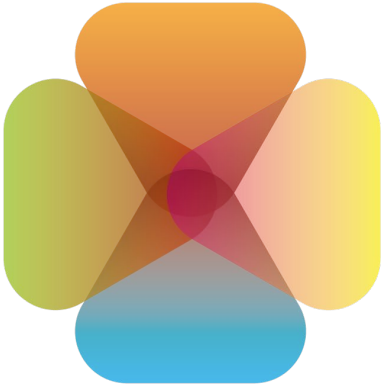


ACCREU
Assessing Climate Change Risk in EUrope

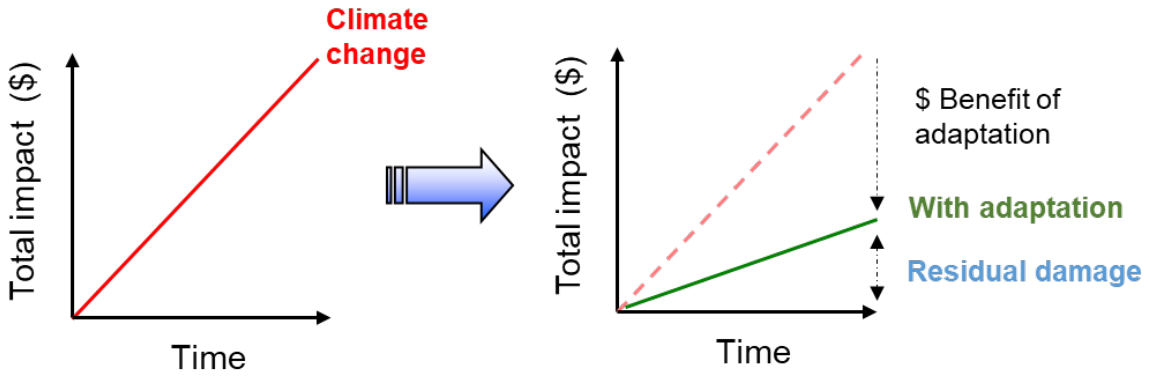
Findings on adaptation economics in the ACCREU project

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



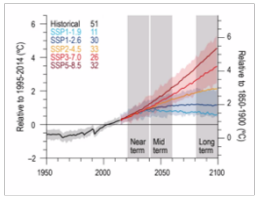
There are different ways to assess adaptation

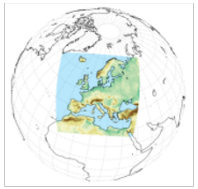
Science first - impacts

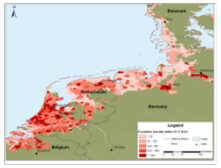
What are the economic costs of climate change in Europe in 2050 and 2100, under different warming scenarios?

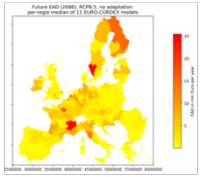
Science first - adaptation

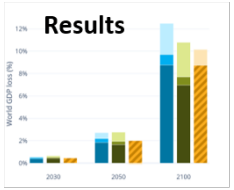
What are the modelled costs and benefits of adaptation in 2050 and 2100, for each of these warming scenarios?











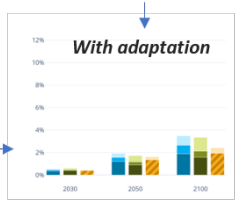
RCPs (scenario) → Climate model → Socio-econ. (Exp., Vul.) → Impact model → Economic model

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?

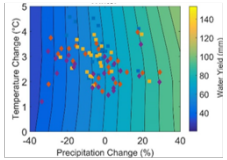
What are the costs to climate proof a new infrastructure project being built today?

Objectives → Assess risk → Options → Decision support → Implement

Structure policy question and objective



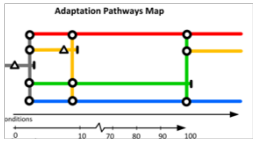
Assess current risks and future risks with uncertainty



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

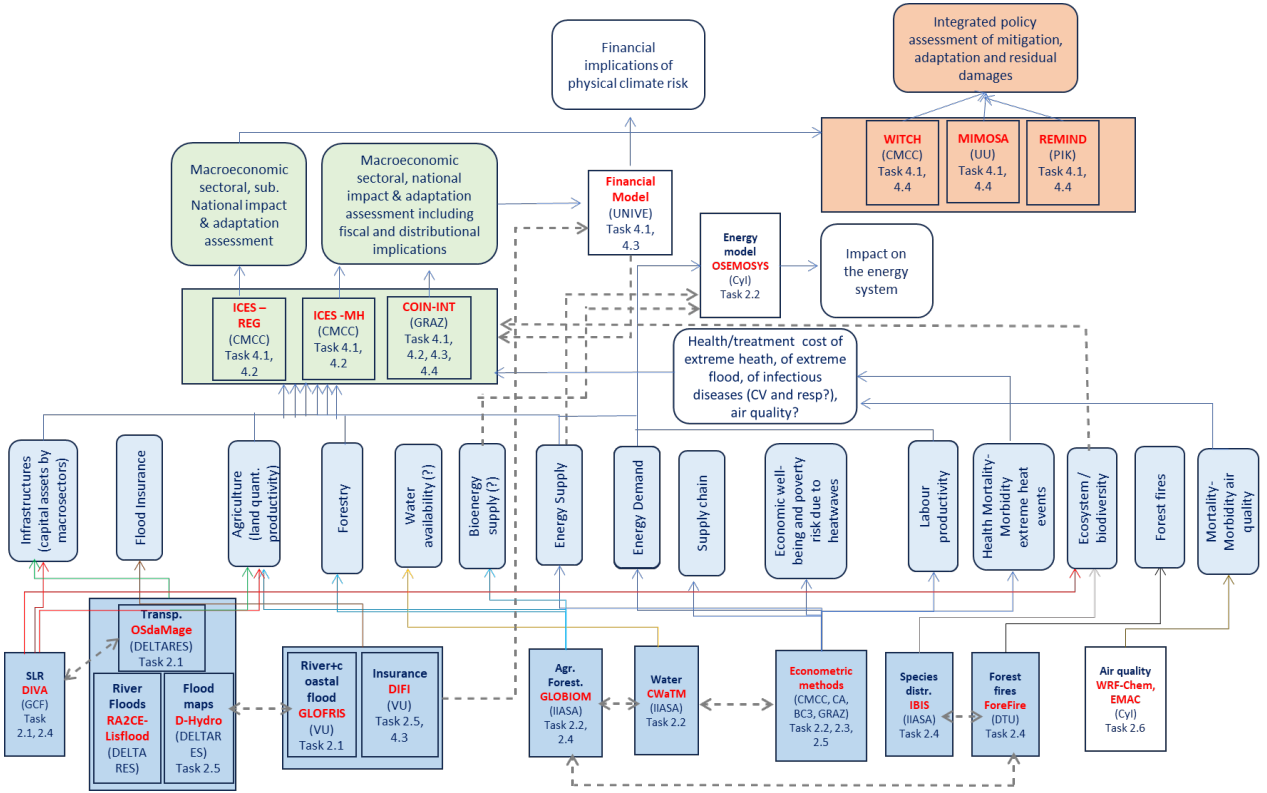
Modelling of adaptation in ACCREU

3 Global Integrated assessment models
-functions from sectors

2 European macro-economic CGE models
-use sector outputs

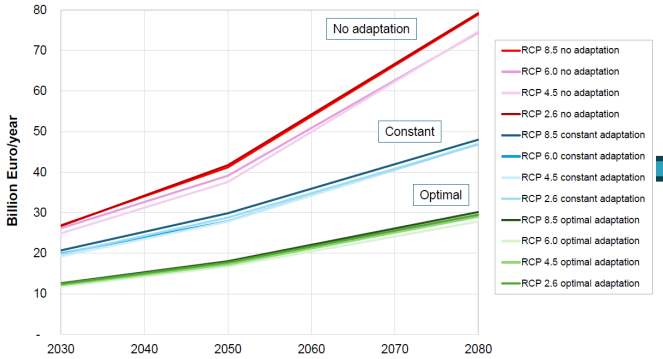
Sector models
-directly assess adaptation

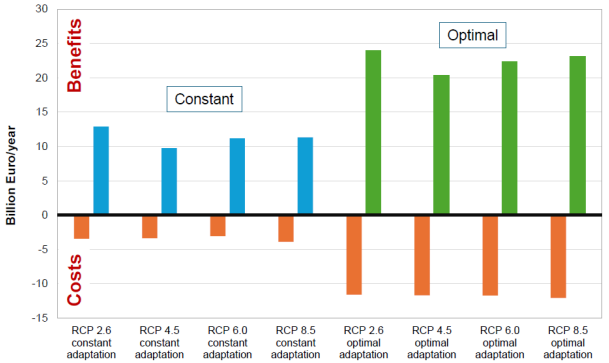
Integrated modelling analysis at multiple scales



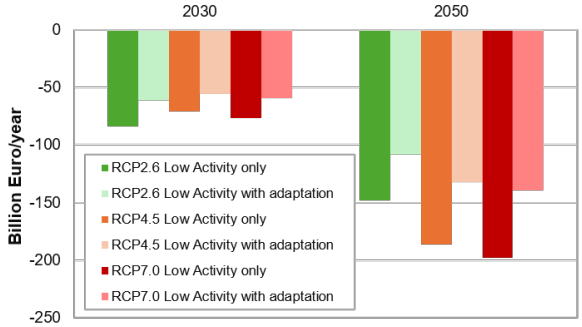
Sectoral adaptation modelling

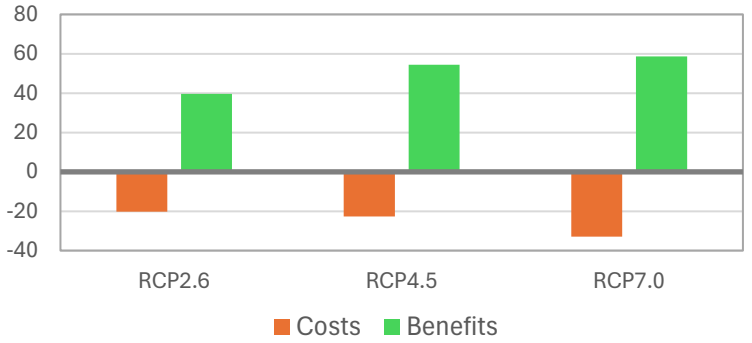
- ACCREU assessed adaptation in a suite of sectoral models – using science-first analysis
- These shows adaptation can significantly reduce impacts and positive benefit to cost ratios





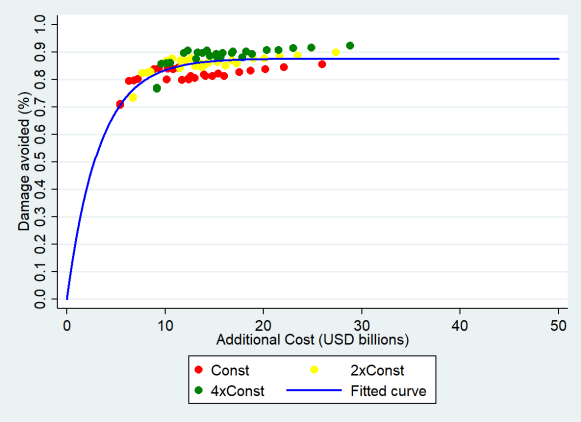
In 2050

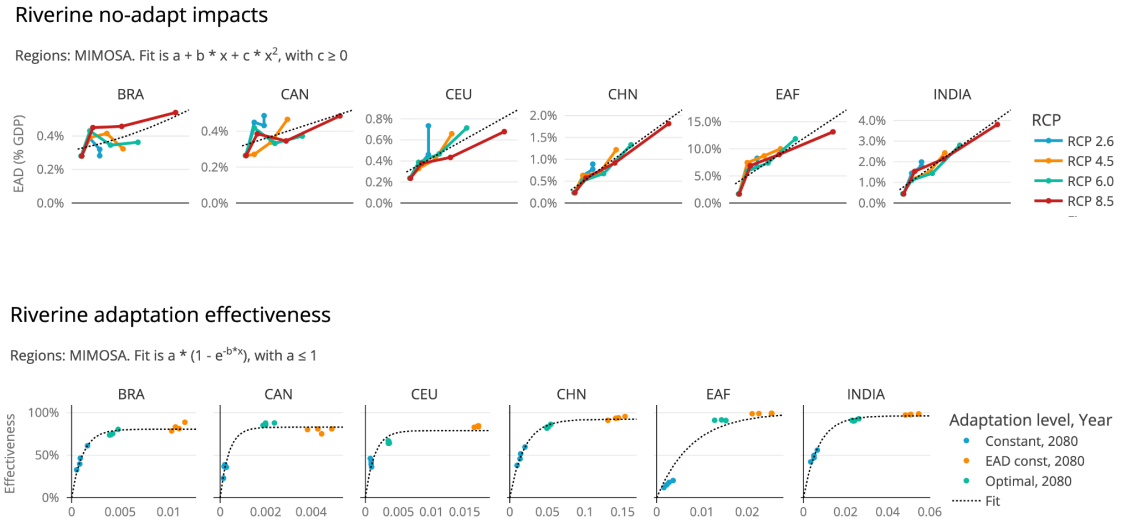




Adaptation functions for IAMs

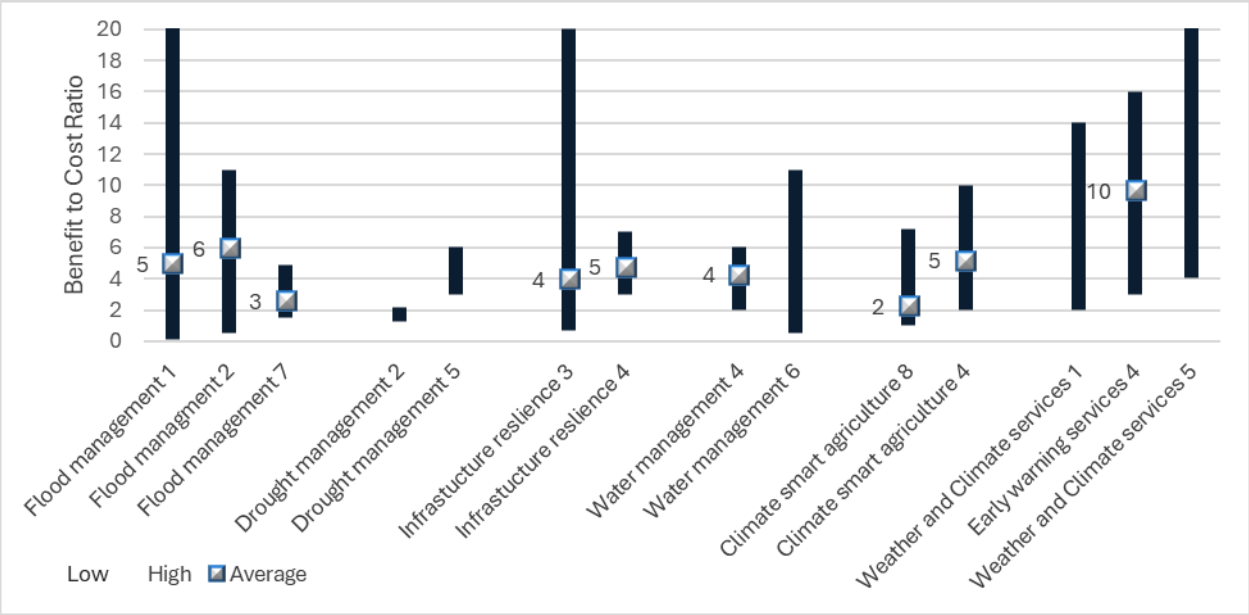
- ACCREU has taken these sectoral results and used to derive functional relationships between benefits and costs
- Generate functions disaggregated at country level, for IAMs





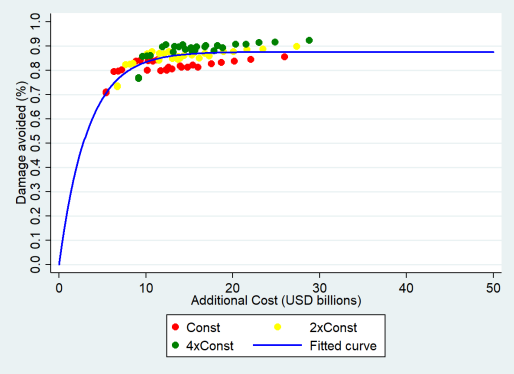
Review of the evidence for adaptation economics

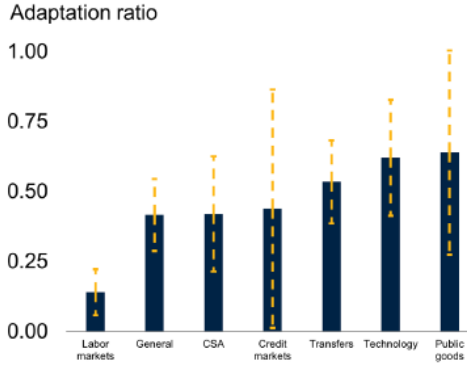
- Complemented with bottom-up literature review of adaptation options
- Adaptation generally has high economic returns (4:1) but site- and context-specific
- But financial returns are lower – highlighting will still be challenging to deliver

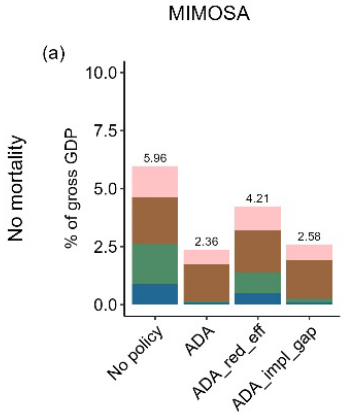


Insights

- 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

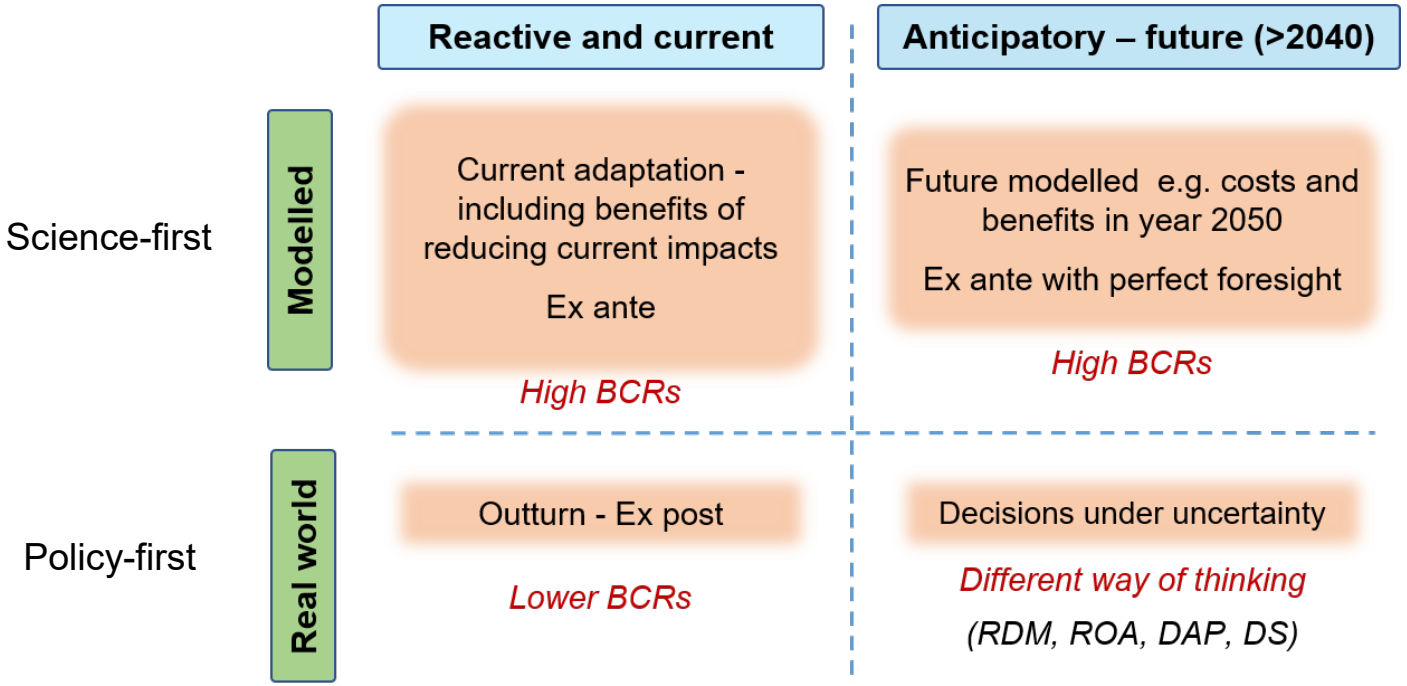






Insights – lessons for future analysis

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

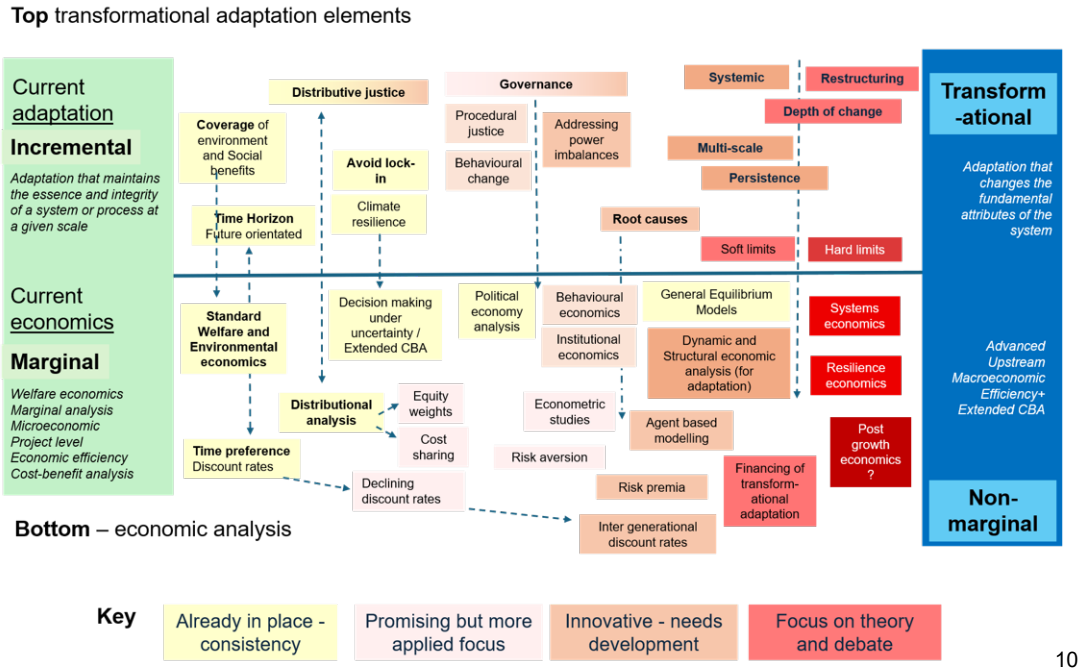


Transformational adaptation

- 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

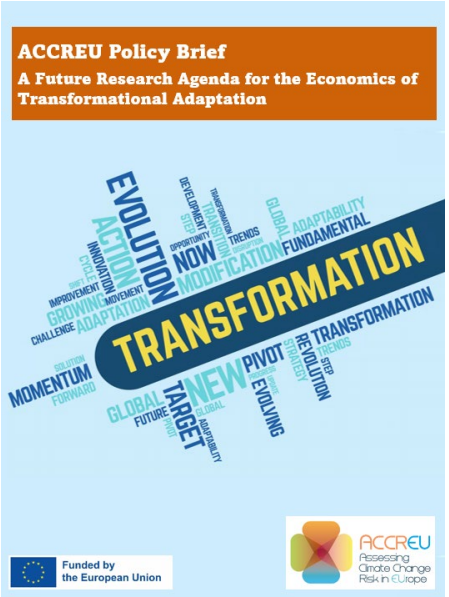
Key findings

- 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

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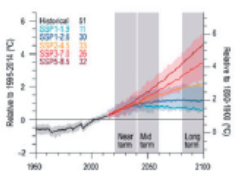



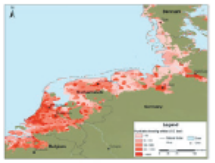

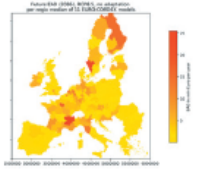

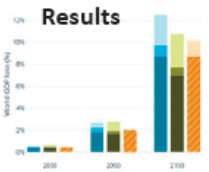

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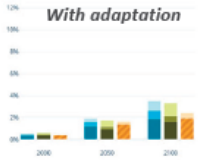

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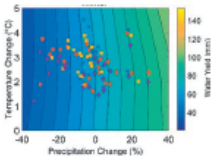

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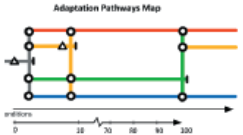
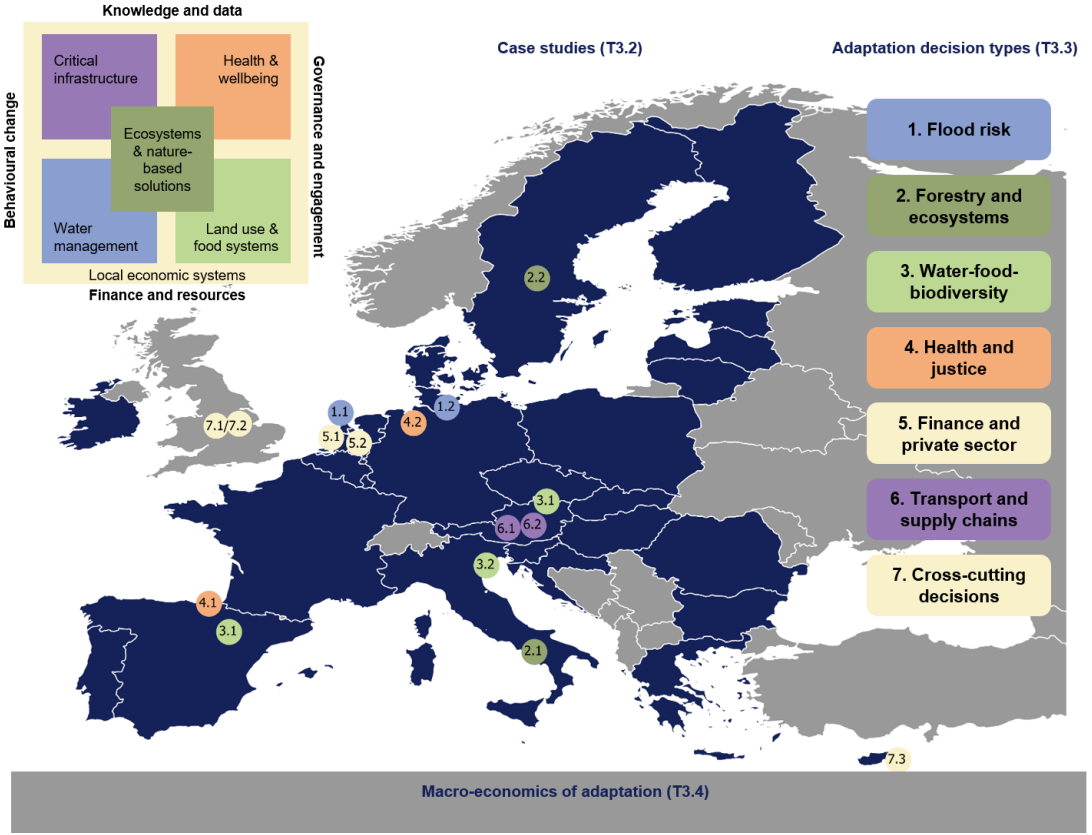


Design, finance, implement, monitor

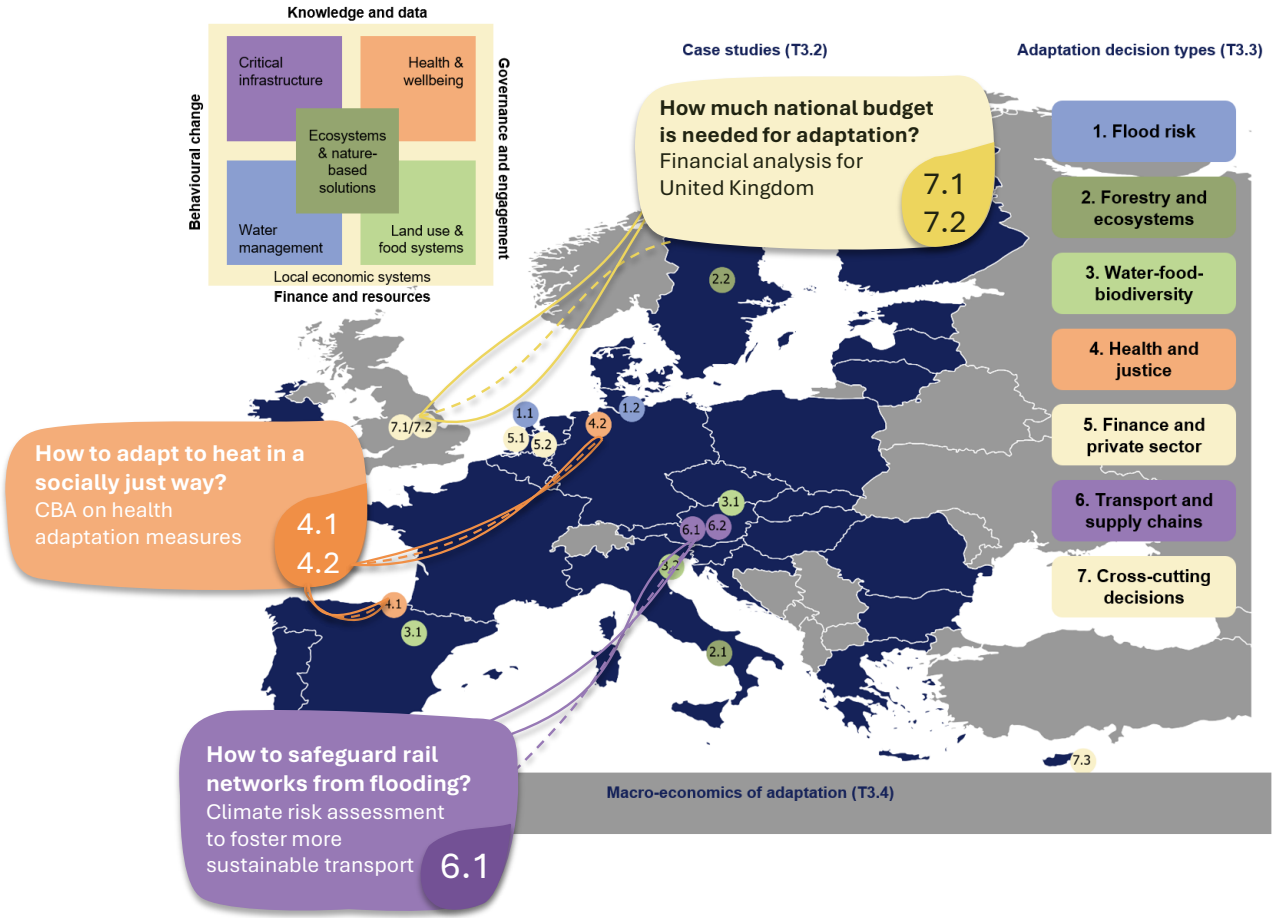
Economic appraisal of adaptation options in case studies

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

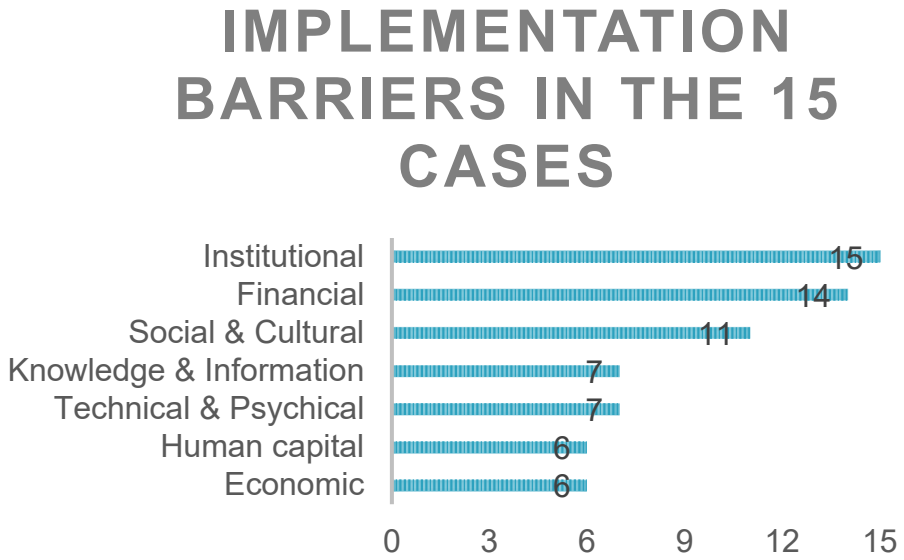
Types of targeted measures included:
- Training people working with vulnerable people
- Heat protection in school playgrounds
- Protection measures for unhoused and substance-using citizens
- Support for pediatric facilities



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....

