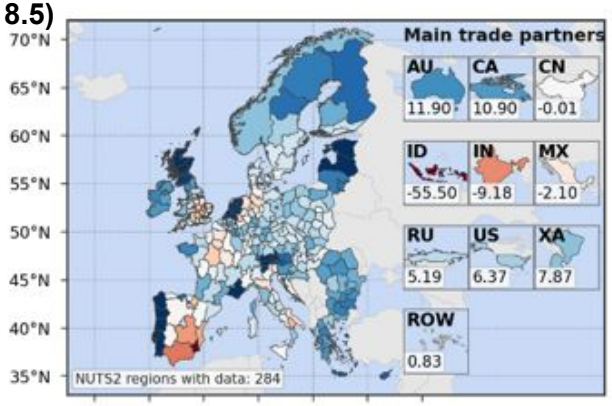


Figure: Ensemble-mean labour productivity deviation from the 1981–2010 baseline (%), averaged over 2081–2100,

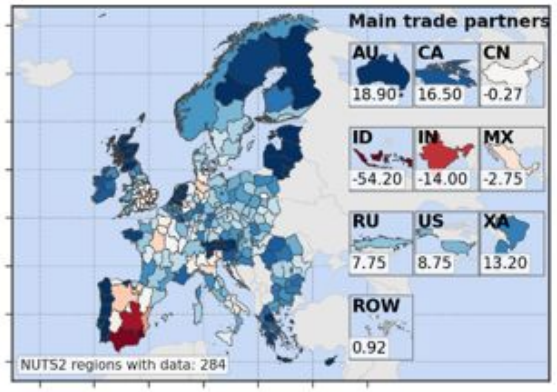
Results climate change impacts & adaptation (Combined scenario) - Production

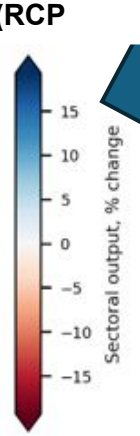
Wheat

Climate impacts – Combined scenario (RCP 4.5)



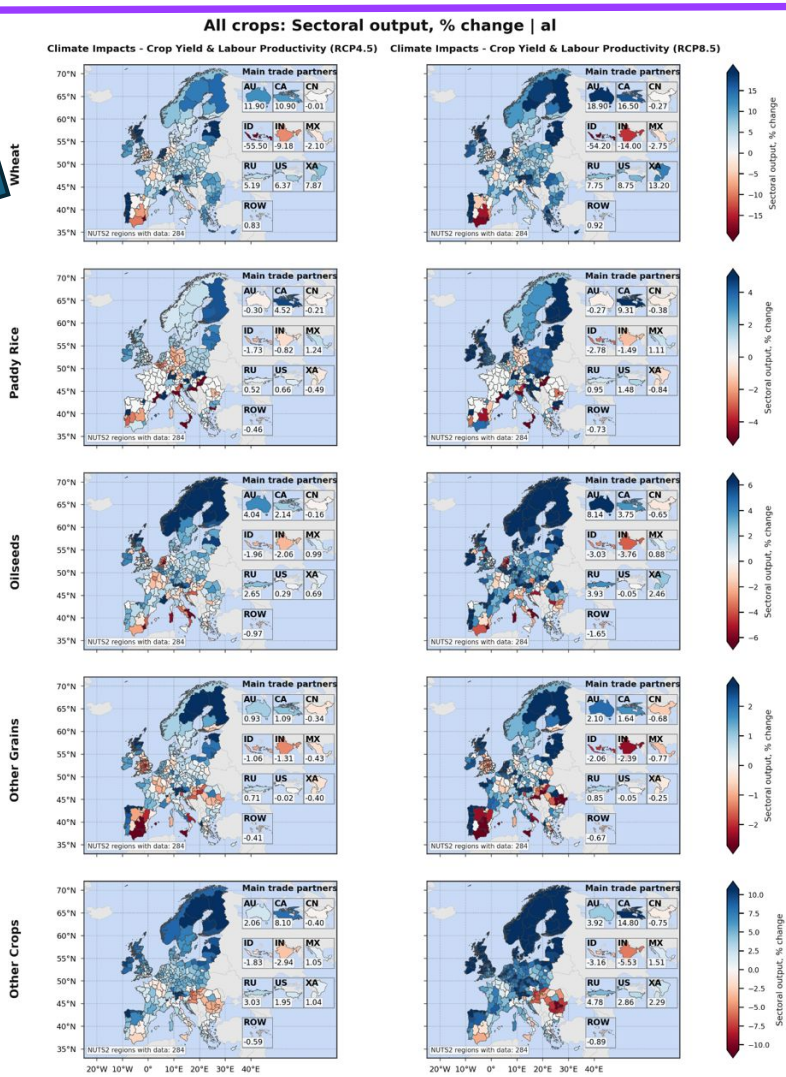
Climate impacts – Combined scenario (RCP 8.5)





RCP 8.5 Scenario

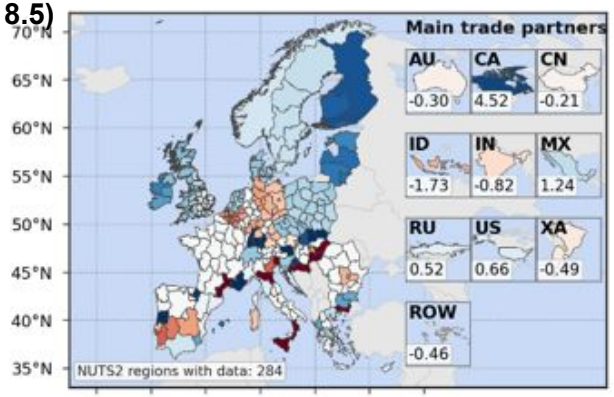
Wheat (WHT) Top ten producers (20%)		Climate change		Adaptation	
ES41	Castilla y Leon	↓	-4.8%	↓	-15.5%
FRB0	Centre Val de Loire	↓	-4.1%	↓	-21.8%
FRE2	Picardie	↓	-1.1%	↓	-0.2%
FRG0	Pays de la Loire	↑	7.0%	↑	3.3%
ES61	Andalucia	↓	-18.1%	↓	-23.0%
FRF2	Champagne-Ardenne	↑	2.0%	↑	14.0%
RO31	Sud-Muntenia	↑	5.7%	↓	-40.6%
FRE1	Nord-Pas de Calais	↑	4.5%	↑	23.4%
FRI3	Poitou-Charentes	↑	2.8%	↓	-1.7%
TLF3	Mardin	↑	0.6%	↓	-19.6%



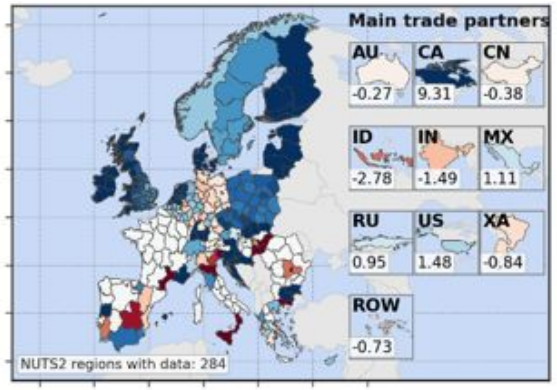
Results climate change impacts & adaptation (Combined scenario) - Production

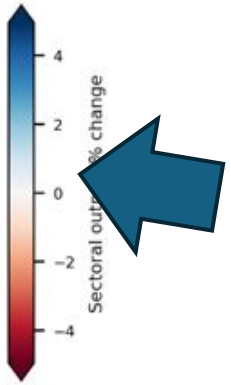
Paddy Rice

Climate impacts – Combined scenario (RCP 4.5)



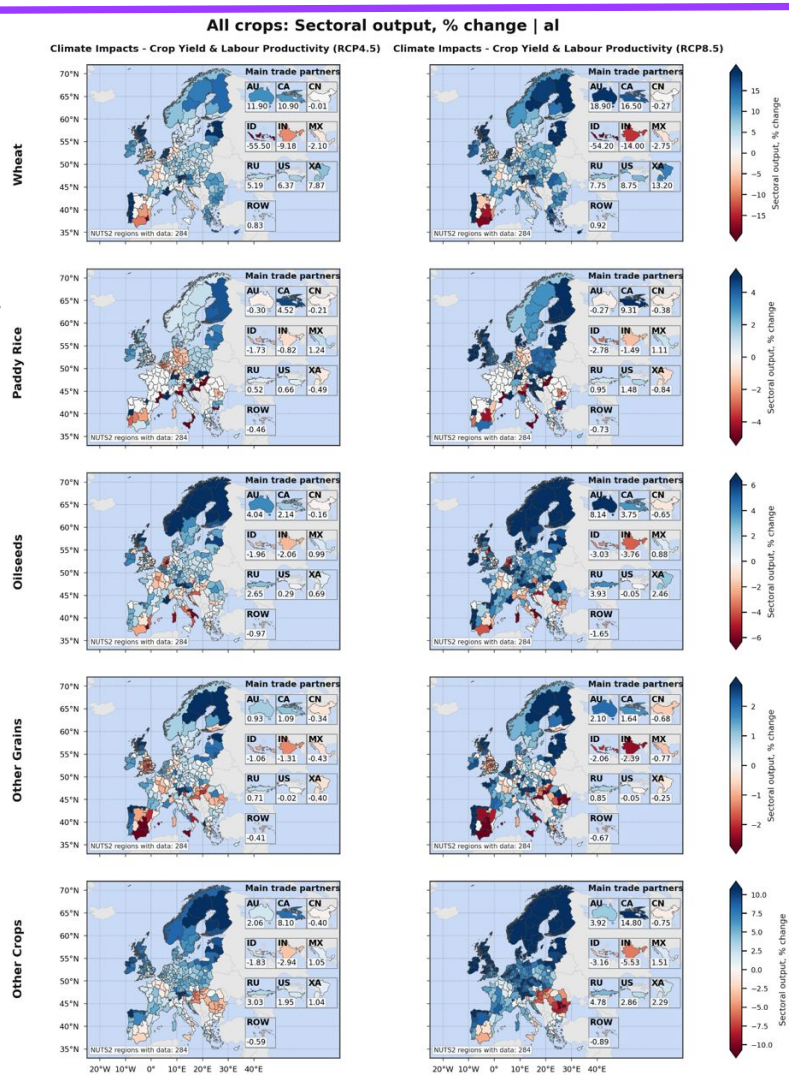
Climate impacts – Combined scenario (RCP 8.5)





RCP 8.5 Scenario

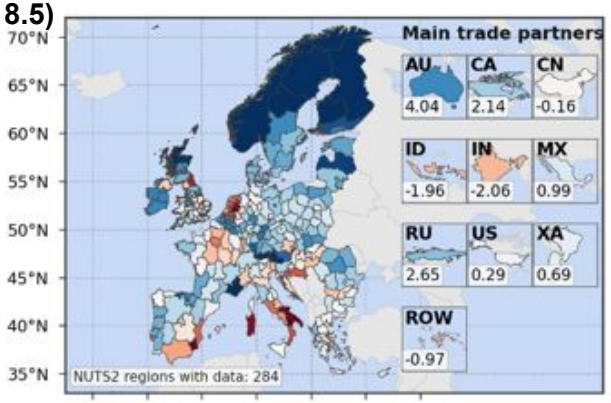
Paddy rice (PDR) Top ten producers (86%)		Climate change	Adaptation
ITC1	Piemonte	1.4%	3.2%
ITC4	Lombardia	-1.2%	3.2%
ES52	Comunidad Valenciana	-1.0%	-3.0%
ES51	Cataluna	0.2%	8.9%
ES43	Extremadura	-0.2%	13.4%
FRL0	Provence-Alpes-Cote d'Azur	20.6%	-73.1%
ITG2	Sardegna	-0.1%	-25.8%
ITH5	Emilia-Romagna	-14.3%	-14.2%
EL52	Kentriki Makedonia	2.1%	7.6%
RO31	Sud-Muntenia	-2.8%	-40.4%



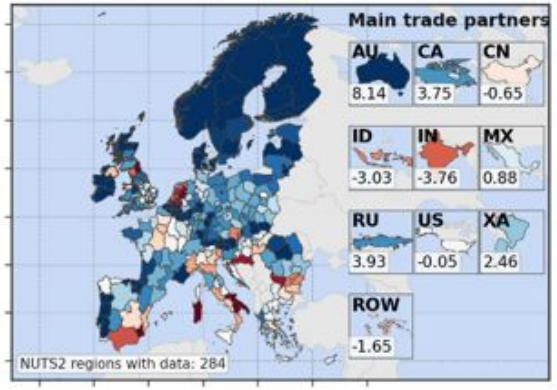
Results climate change impacts & adaptation (Combined scenario) - Production

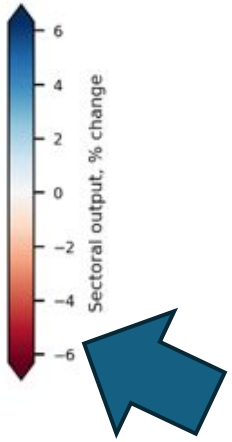
Oilseeds

Climate impacts – Combined scenario (RCP 4.5)



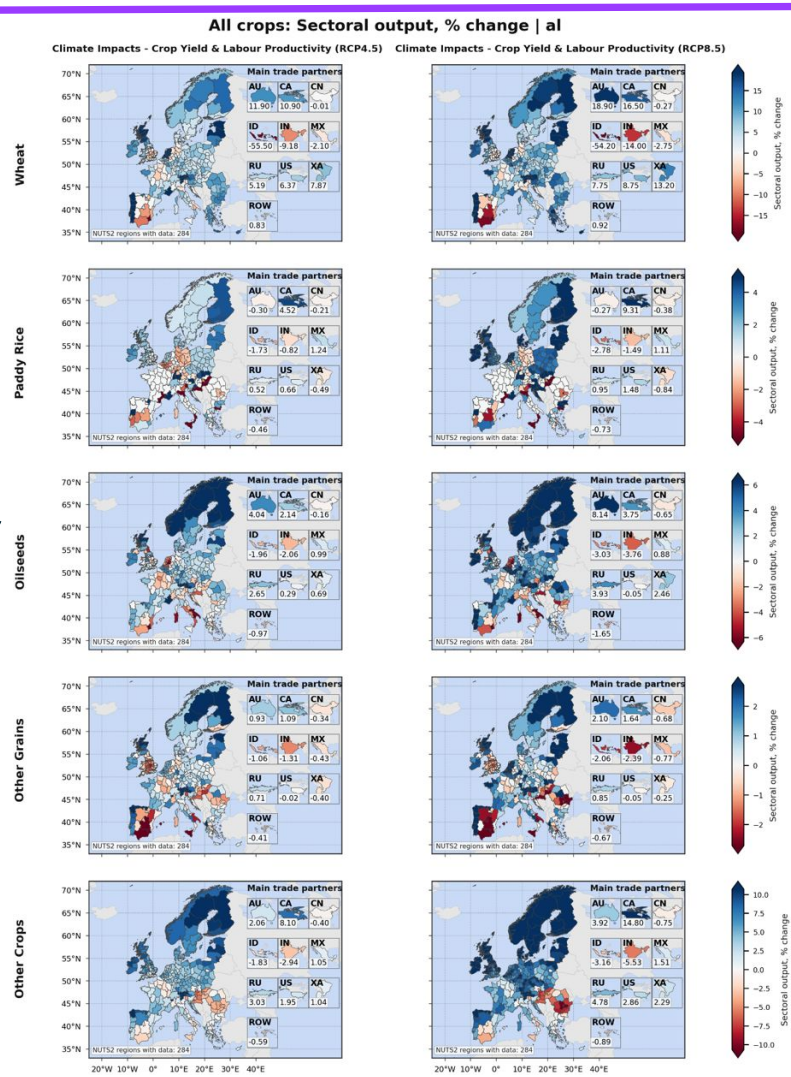
Climate impacts – Combined scenario (RCP 8.5)





RCP 8.5 Scenario

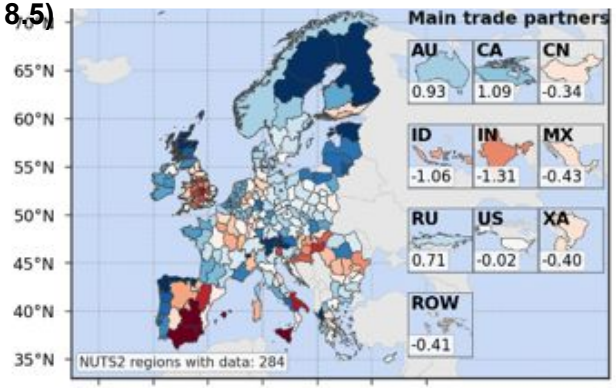
Oilseeds (OSD) Top ten producers (47%)		Climate change	Adaptation
ES41	Castilla y Leon	2.0%	0.0%
ITH3	Veneto	-1.5%	-4.9%
EL51	Anatoliki Makedonia, Thraki	0.3%	-0.7%
ES61	Andalucia	-4.0%	-4.8%
ITC4	Lombardia	-0.6%	-4.7%
ITH4	Friuli-Venezia Giulia	-2.7%	5.5%
ES42	Castilla-La Mancha	-1.0%	-6.0%
EL52	Kentriki Makedonia	0.4%	1.9%
ITH5	Emilia-Romagna	-2.5%	-21.9%
FRB0	Centre Val de Loire	-1.4%	-14.7%



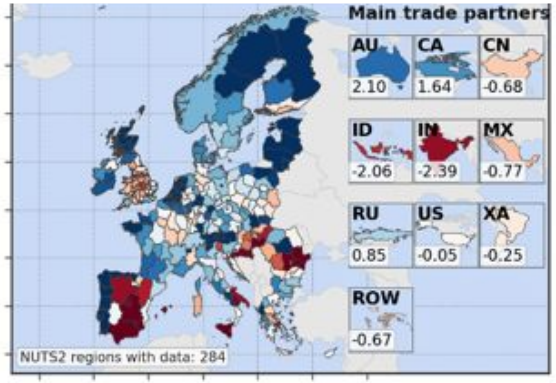
Results climate change impacts & adaptation (Combined scenario) - Production

Other Grains

Climate impacts – Combined scenario (RCP 4.5)

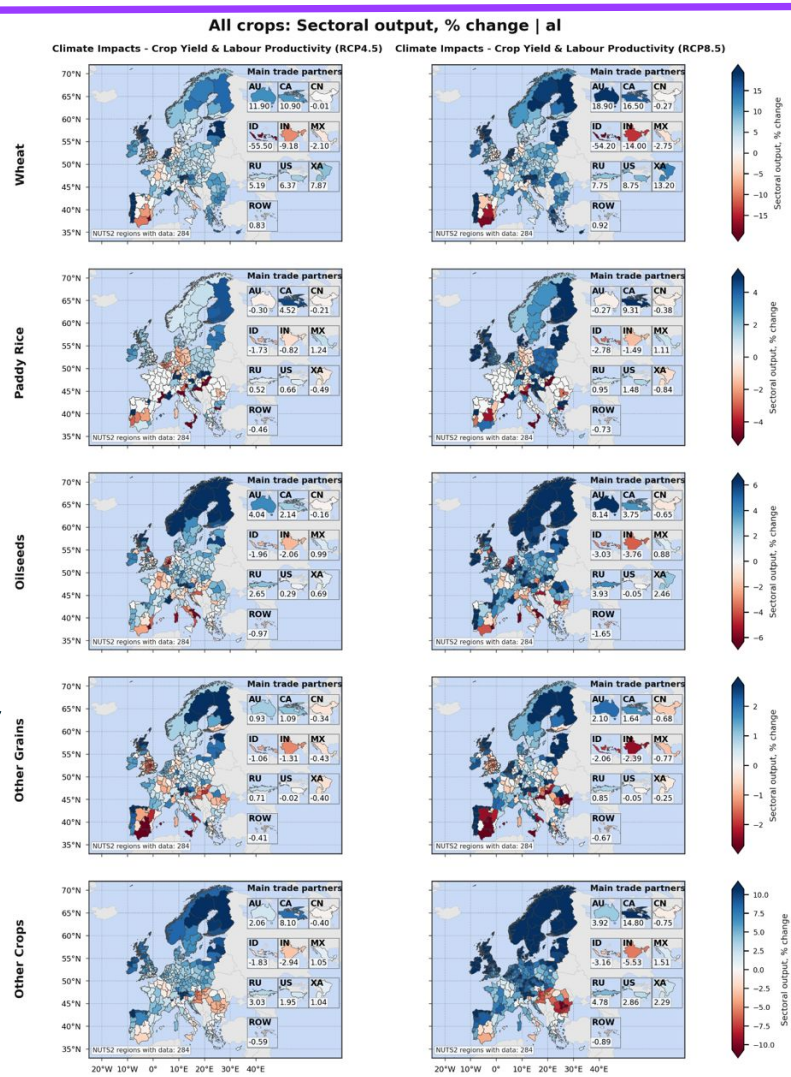


Climate impacts – Combined scenario (RCP 8.5)



RCP 8.5 Scenario

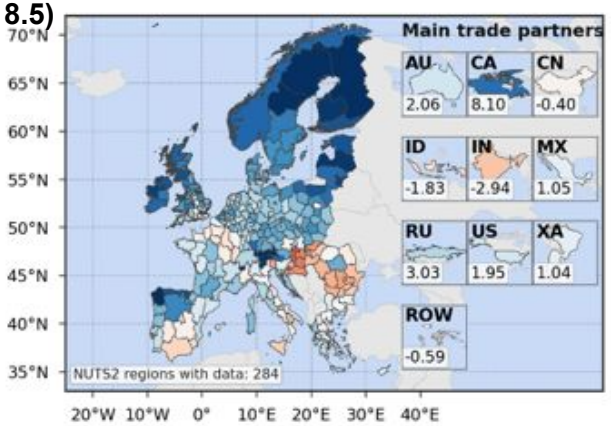
Other grains (GRO) Top ten producers (23%)		Climate change	Adaptation
ES41	Castilla y Leon	-2.4%	-3.8%
PL41	Wielkopolskie	0.6%	0.1%
ITC4	Lombardia	1.4%	10.8%
ITH3	Veneto	0.9%	10.1%
ES24	Aragon	-2.2%	0.6%
ITC1	Piemonte	-0.5%	5.6%
FRB0	Centre Val de Loire	0.2%	0.0%
PL92	Mazowiecki regionalny	1.0%	-0.2%
ES42	Castilla-La Mancha	-8.3%	-15.5%
FRI1	Aquitaine	2.2%	3.5%



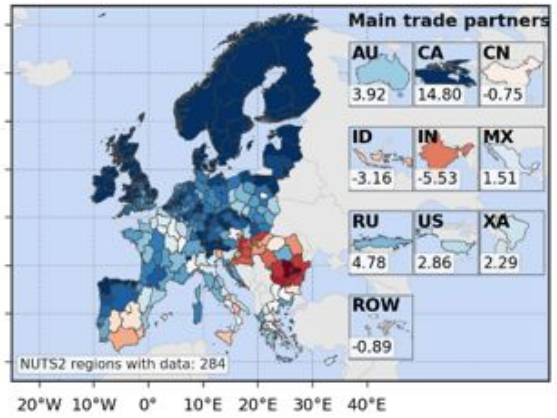
Results climate change impacts & adaptation (Combined scenario) - Production

Other Crops

Climate impacts – Combined scenario (RCP 4.5)

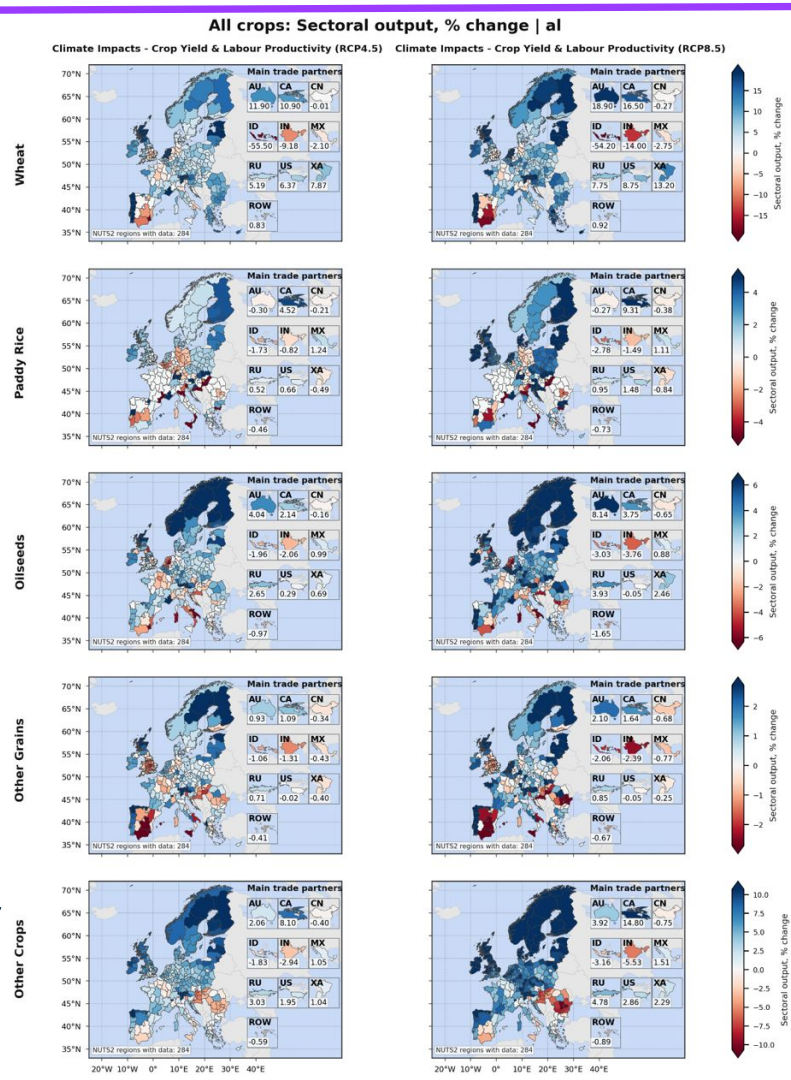


Climate impacts – Combined scenario (RCP 8.5)



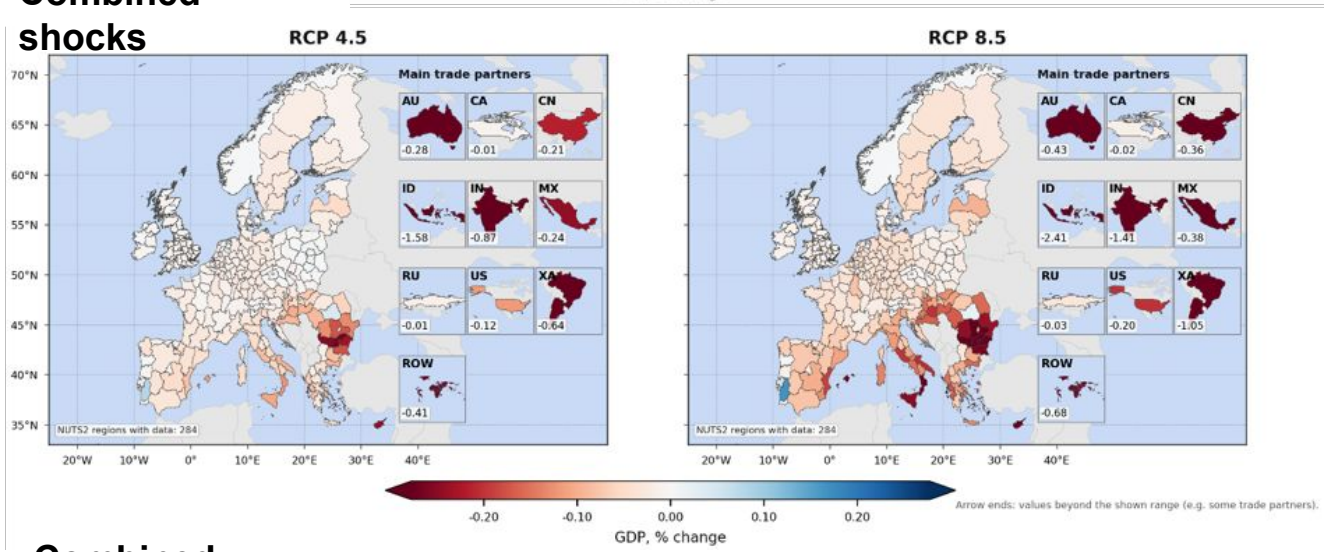
RCP 8.5 Scenario

Other crops (OCR) Top ten producers (21%)		Climate change	Adaptation
ES61	Andalucia	-4.0%	-2.5%
FRF2	Champagne-Ardenne	0.7%	1.1%
ITG1	Sicilia	-3.0%	-2.8%
NL36	Flevoland	8.2%	4.0%
FRI1	Aquitaine	7.2%	-0.5%
ITH3	Veneto	1.8%	5.8%
ITF4	Puglia	2.2%	-12.9%
FRL0	Provence-Alpes-Cote d'Azur	5.8%	-6.3%
FRC1	Bourgogne	1.3%	3.9%
ES42	Castilla-La Mancha	-1.5%	4.4%

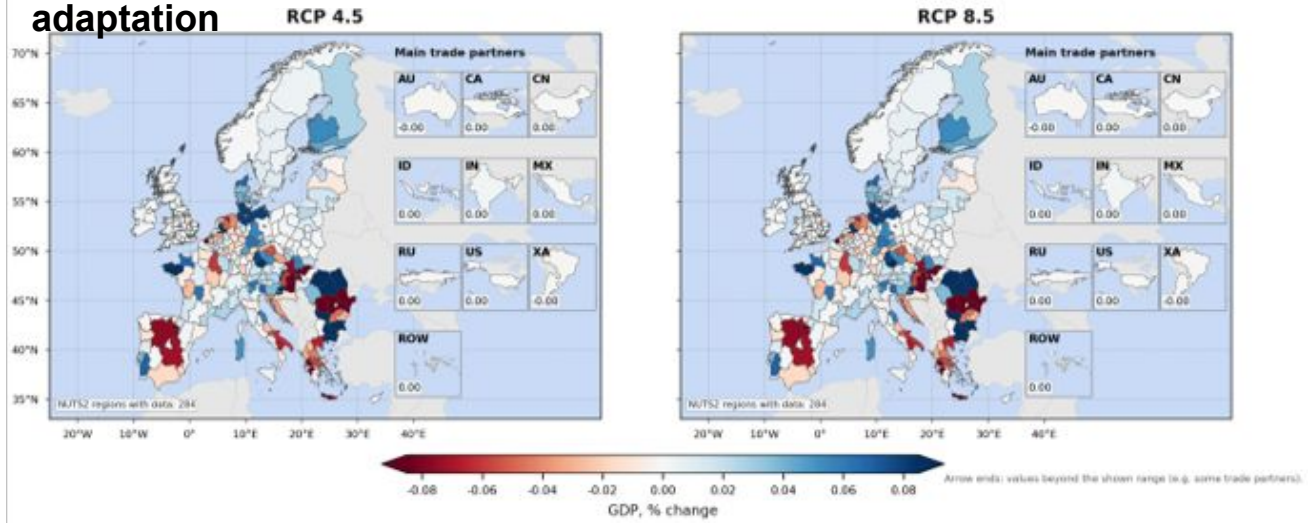


Results climate change impacts (Combined scenario) - GDP

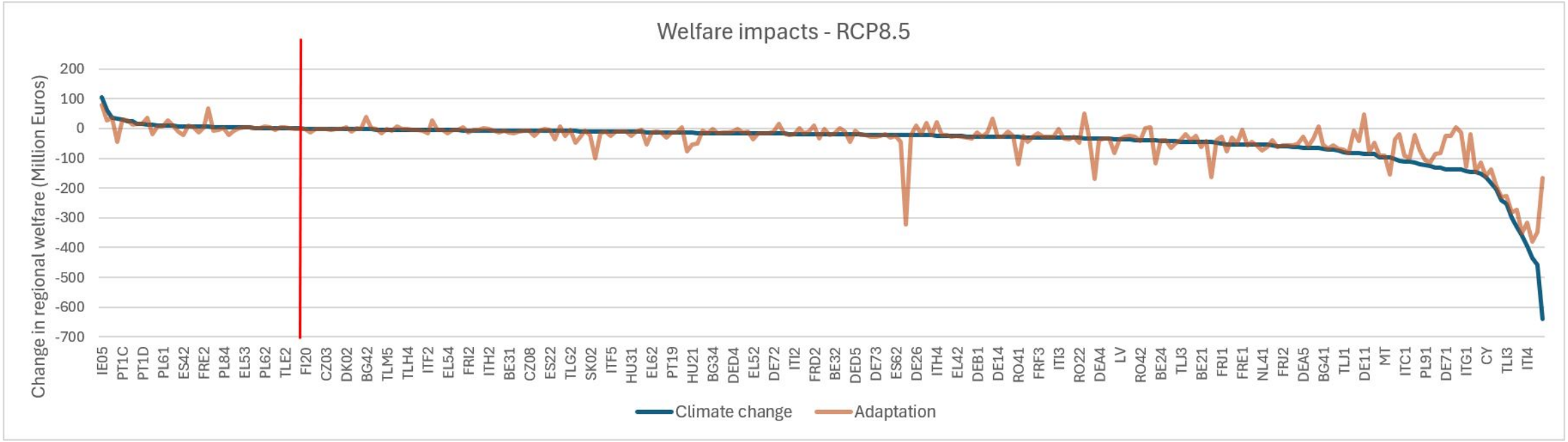
Combined shocks



Combined adaptation



Results climate change impacts (Combined scenario) - Welfare



Conclusions & limitations

Conclusions

- Climate change generates risks and opportunities for European farmers
- The impact of climate change and adaptation depends on the relative change in biophysical conditions (direct) and economic conditions (indirect)
- Targeted adaptation is necessary to mitigate the impacts of climate change in the most productive regions
- The most effective adaptation option depends on the region. However, larger positive impacts are expected with irrigation enhancement.

Limitations

- Do not consider costs associated to adaptation options
- Do not consider environmental impacts
- Every NUTS2 region is modelled independently to the country it belongs.

Thank you



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ACCREU
Assessing Climate Change Risk in EUrope

CrossEU

THE ACCREU AND CROSSEU FINAL EVENT

CLIMATE RISK ACROSS EUROPE: KNOWLEDGE, TOOLS AND PATHWAYS TO RESILIENCE

Brussels and online, 13 November 2026

Organised by:

cmcc Centro Euro-Mediterraneo sui Cambiamenti Climatici

METEO ROMANIA

UK Research and Innovation

Funded by the European Union

ACCREU
Assessing Climate Change Risk in EUrope

6th ACCREU final project meeting

Brussels, November 12th-13th 2026

ACCREU Digital Tools

Enrica De Cian, CMCC Foundation & Ca' Foscari University of Venice

Amanda Palazzo, IIASA

ACCREU tools

- ACCREU Data Catalog
- Climate Change Impact & Adaptation Scenario Explorer
- European Adaptation Handbook







ACCREU Data Catalog

IIASA ACCELERATOR · ABOUT

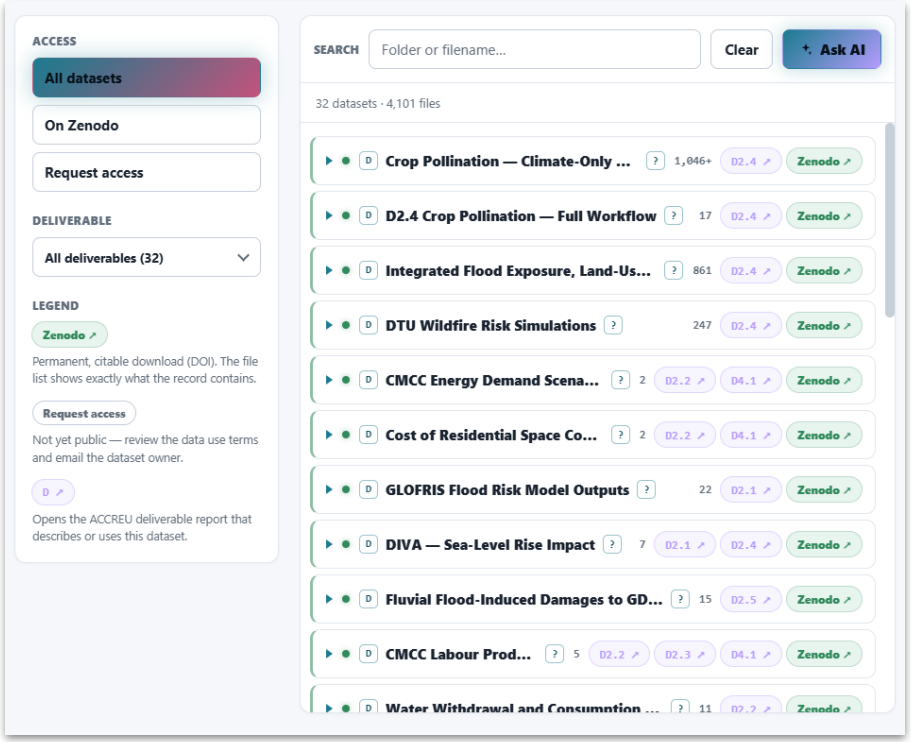
ACCREU Data Catalog

Project site ↗ | Zenodo community ↗ | ← Back to the catalog

The ACCREU Data Catalog provides a central entry point for discovering and accessing datasets produced within the ACCREU project (Assessing Climate Change Risk in EUrope). Explore quantitative data on the economic, physical and biophysical impacts of climate change and adaptation, covering agriculture and land use, water, ecosystems and biodiversity, energy, labour, coastal impacts, wildfire, and the economy, across a wide range of spatial scales and modelling approaches.

Throughout the project, IIASA has maintained ACCREU's internal data repository through the IIASA Accelerator, supporting the management, sharing and use of data among the 15 ACCREU partners. This catalog builds on that infrastructure to provide a single public entry point for the datasets released by ACCREU partners, and brings together datasets published through established research repositories such as Zenodo. Each dataset links to the ACCREU deliverable that describes it.

FILES CATALOGED	DATASETS	ON ZENODO	DELIVERABLES LINKED
4,101	32	32 of 32	11



ACCREU Data Catalog: Purpose and Users

- A common entry point to datasets from climate-impact and adaptation research.
- Designed for researchers and modelers, and relevant to policy analysts and other users of climate-risk data.

FIND

Locate data across partners, sectors and research activities.

INTERPRET

Connect datasets to documentation, methods and deliverables.

REUSE

Assess suitability for further analysis, modelling or comparison.

Data coverage: spatial scales, research domains, types

Coverage and resolution differ by dataset; not every domain is available at every scale.

SPATIAL COVERAGE

Global | European / regional | National | Subnational (NUTS2) | Case-study regions

RESEARCH DOMAINS

Agriculture and land use | Water resources and demand | Energy | Health and labour

Ecosystems and biodiversity | Flooding and Coastal impacts | Wildfire

Economic and distributional impacts | Infrastructure and built environment

INPUT DATA

Climate forcing

Climate projections used to drive the models

INTERMEDIATE DATA

Intermediate model outputs

Results from upstream models used as inputs to downstream assessments (e.g. hydrological data)

MODEL RESULTS

Impact and adaptation outputs

Biophysical impacts and socioeconomic / economic results

Example: Extreme heat: health and economic impacts

Can I use ACCREU data to study the health costs of extreme heat?

1 DOES IT COVER MY RESEARCH QUESTION?

Heat-related mortality, morbidity and economic valuation for people aged 65+.

2 IS THE SPATIAL AND TEMPORAL COVERAGE SUITABLE?

European NUTS3 regions · Historical, 2030, 2050 and 2070 · Four SSP–RCP combinations

3 HOW WERE THE RESULTS PRODUCED?

Links to relevant ACCREU deliverables with methodology, scenarios and analysis.

4 CAN I ACCESS AND PROPERLY CITE THE DATA?

Zenodo record with DOI and authorship, plus links to the underlying publications.

5 ARE THERE ANY RELATED DATASETS THAT COULD SUPPORT MY RESEARCH?

Explore additional datasets linked to the same ACCREU deliverable

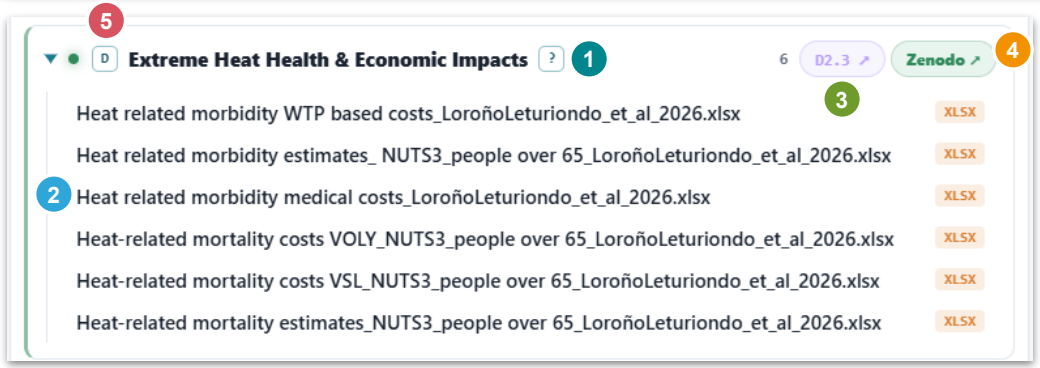
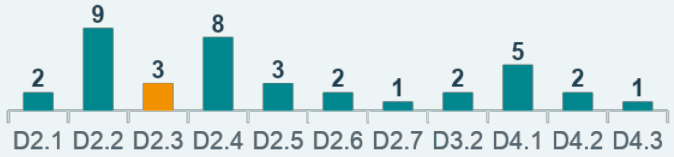


Image of the Extreme Heat dataset in the ACCREU Data Catalog

Finding datasets: Browse the catalog or use AI agent

Navigate Data Catalog by project deliverable

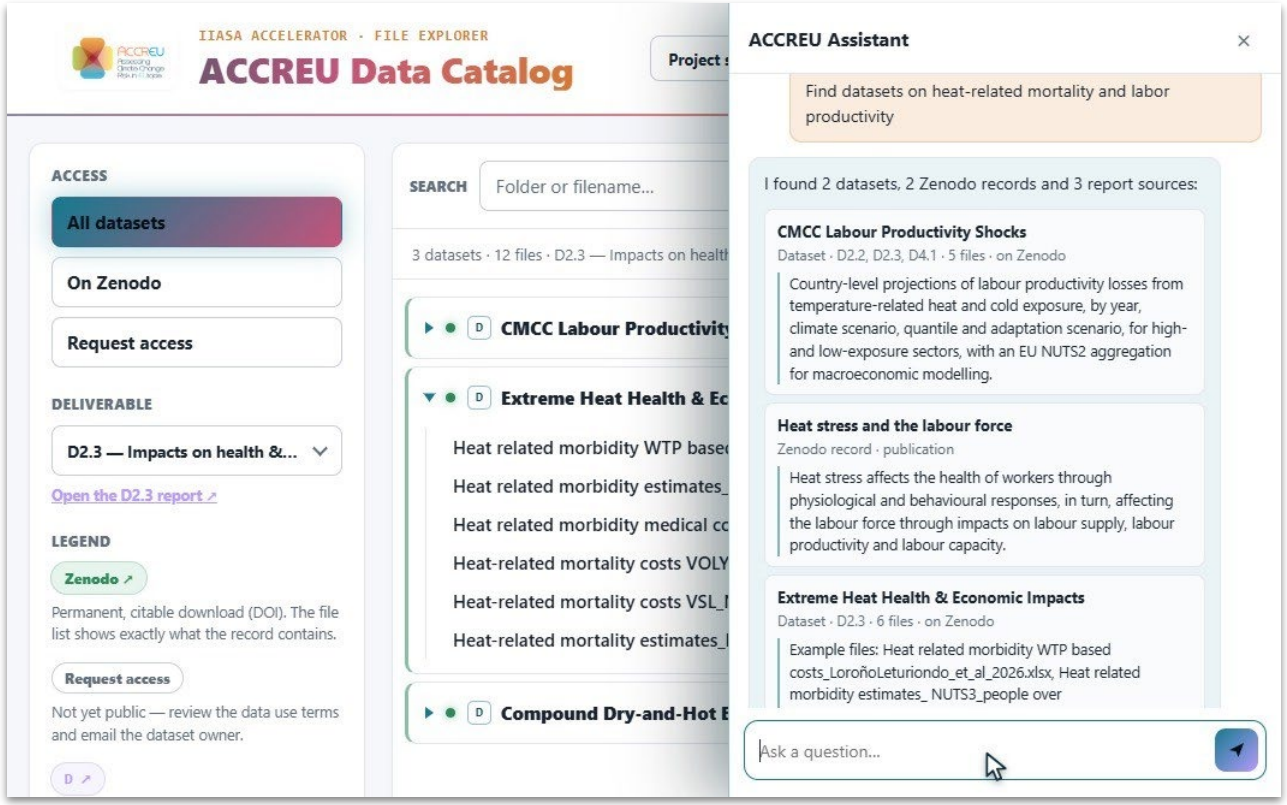


Datasets per deliverable (one dataset can belong to several)

Ask AI

Use a research question to identify potentially relevant deliverable and dataset records.

"Find datasets on heat-related mortality and labor productivity."



1 Enter a query › 2 Inspect the result › 3 Open the original record

Documentation, access and citation

CATALOG RECORD

Understand the dataset

- Title and description
- Links to underlying Zenodo records
- Related project deliverables, where applicable

REPOSITORY RECORD

Check before reuse

- Methods and provenance
- Coverage, variables and units
- License and access conditions

ZENODO RELEASE

Cite the data

- Persistent DOI
- Version information
- Metadata and associated files

Some records may require an access request while data remain restricted or embargoed until publication.

Access Data Catalog and related resources

Locate ACCREU datasets, review the documentation and project deliverables and cite the relevant records.

Amanda Palazzo
IIASA· palazzo@iiasa.ac.at

Data Catalog
iiasa.github.io/ACCREU

Zenodo Community
zenodo.org/communities/accreu-project

ACCREU
Assessing Climate Change Risk in EUrope

Welcome to the

Climate Change Impact & Adaptation Scenario Explorer

This tool showcases the main results of the ACCREU project.

Different impacts along the causal chain starting from climate change pressures and ending with economic implications, together with cost effectiveness ratios of adaptation actions are presented in multiple climate change and social economic scenarios. These assessments are performed by a set of last generation biophysical, econometric, economic models. They are integrated consistently to provide a comprehensive and multidimensional picture of realistic climate change futures.

Results are shown at the NUTS 2 level for the European Union + UK.

Impacts

Adaptation

ACCREU Scenario Explorer

Key sectors

1. Agriculture
2. Sea-level rise
3. **Riverine floods**
4. Labour
5. Energy supply
6. Energy demand
7. Biodiversity
8. Wildfires

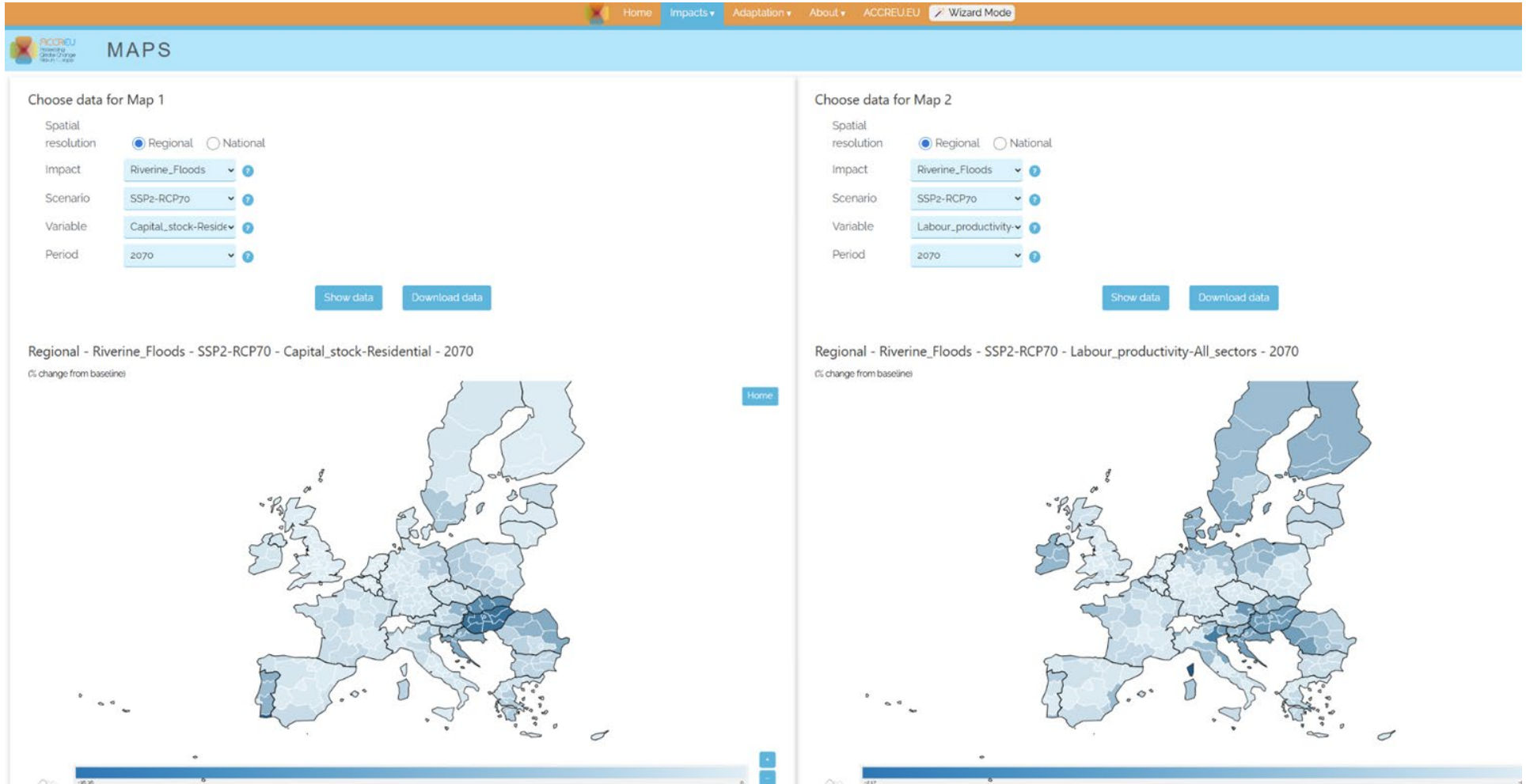
Direct physical and biophysical impacts (e.g. change in crop yields, capital, land losses)

Macroeconomic implications
GDP changes

ACCREU Scenario Explorer: Riverine flood

Direct impacts: on labor productivity and capital stock

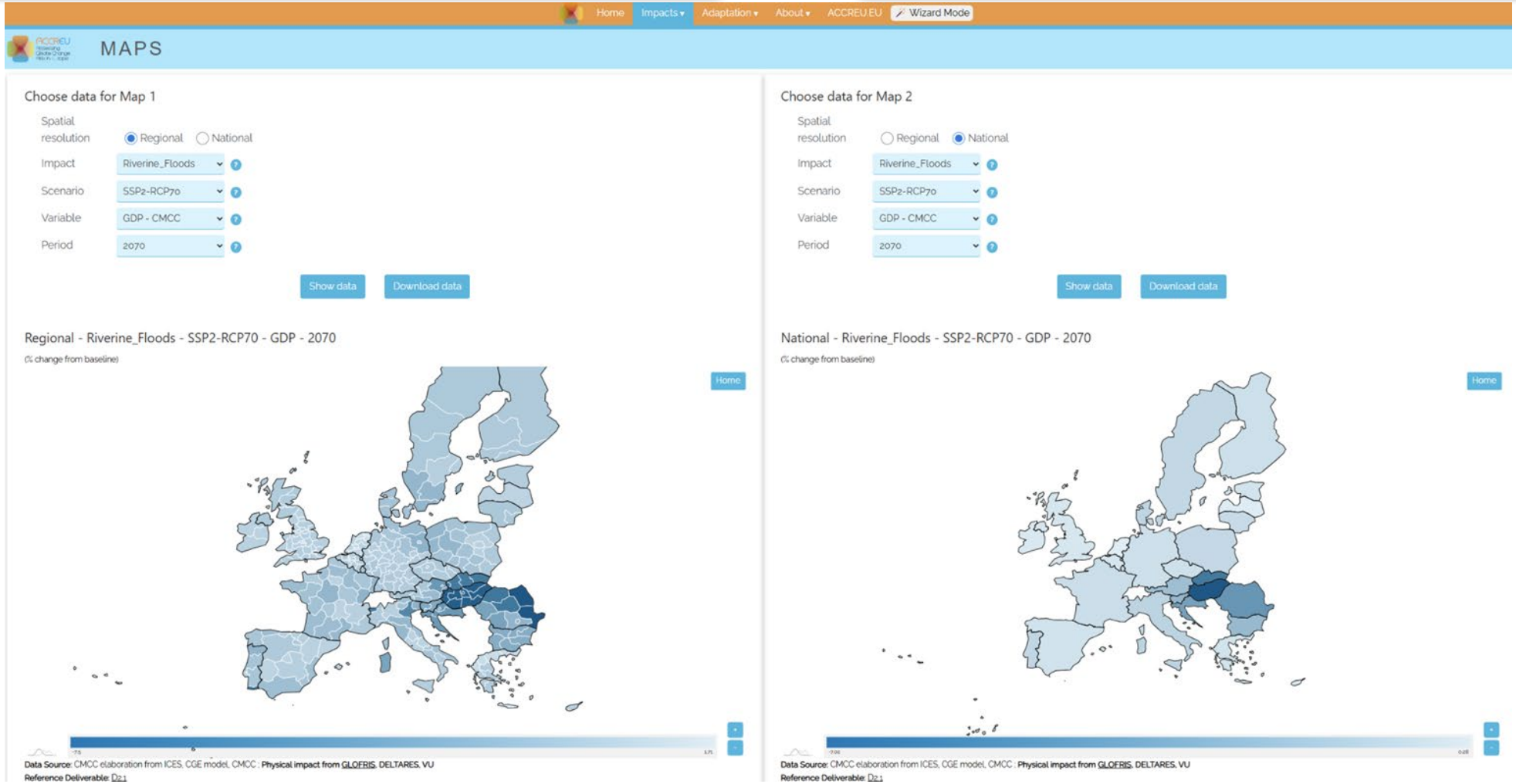
Regional impacts
138 European regions



ACCREU Scenario Explorer: Riverine flood

Macroeconomic GDP changes

Regional and national results



ACCREU Scenario Explorer: Riverine flood

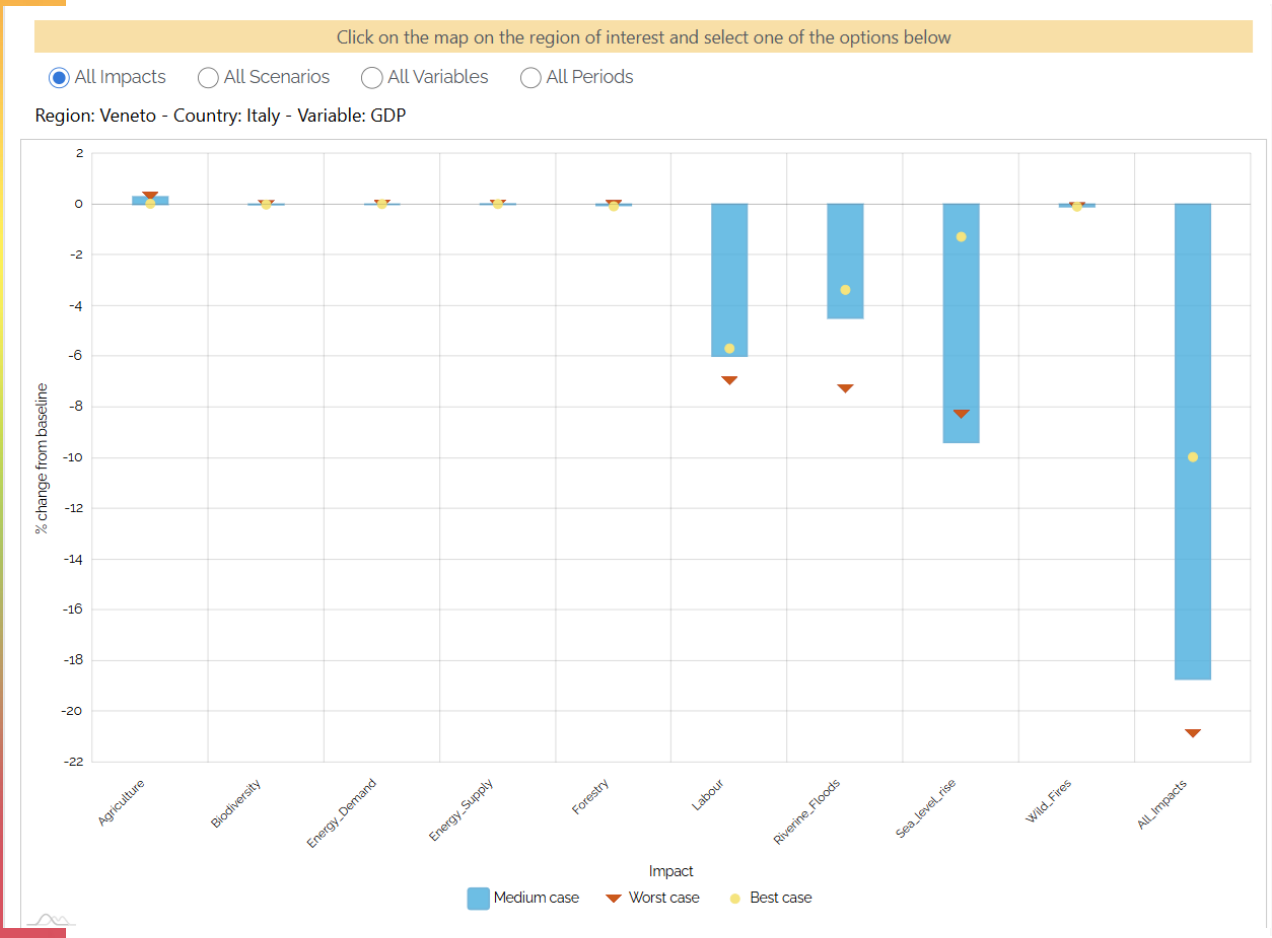
Different degree of warming
RCP2.6, 4.5, 7

Different time horizons
2025-2070

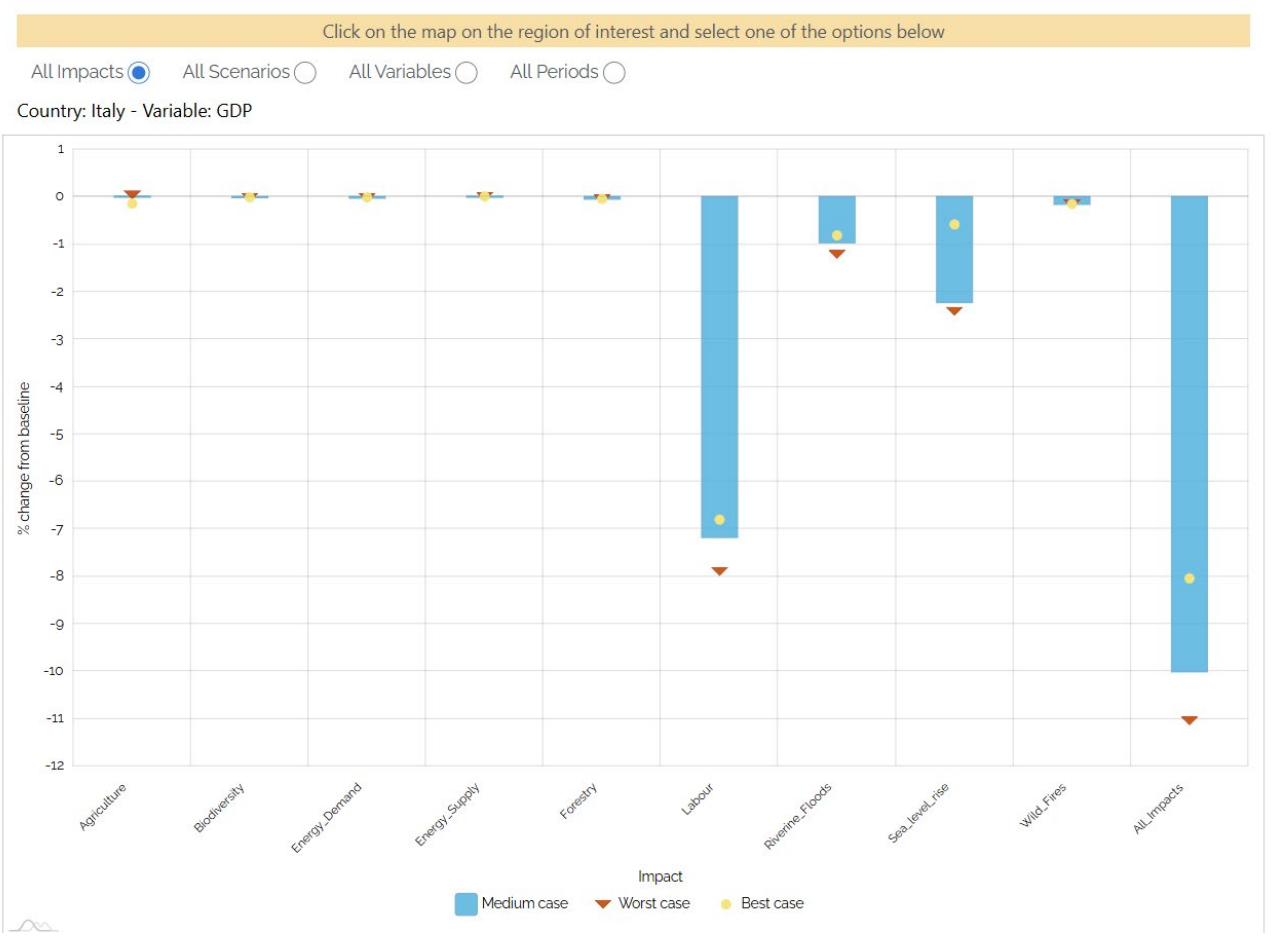


ACCREU Scenario Explorer: All impacts

Impact decomposition by region



Impact decomposition by country



ACCREU Scenario Explorer: Adaptation



ACCREU Scenario Explorer: Adaptation in models



ACCREU Assessing Climate Change Risk in EUrope

European Adaptation Handbook

What climate adaptation costs and what it delivers, in 15 European case studies

7 TOPICS · 15 CASE STUDIES

FROM THE CASE STUDIES 1 / 15

€526 million of benefits from adaptation, mostly from housing

Floods · Case study 1.1 Den Helder

Health

How European regions protect those who are most exposed to rising heat

Heat is one of the most dangerous climate hazards in Europe. In ACCREU we have used two case studies, in the Basque Country and Bremen, Germany, to calculate the costs and benefits of regional heat plans and how these are distributed. In both places we find that modest coordination budgets bring very large health benefits: in Bremen, each Euro spent provides an investment return of €73 to €105.

Pressures

Average temperatures and the number of hot days are continuing to rise, while factors such as existing health conditions, unemployment, poverty and isolation create imbalances inthe way that people are affected.

Risks

Increase in heat-related deaths and illness with babies, elderly people, pregnant women and people on low incomes at particular risk.



VIDEO OVERVIEW

Who benefits from a heat plan and how much are these benefits worth?

The cost of heat plans is very low compared to the health benefits

A Socially Just Heat Adaptation Plan in Bremen, Germany



Assessing the social justice and economic implications of health-related adaptation policies

This case study focuses on the federal state of Bremen in northern Germany, a region marked by socio-economic disparities and poor health outcomes compared with other German states. Facing rising temperatures and prolonged heat waves, Bremen adopted a **Heat Action Plan** in 2024, covering risk communication, extreme event management, urban development and monitoring. Annual costs are approximately estimated at € 510.000, against benefits of € 50 million per year in terms of avoided deaths and illness.

Cross-cutting

How national governments estimate what their adaptation plans cost and what they deliver

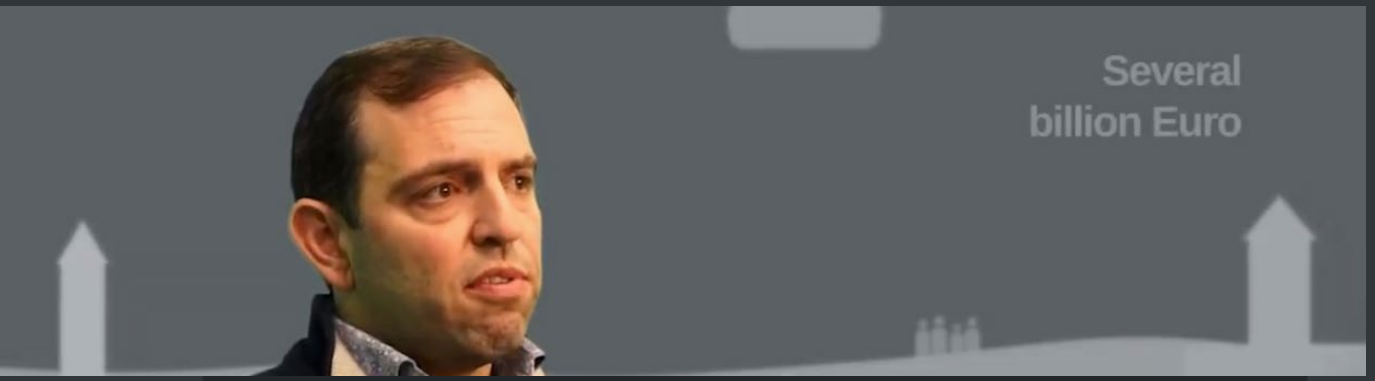
Climate change affects every sector of the economy, so adapting to it needs coordination across government. Two ACCREU case studies, in England and Cyprus, estimate what a national adaptation plan costs and what it is worth. In England, the measures of the national adaptation programme cost around £9 billion a year, and almost all of them bring more benefits than costs.

Pressures

Floods, water shortages and heat increasingly affect England, while Cyprus expects about 25 more days above 35°C by mid-century.

Risks

Without adaptation, cumulative climate damage in Cyprus could reach close to €20 billion by 2050 and around €90 billion by 2100.



VIDEO OVERVIEW

What national adaptation plans cost, and who pays for them

Climate change affects every sector of the economy, so adaptation

Costing England's Third National Adaptation Programme

England / United Kingdom / National adaptation planning

England's third National Adaptation Programme sets out 389 actions for 2023–2028, but did not estimate their costs or benefits. The research team worked with government departments to cost the main measures and compare them with what they deliver.

Climate-proofing | Public spending | Benefit versus costs

Key takeaway: delivering the programme costs around £9 billion a year, about 1% of government spending, and almost all



CASE STUDY 7.2



Cyprus can make smart climate investments pay off

Cyprus / National / National adaptation planning

During the 2024–2025 revision of the national adaptation strategy of Cyprus, the research team worked with national ministries to estimate the investment needed, how much of it is already planned, who should pay for it, and the cost of not adapting.

Cyprus can make smart climate investments pay off

A few billions in adaptation today could prevent tens of billions in future climate damage



Cyprus lies in a rapidly warming Eastern Mediterranean hotspot and already faces more frequent heatwaves, droughts and damaging storms that threaten water security, tourism and health. Costing the revised adaptation strategy and related plans suggests additional investment needs of about 4.1 billion euros to 2050 - 0.5% of national GDP of the entire period – with only around 30% planned so far, leaving a funding gap of roughly 2.9 billion euros.

ON THIS PAGE

01 Data
02 Details
03 References
04 Glossary

Data

Context

After a climate vulnerability and risk assessment in 2016, Cyprus adopted a national adaptation strategy and action plan in 2017, but implementation remained relatively weak, partly because there was no strong institutional framework to make measures binding for public authorities.

In 2024–2025, the Ministry of Agriculture, Rural Development and Environment led a revision of the strategy, and the ACCREU research team worked with national ministries to clarify how much adaptation investment is needed, which measures are already planned, who should finance them, and what the costs of unmitigated climate change could be.

ADAPTATION OPTIONS

Cooling buildings, greening cities and modernising water networks

Key adaptation options in Cyprus focus on reducing heat exposure, safeguarding water resources and climate-proofing economic activities. They include upgrading building envelopes and cooling systems in homes, schools and hospitals, rolling out shading, ventilation and reflective surfaces in public spaces, and expanding urban **green and blue infrastructure** to lower local temperatures.
Water-related measures involve modernising supply networks, enhancing **drought** and leakage management and increasing reuse in agriculture and tourism facilities. In climate-sensitive sectors, options range from adjusting tourism offers and working hours during extreme heat to promoting more resilient crops and irrigation practices. These measures combine technical investments with regulatory standards, early-warning systems and targeted support for vulnerable households, workers and visitors across energy, water, health, transport and tourism sectors.

COSTS

€4.1 billion needed by 2050, only 30% currently funde

Implementing the measures in Cyprus's revised adaptation strategy and related plans is estimated to require around 4.1 billion euros of additional investment up to 2050, but only about 30% of this amount is currently planned or budgeted, leaving a funding gap of roughly 2.9 billion euros. The level of required additional investments is not prohibitive for the Cypriot economy since both the public and the private sector have already implemented several measures to adapt to the existing climate conditions in Cyprus. 70% of the necessary investments are related to energy-efficiency-related renovations of buildings, which contribute to both adaptation and mitigation of climate change.

BENEFITS

Every €1 spent on adaptation avoids more than €4 in

The economic benefits of timely and well-planned adaptation in Cyprus are large compared with the costs. Modelling shows that without adaptation, cumulative climate-related damages could reach close to 20 billion euros by 2050 and around 90 billion euros by 2100, whereas ambitious adaptation and climate-resilient investment pathways could avoid severe damages over the long term. These avoided losses could reflect reduced heat-related productivity impacts, smaller shocks to tourism and agriculture and lower damage to infrastructure, buildings

Access to ACCREU tools

Locate ACCREU tools with QR Codes available in the room

Data Catalog:
iiasa.github.io/ACCREU

Scenario explorer:
https://explorer.accreu.eu/

Digital handbook
https://adaptation-handbook.accreu.eu

CrossEU

The CROSSEU Decision Support System

Turning climate research into actionable information

Penny Boorman, Doug Fraser (WEMC) & Server Kasap (UKRI)

Presented by Alberto Troccoli (WEMC)

CROSSEU-ACCREU joint meeting, Brussels, 13 November 2026

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

UK participants in this project are co-funded by UK Research and Innovation (UKRI).

Co-funded by the European Union

UK Research and Innovation

CROSSEU DSS
From climate impacts to informed decisions

Integrating climate-impact knowledge.

Bringing together results from eight case studies, multiple climate hazards and socio-economic assessments.

Making results accessible and usable.

Combining interactive exploration with guided, stakeholder-informed narratives and policy information.

Building a reusable decision-support framework.

Connecting **Teal** visualisation with **DAFNI** data and computational capabilities to support future applications.

Climate research → Accessible evidence → Better-informed adaptation decisions

Designed for policymakers, regional planners, researchers and infrastructure operators.

CrossEU

CROSSEU DSS
Turning climate research into actionable information

The Decision Support System (DSS) provides an accessible interface to explore climate risks, socio-economic impacts and adaptation-related information across the CROSSEU case studies.

- **Explore**: Compare climate hazards, socio-economic indicators and future scenarios.
- **Understand**: Access guided narratives, contextual information and policy-relevant findings.
- **Interact**: Visualise results and, where authorised, launch computational workflows.
- **Use**: Download data, charts and customised PDF summaries to support further analysis and decision-making.

Powered by the **Teal visualisation framework** and **DAFNI computational infrastructure**.

CrossEU

What makes the CROSSEU DSS different?

Multihazard, cross-sectoral evidence

Results from **eight case studies** covering climate hazards, socio-economic vulnerabilities and impacts across different sectors.

Stakeholder-informed design

Developed through case-study **consultations and iterative feedback** to address practical information needs.

Science connected to policy

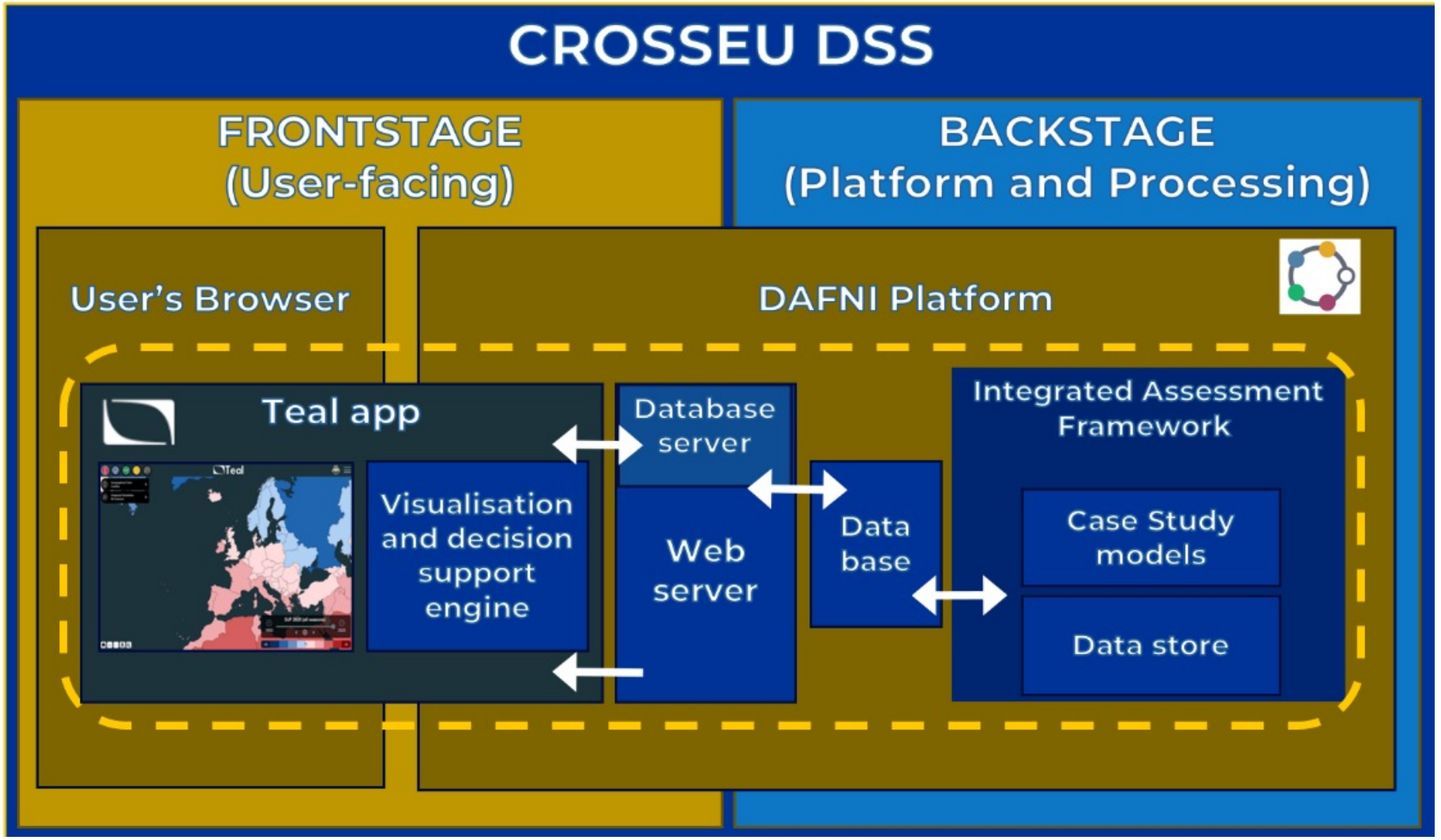
Interactive climate-impact information linked to European, national and regional **policy and governance knowledge**.

Established, reusable infrastructure

Teal visualisation combined with **DAFNI** data management and computational capabilities.

CrossEU

DSS Architecture



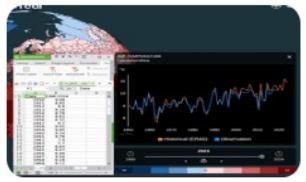
CrossEU

The DSS UI – The Teal framework

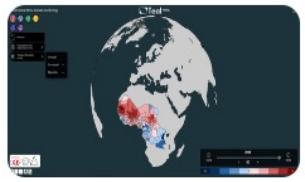
Teal framework underlies the CROSSEU DSS UI

Multiple public and bespoke versions





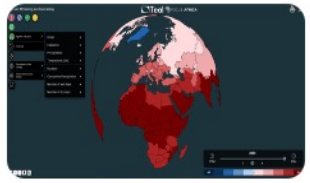
Public Teal



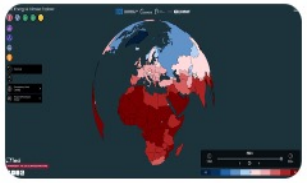
WCA Teal



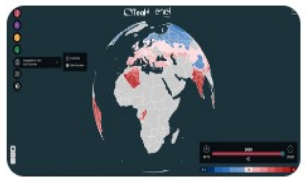
CDI Teal



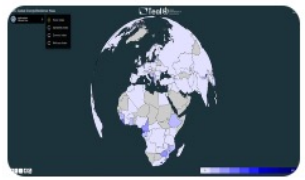
FA Teal



C3S Teal



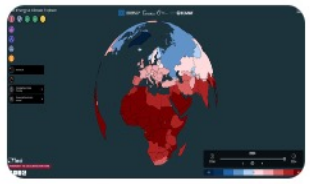
EF Teal



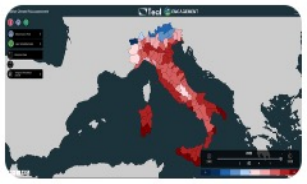
WMO Teal



ARPAV Teal



CROSSEU DSS Teal



ENGAGE Teal

https://tealtool.earth

CrossEU

The DSS UI – The Teal framework

Public Teal: Climate and emissions data

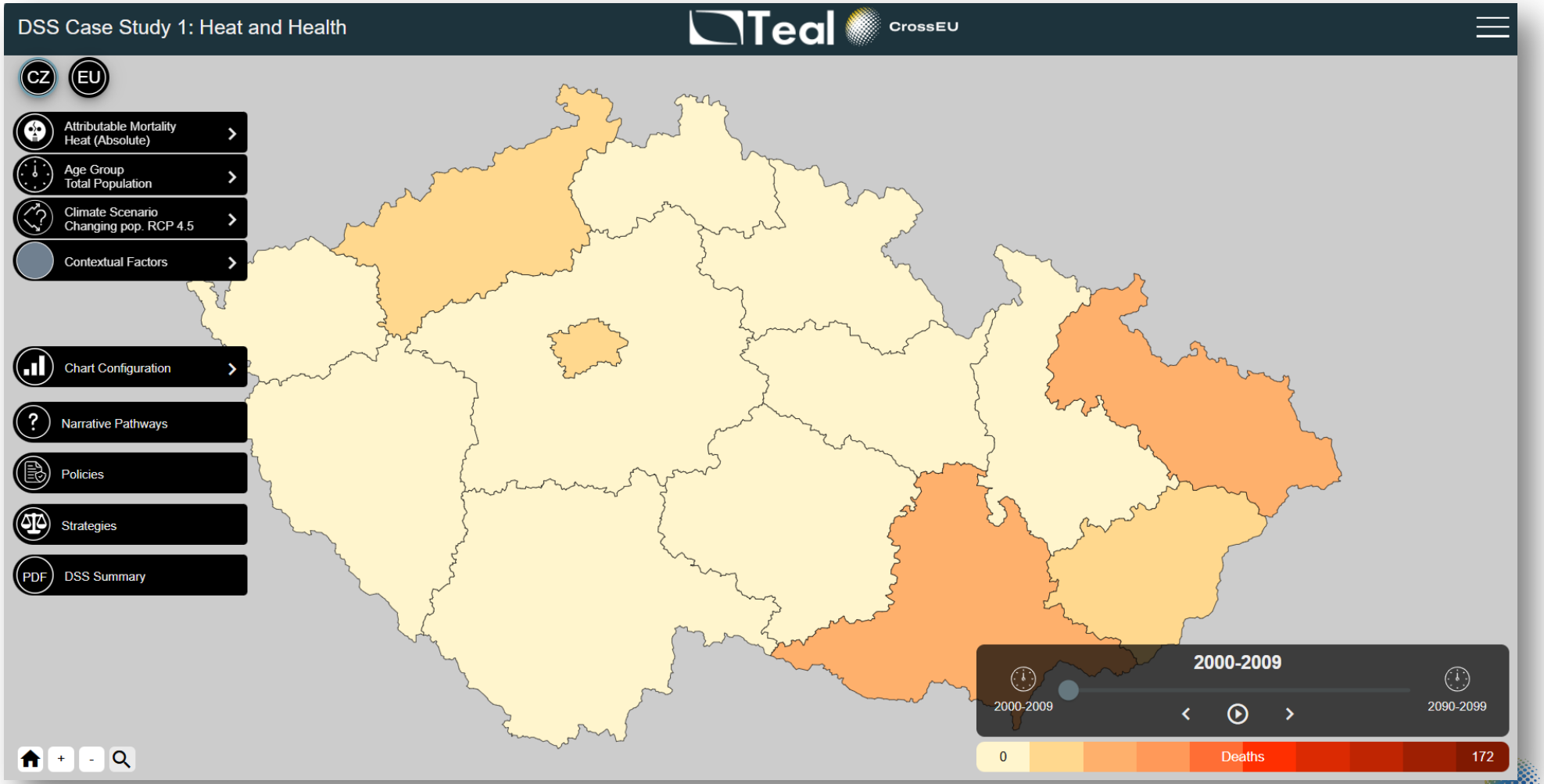
https://tealtool.earth

MOVIE

https://www.wemcouncil.org/TALKS/PublicTeal_Gao2024_20251124.mp4

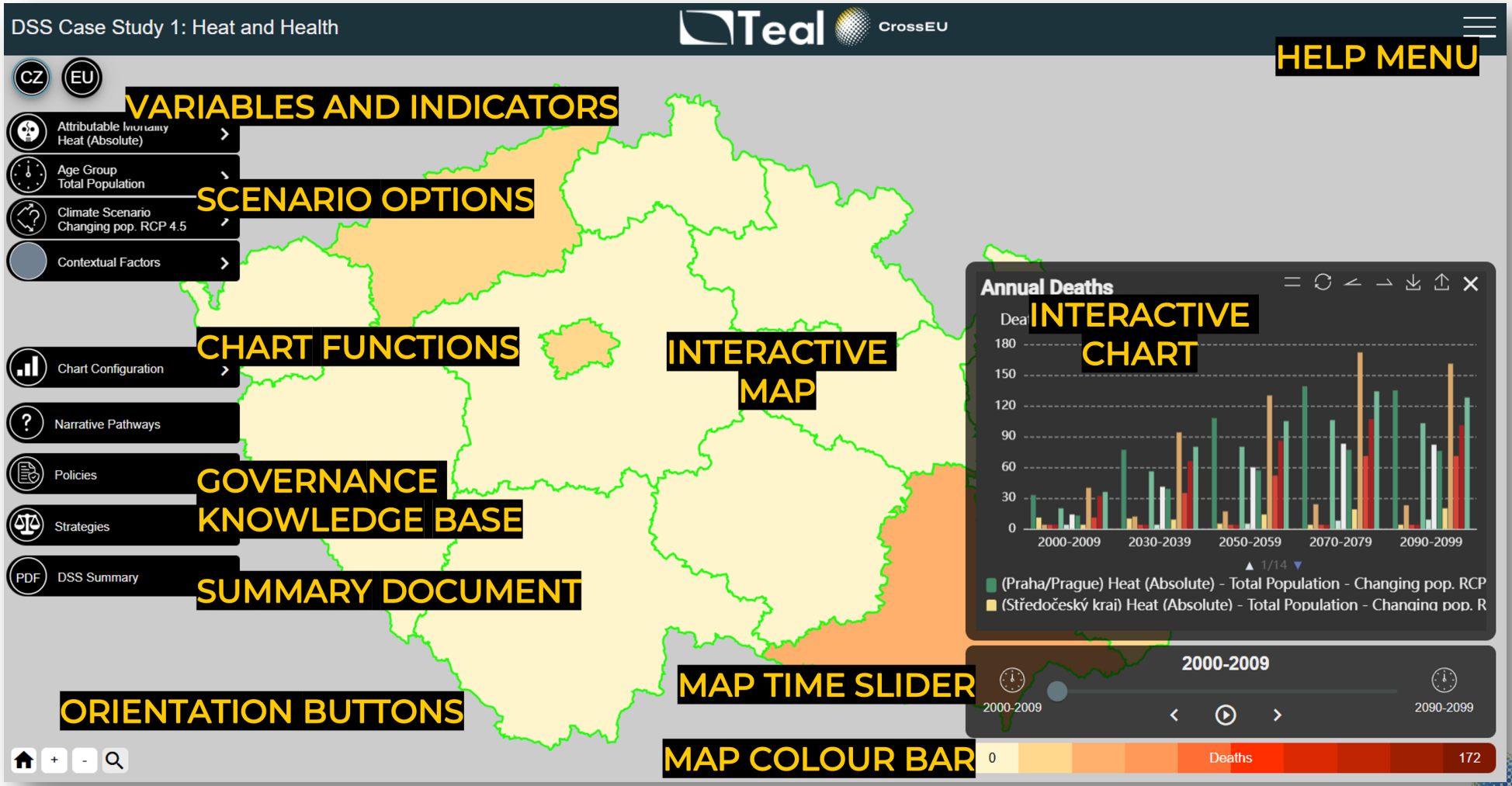
CrossEU

The DSS UI



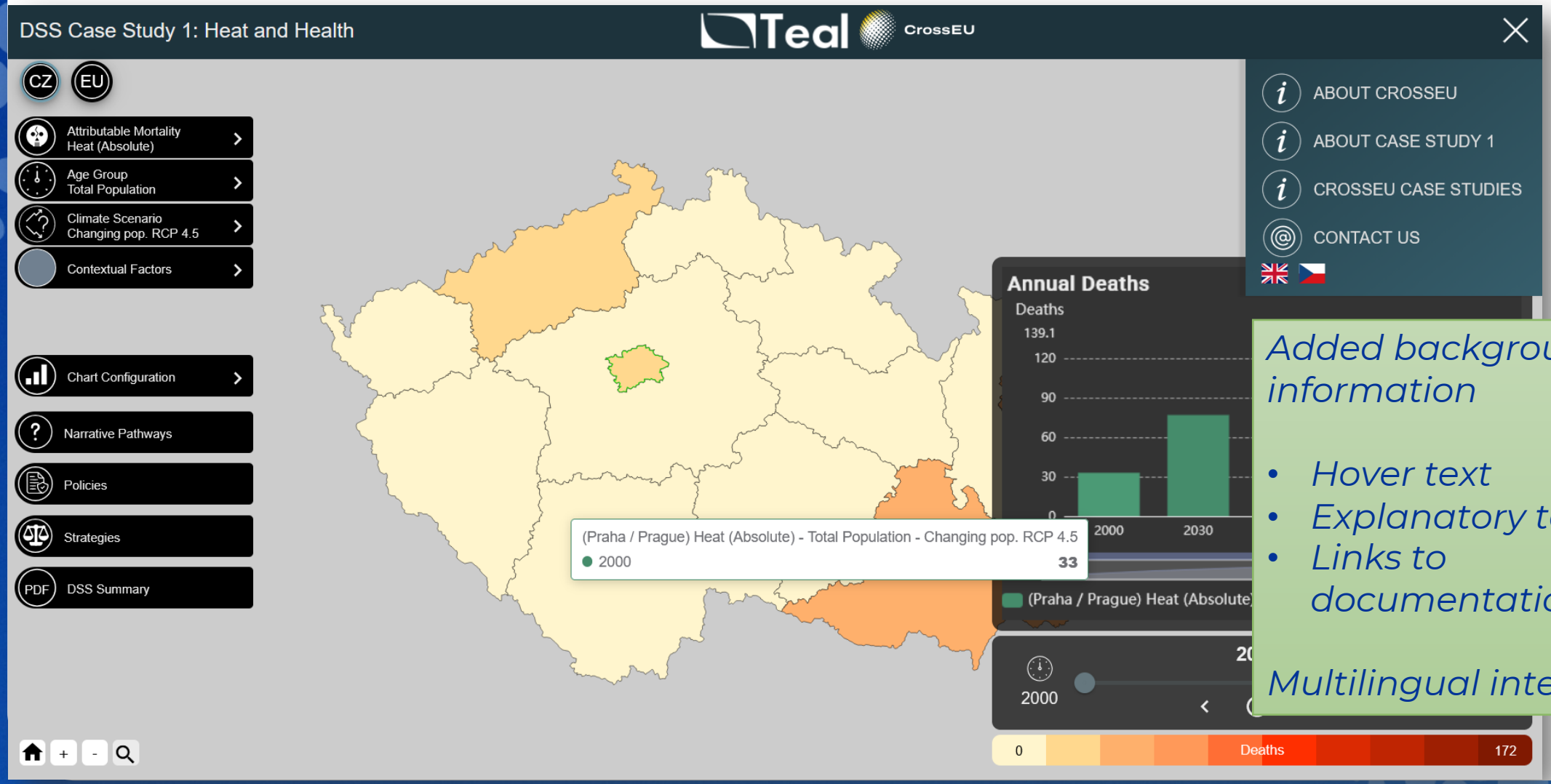
CrossEU

The DSS UI



CrossEU

The DSS UI - Exploratory pathway



Added background information

- *Hover text*
- *Explanatory texts*
- *Links to documentation*

Multilingual interface

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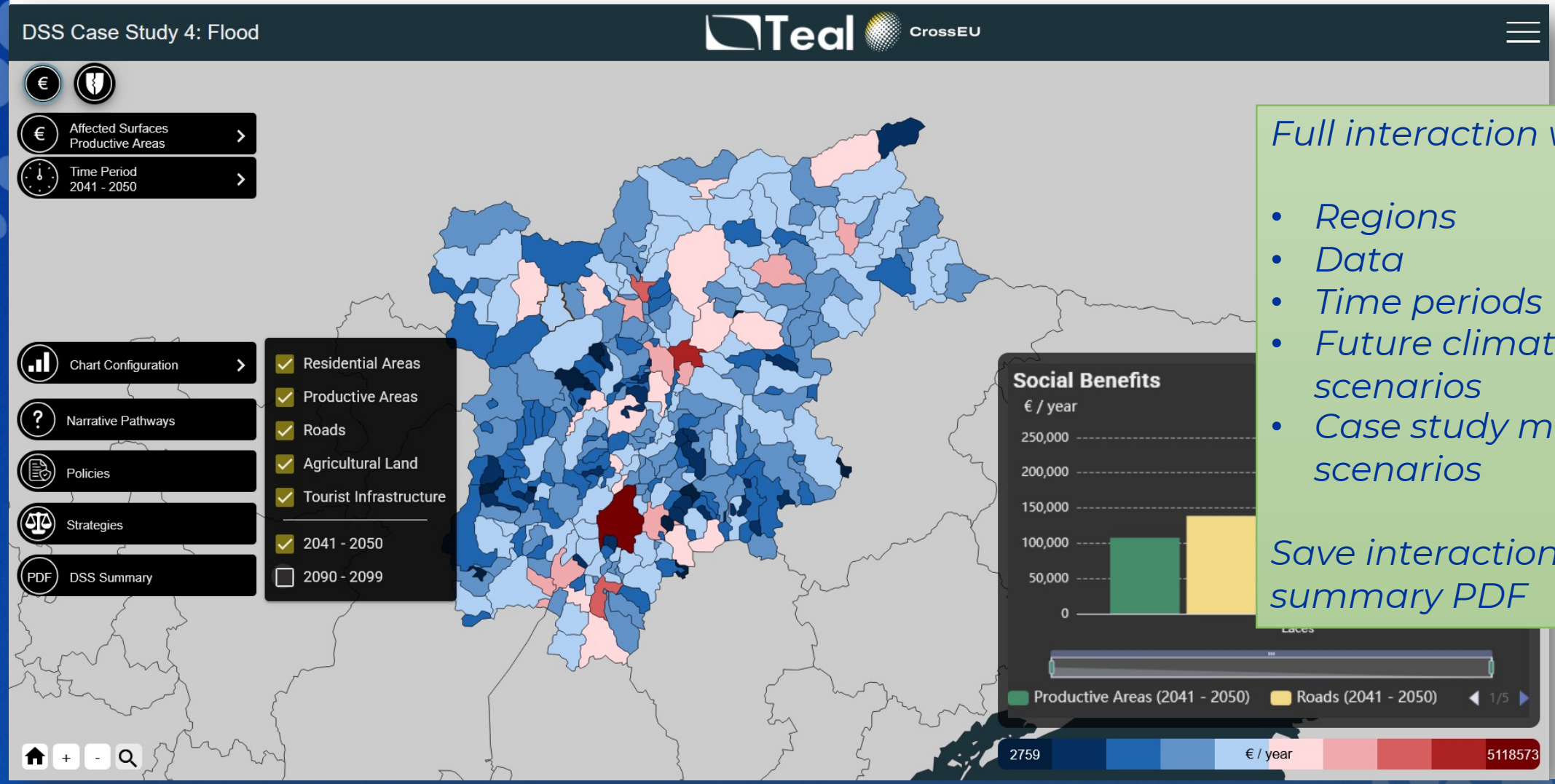
The DSS UI - Exploratory pathway



Full interaction with data

- *Regions*
- *Data*
- *Time periods*
- *Future climate scenarios*
- *Case study modelling scenarios*

Save interactions in summary PDF

CrossEU

The DSS UI - Exploratory pathway

For users who want to investigate

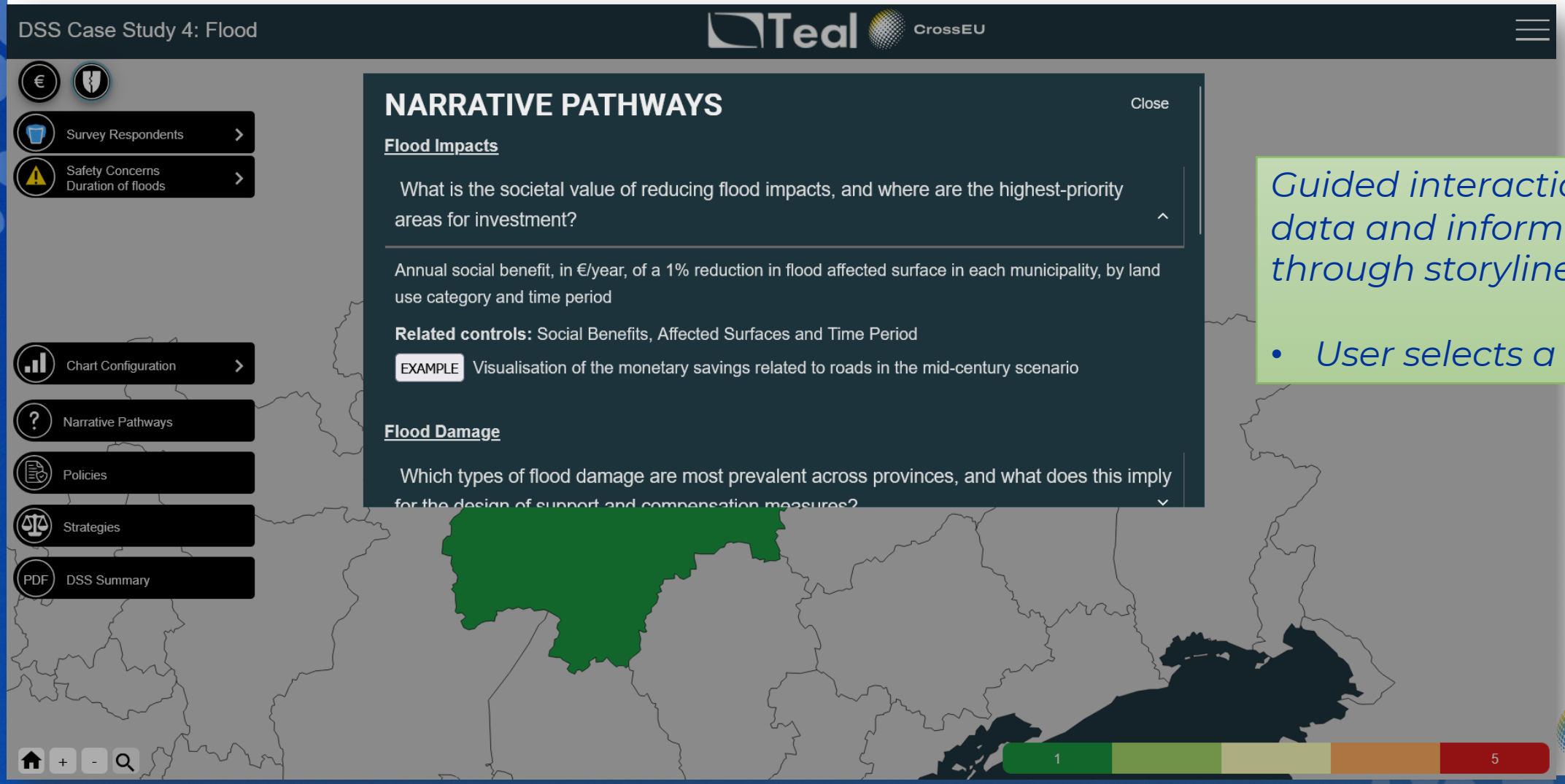
Select indicators, regions, scenarios and time periods; interact with maps and charts; compare results and download outputs.

MOVIE

https://www.wemcouncil.org/TALKS/DSS_exploratory_261110.mp4

CrossEU

The DSS UI - Narrative pathway



Guided interaction with data and information through storylines

- *User selects a storyline*

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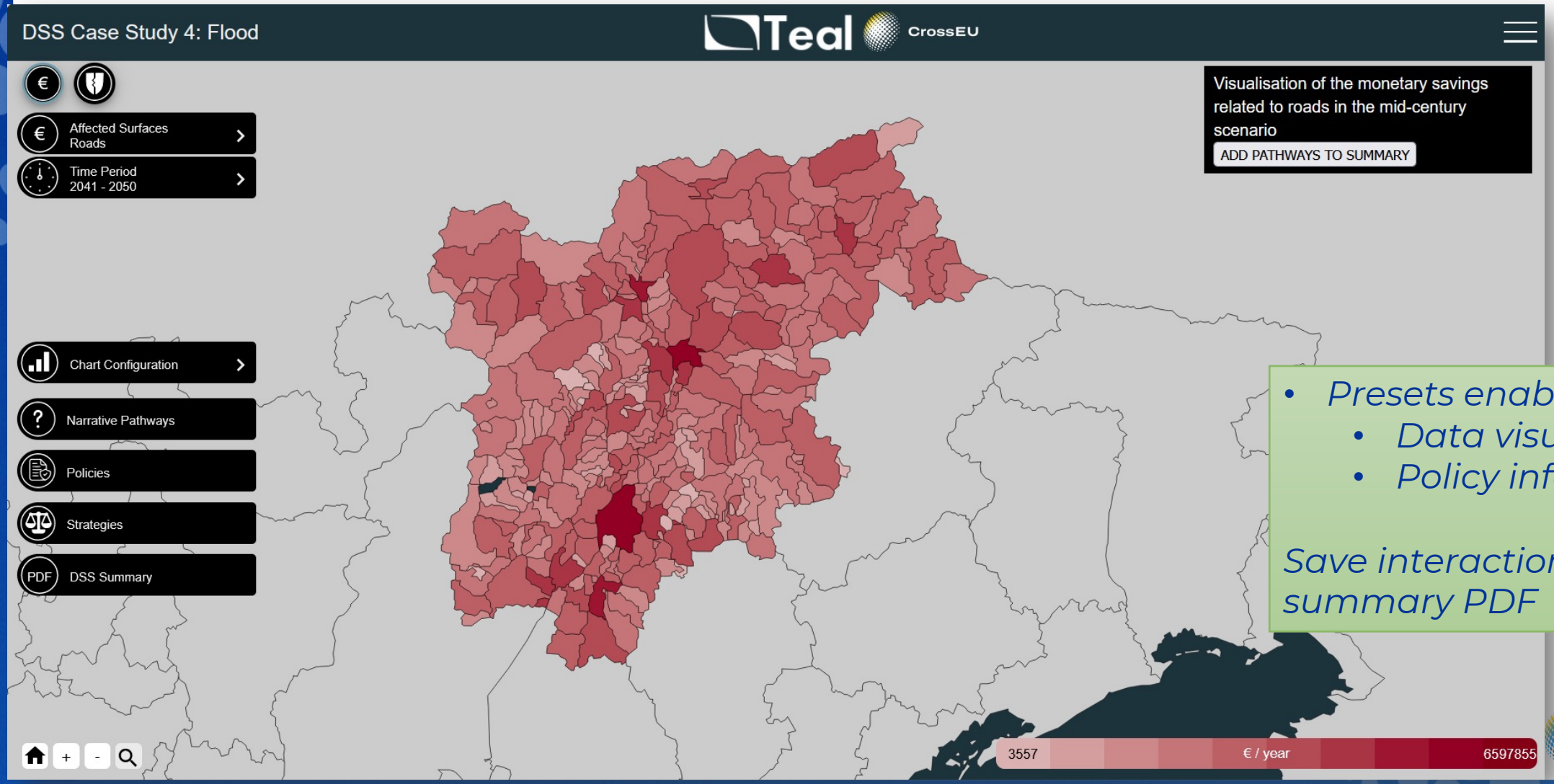
The DSS UI - Narrative pathway



- *Presets enabled for*
  - *Data visualisation*
  - *Policy information*

Save interactions in summary PDF

CrossEU

The DSS UI - Narrative pathway

For users who want guided insights

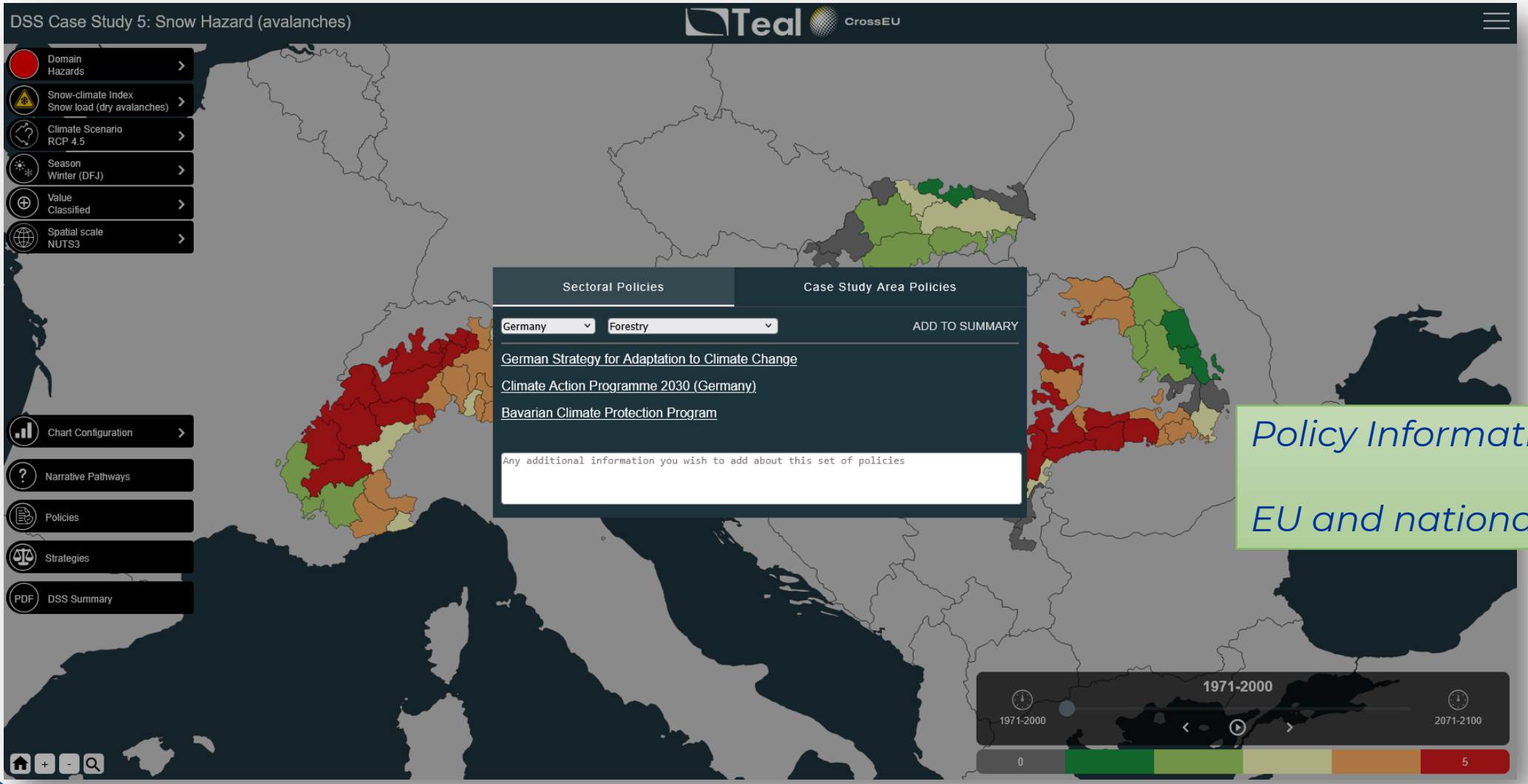
Follow stakeholder-informed questions and storylines, with relevant datasets and visualisations automatically selected.

MOVIE

https://www.wemcouncil.org/TALKS/DSS_narrative_261110.mp4

CrossEU

The DSS UI - Policy information

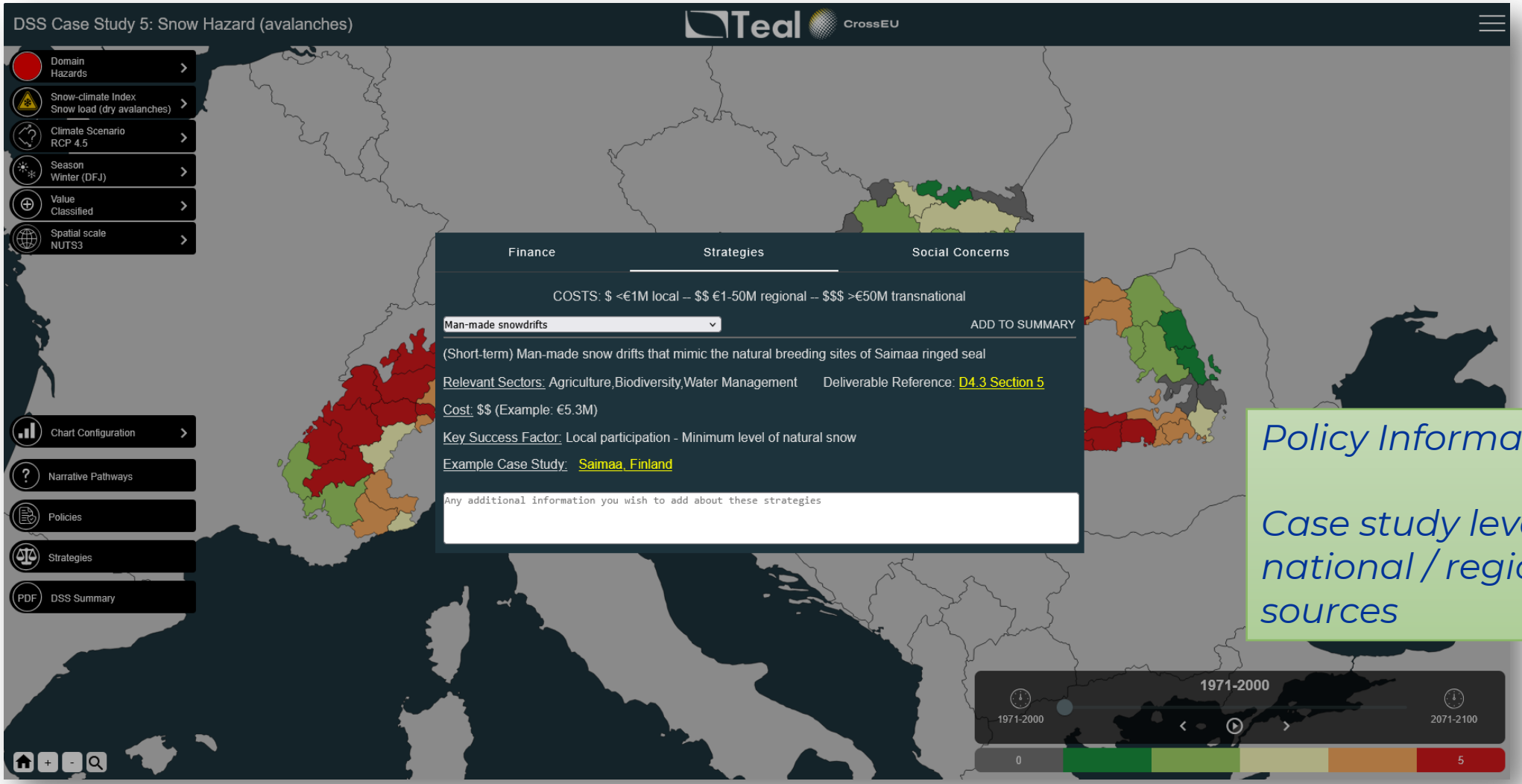


Policy Information

EU and national level

CrossEU

The DSS UI - Policy information



Policy Information

Case study level – national / regional / local sources

CrossEU

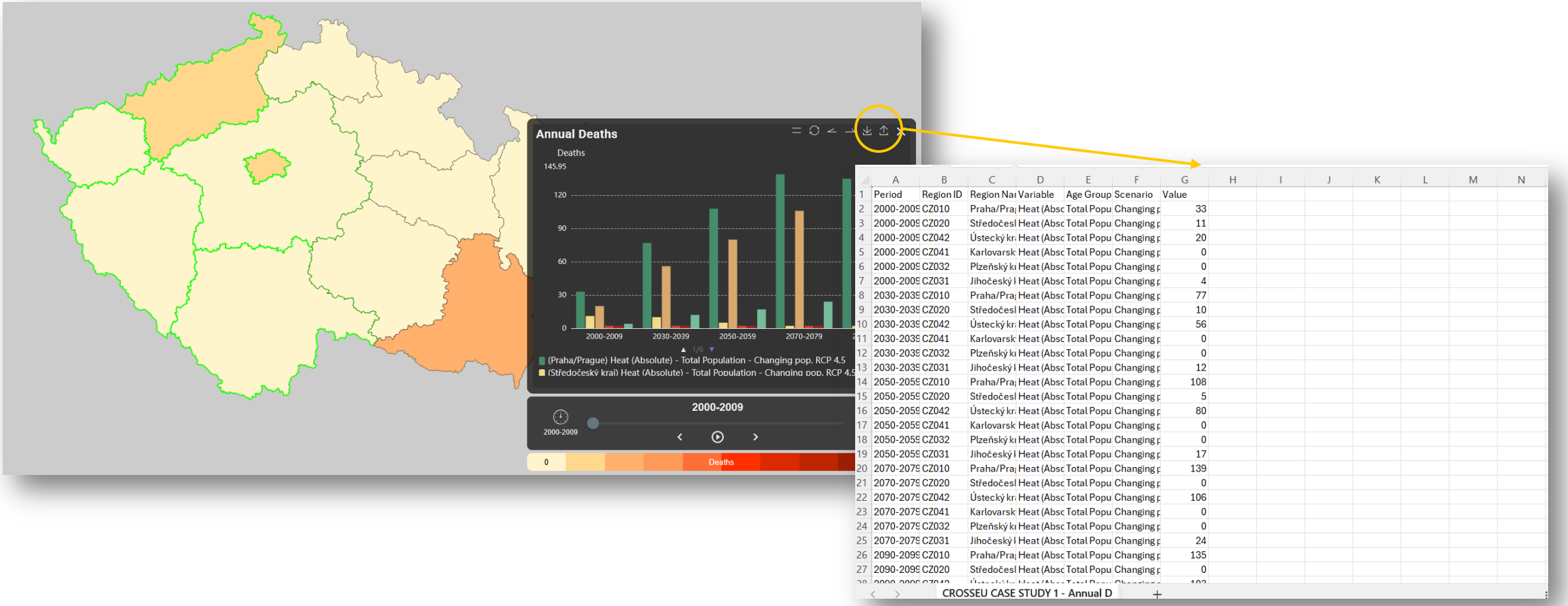
The DSS UI - Policy information

MOVIE

https://www.wemcouncil.org/TALKS/DSS_policy_261110.mp4

CrossEU

Information downloads – data



	A	B	C	D	E	F	G
1	Period	Region ID	Region Na	Variable	Age Group	Scenario	Value
2	2000-2009	CZ010	Praha/Pra	Heat (Absc	Total Popu	Changing p	33
3	2000-2009	CZ020	Středočesl	Heat (Absc	Total Popu	Changing p	11
4	2000-2009	CZ042	Ústecký kr	Heat (Absc	Total Popu	Changing p	20
5	2000-2009	CZ041	Karlovarsk	Heat (Absc	Total Popu	Changing p	0
6	2000-2009	CZ032	Plzeňský k	Heat (Absc	Total Popu	Changing p	0
7	2000-2009	CZ031	Jihočeský l	Heat (Absc	Total Popu	Changing p	4
8	2030-2039	CZ010	Praha/Pra	Heat (Absc	Total Popu	Changing p	77
9	2030-2039	CZ020	Středočesl	Heat (Absc	Total Popu	Changing p	10
10	2030-2039	CZ042	Ústecký kr	Heat (Absc	Total Popu	Changing p	56
11	2030-2039	CZ041	Karlovarsk	Heat (Absc	Total Popu	Changing p	0
12	2030-2039	CZ032	Plzeňský k	Heat (Absc	Total Popu	Changing p	0
13	2030-2039	CZ031	Jihočeský l	Heat (Absc	Total Popu	Changing p	12
14	2050-2059	CZ010	Praha/Pra	Heat (Absc	Total Popu	Changing p	108
15	2050-2059	CZ020	Středočesl	Heat (Absc	Total Popu	Changing p	5
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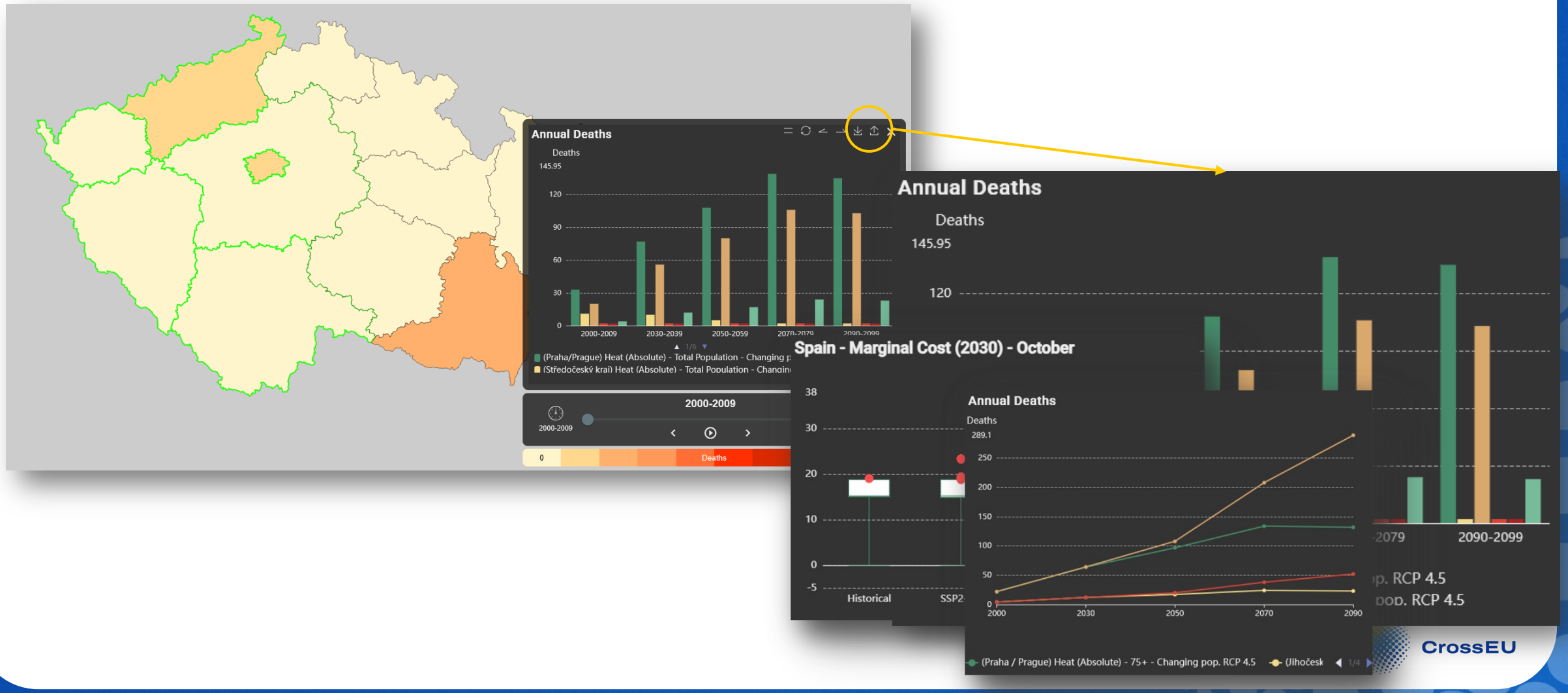
19	2050-2059	CZ031	Jihočeský l	Heat (Absc	Total Popu	Changing p	17
20	2070-2079	CZ010	Praha/Pra	Heat (Absc	Total Popu	Changing p	139
21	2070-2079	CZ020	Středočesl	Heat (Absc	Total Popu	Changing p	0
22	2070-2079	CZ042	Ústecký kr	Heat (Absc	Total Popu	Changing p	106
23	2070-2079	CZ041	Karlovarsk	Heat (Absc	Total Popu	Changing p	0
24	2070-2079	CZ032	Plzeňský k	Heat (Absc	Total Popu	Changing p	0
25	2070-2079	CZ031	Jihočeský l	Heat (Absc	Total Popu	Changing p	24
26	2090-2099	CZ010	Praha/Pra	Heat (Absc	Total Popu	Changing p	135
27	2090-2099	CZ020	Středočesl	Heat (Absc	Total Popu	Changing p	0

CROSSEU CASE STUDY 1 - Annual D

CrossEU

Information downloads – charts



Information downloads – PDFs summaries

CrossEU DAFNI Teal

CROSSEU DSS CASE STUDY 4: FLOOD

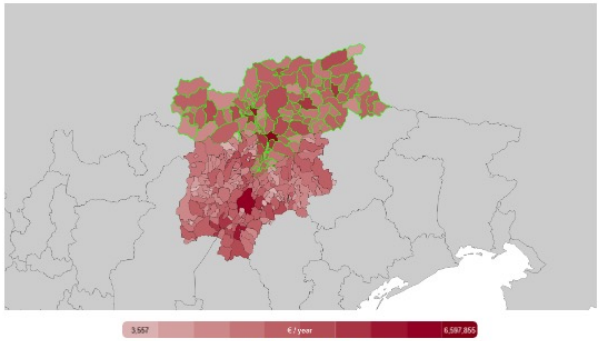
BACKGROUND: The Trentino-Alto Adige region in northeastern Italy is exposed to an increasing frequency of short-duration extreme precipitation events driven by climate change. The combination of steep orography, geomorphological fragility and high concentration of alluvial fans makes the region particularly susceptible to flash floods and debris flows. The storyline anchoring the case study is Storm Vaia (27-29 October 2018), which caused widespread flooding, landslides and 11 fatalities across the Eastern Italian Alps.

NARRATIVE PATHWAY

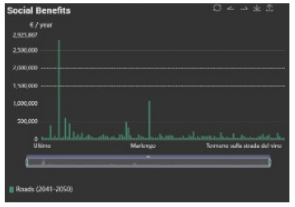
What is the societal value of reducing flood impacts, and where are the highest-priority areas for investment?

Annual social benefit, in €/year, of a 1% reduction in flood affected surface in each municipality, by land use category and time period

Visualisation of the monetary savings related to roads in the mid-century scenario



surfaces - roads



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Roads 2040s

SECTORAL POLICIES

Agriculture (IT)

National Plan for Adaptation to Climate Change – PNACC (Italy)	Ecological Transition Plan – PTE (Italy)

FINANCE

Emergency Interventions — Grant

Sectors: Finance
Target Sectors: Primary households
Advantages: Prioritizes low-income households
Disadvantages: None

Deliverable Reference: D4.7 Section 3.6

Acknowledgments

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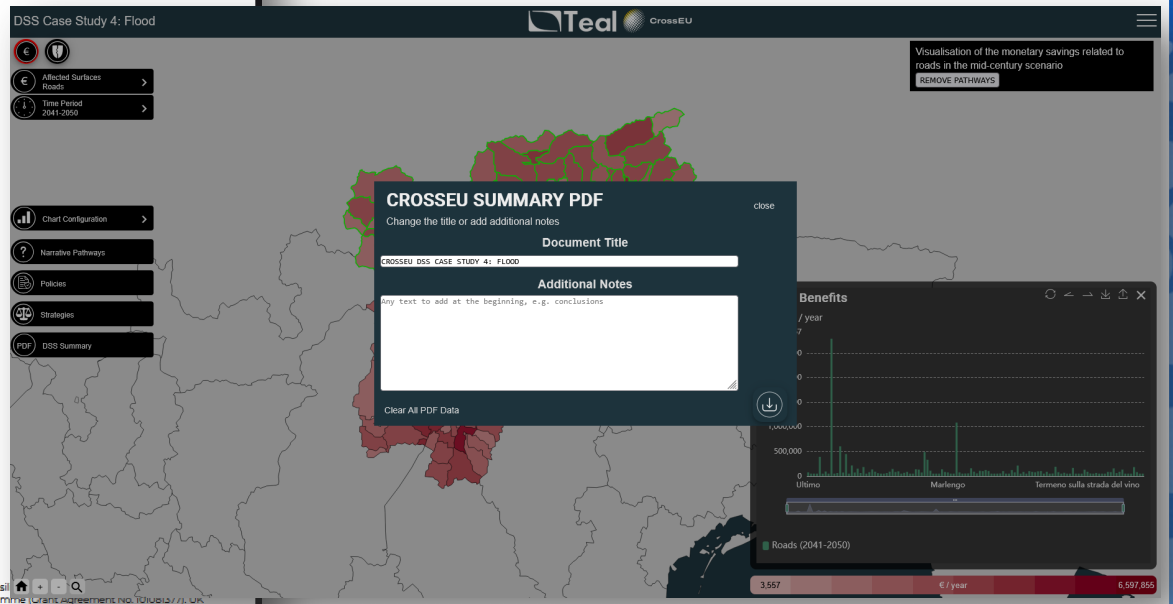

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User Resources

- **DSS page on CROSSEU website**
- **Video tutorials**
- **User Guide**
- **DAFNI DSS Landing page**
- **Scientific and policy Information linked from UI**



https://crosseu.eu/dss

Access

- **Registration on DAFNI**
- **Standard account gives instant access to DSS landing page and UIs**
- **Upgrade to ‘Expert’ account allows users to run workflows**

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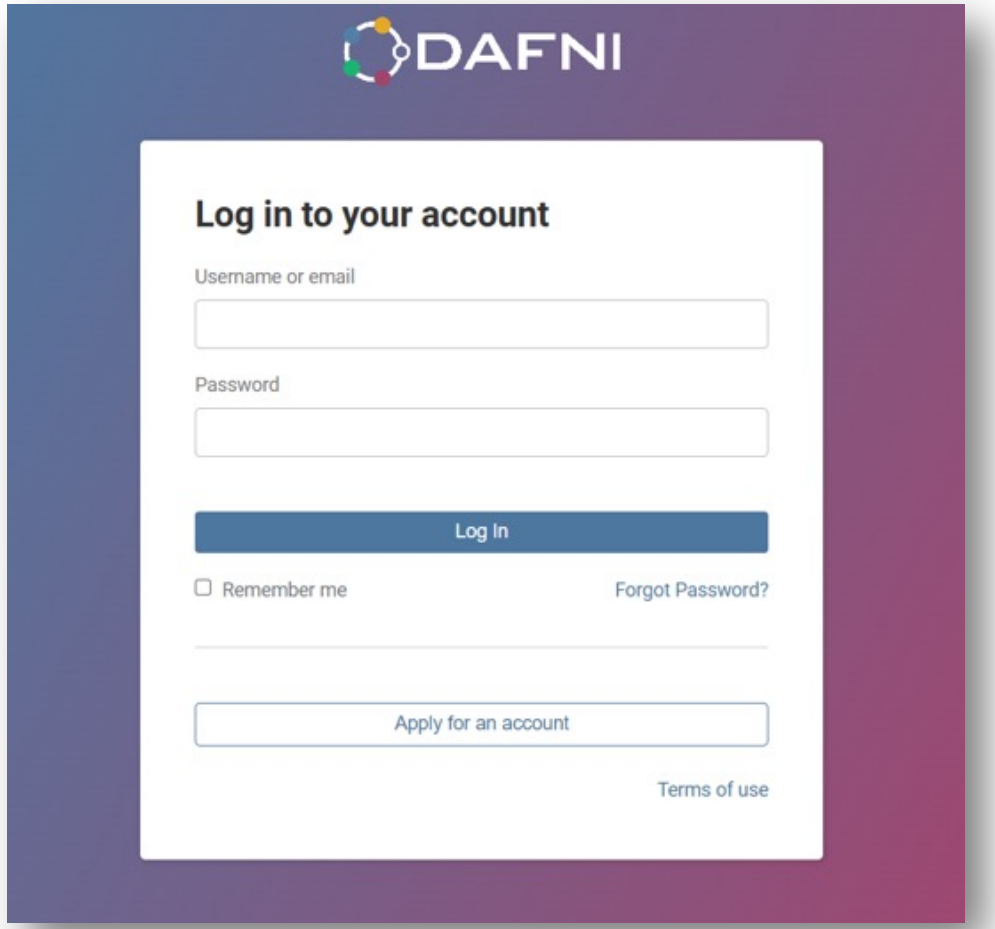

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From climate research to decision support – and beyond

What CROSSEU has delivered

- An accessible interface connecting climate-impact research with stakeholder information needs.
- Exploratory and guided pathways for accessing and interpreting results.
- Integration of visualisation, data access and computational workflows through **Teal** and **DAFNI**.
- A reusable foundation for future climate-risk and adaptation applications.

Beyond CROSSEU

- Extend the approach to additional regions, sectors and climate-risk indicators.
- Further connect climate-impact assessments with adaptation planning and policy processes.
- Continue to build on user feedback to improve accessibility, functionality and practical uptake.

The longer-term opportunity is to move from displaying climate-impact results towards supporting increasingly integrated, evidence-based adaptation decisions.

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Università degli Studi di Padova

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University of Bucharest

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eDF

LGi sustainable innovation

K&I Conoscenza e Innovazione

WEMC World Energy & Meteorology Council

World Meteorological Organization

Cross-sectoral Framework for Socio-Economic Resilience to Climate Change and Extreme Events in Europe (CROSSEU)
EU Horizon Europe Programme (Grant agreement No. 101081377)

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Disclamer

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Assessing Climate Change Risk in EUrope

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THE ACCREU AND CROSSEU FINAL EVENT

CLIMATE RISK ACROSS EUROPE: KNOWLEDGE, TOOLS AND PATHWAYS TO RESILIENCE

Brussels and online, 13 November 2026

Organised by:

cmcc Centro Euro-Mediterraneo sui Cambiamenti Climatici

METEO ROMANIA

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