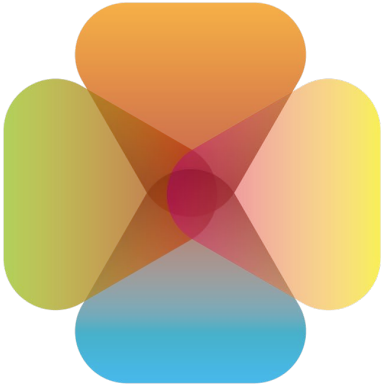


ACCREU
Assessing Climate Change Risk in EUrope

Reflections on the cost and effectiveness of climate change adaptation

Paul Watkiss and the ACCREU consortium

ACCREU, CROSSEU & SPARCCLE Webinar

December, 2025

Assessing Climate Change Risk in Europe: ACCREU

- ACCREU **Project**
- **Horizon Europe** research project conducted by 14 institutions
- https://www.accreu.eu/

- **Project goals**:
  - Analysis of economic costs of climate change on various sectors, countries, and regions of Europe, as well as globally – using models (sector, CGE, IAM)
  - Analysis of costs and benefits of adaptation measures
  - Delivered through a co-design process – to support evidence-based decisions of stakeholders

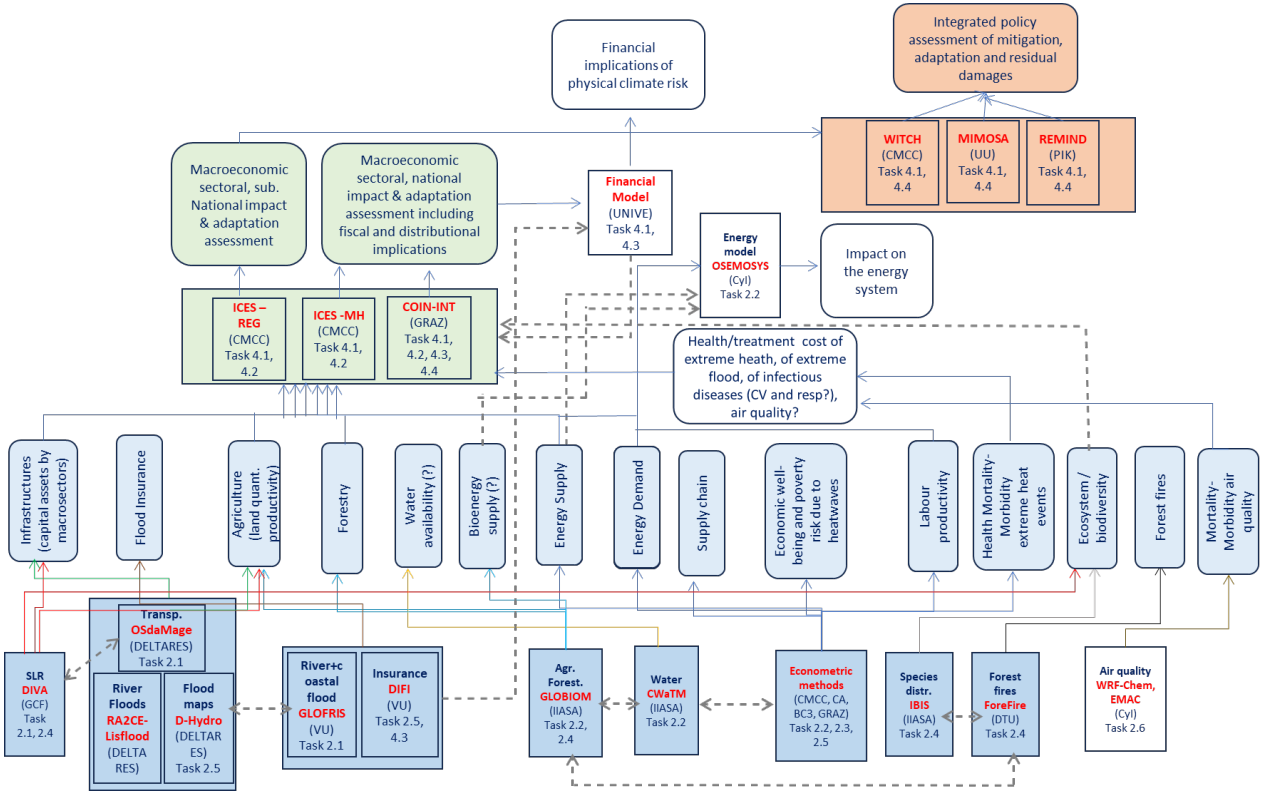
Modelling framework

Global Integrated assessment models

European macroeconomic CGE models

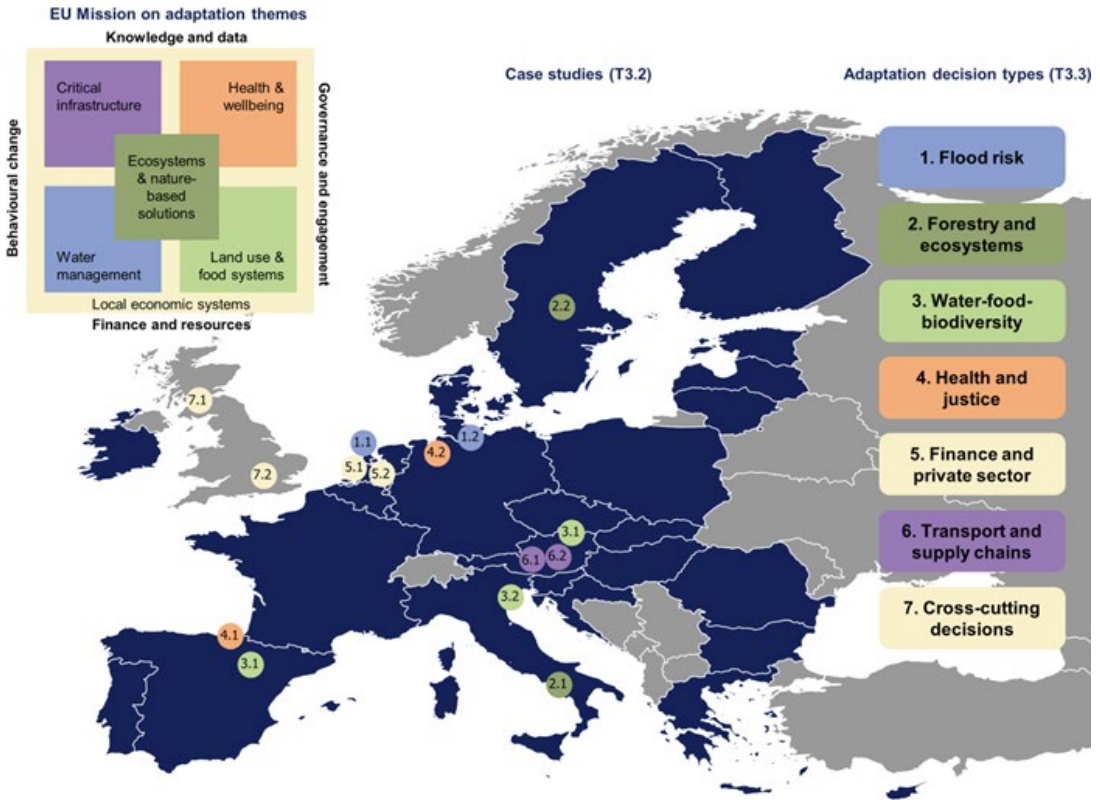
Sector models

Integrated modelling analysis at multiple scales



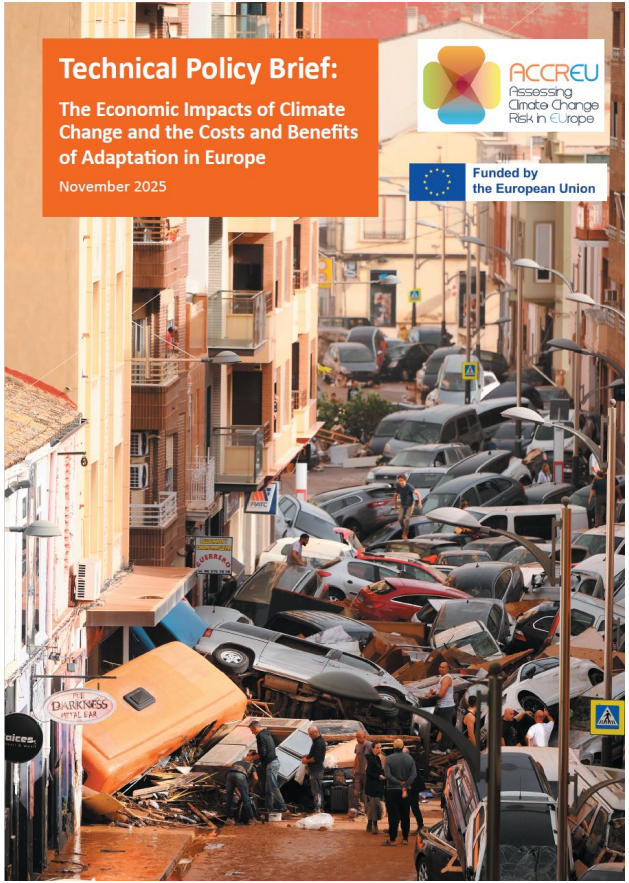
ACCREU Adaptation Case Studies & Decision Types

- **WP3 Adaptation**
  - Models complemented by analysis of adaptation with decision types
  - Provide real world analysis of adaptation economics
  - Literature review of costs, cost-effectiveness and CBA of adaptation



Sector Model Results

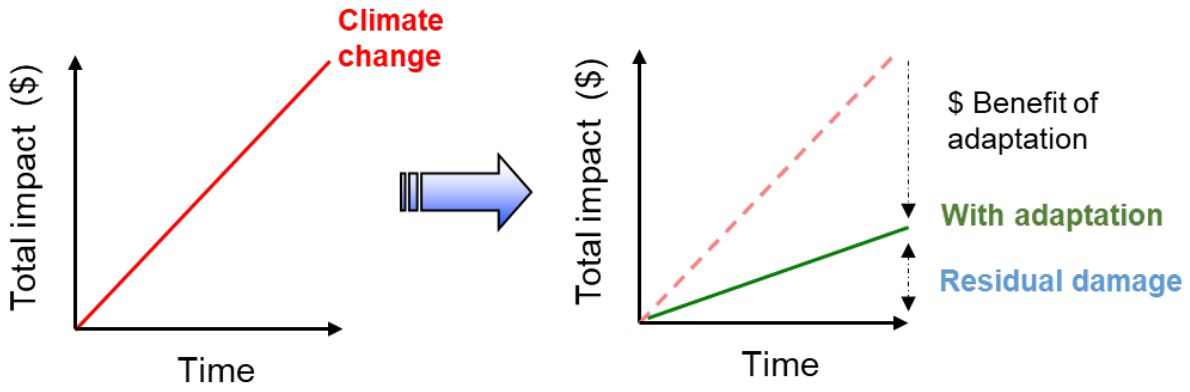
- Run sector models to look at economic costs of climate change (cost of inaction) in Europe and globally
- Consistent set of runs for RCP 2.6 4.5 and 7.0 – undertaken for SSP2 to allow direct comparison
- And costs and benefits of adaptation
- Includes analysis of different adaptation scenarios, to look at effectiveness as well as benefit to cost ratios
- European results published in policy brief



Framing

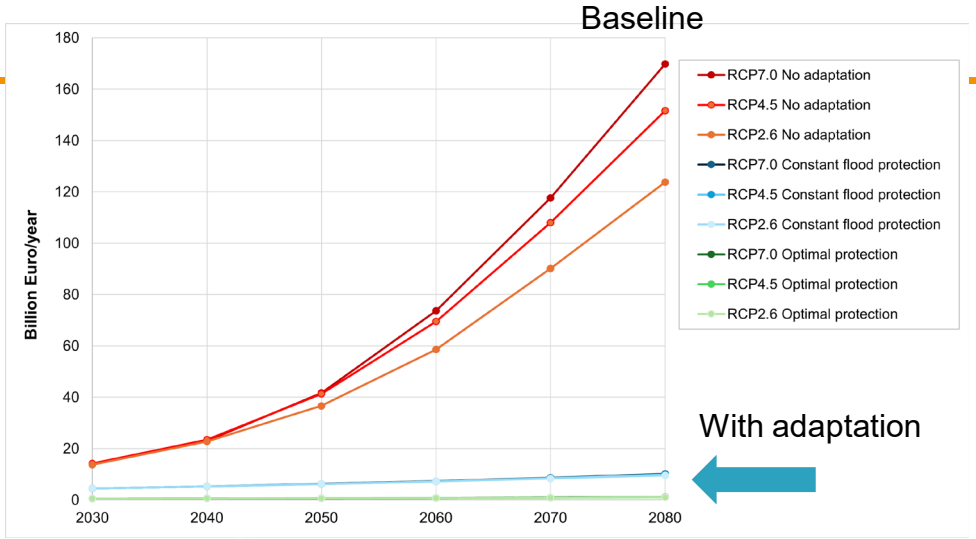
- Adaptation reduces the rising economic costs of climate change
- But not perfectly effective, there is nearly always residual damage after adaptation
- This means there is a trade-off between benefits, costs and residual impact

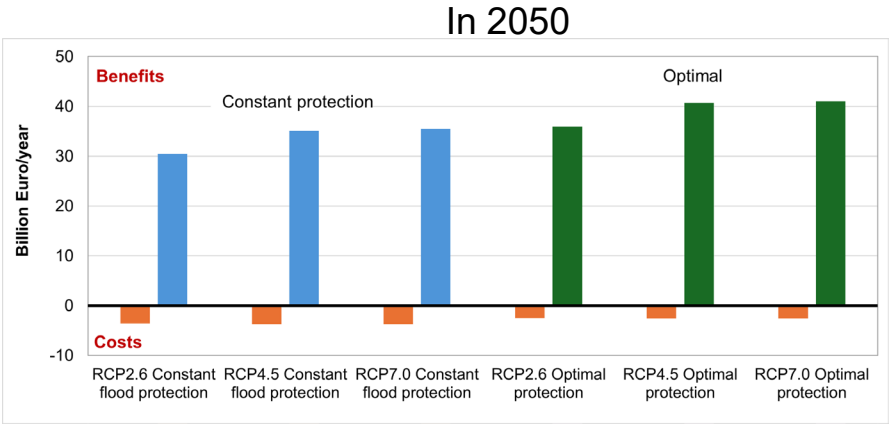
- Objectives are critical – economic optimal versus other metrics e.g. acceptable risk influence trade off – noting current objectives vary with sector and country
- In practice much more challenging and high uncertainty



Coastal / sea level rise

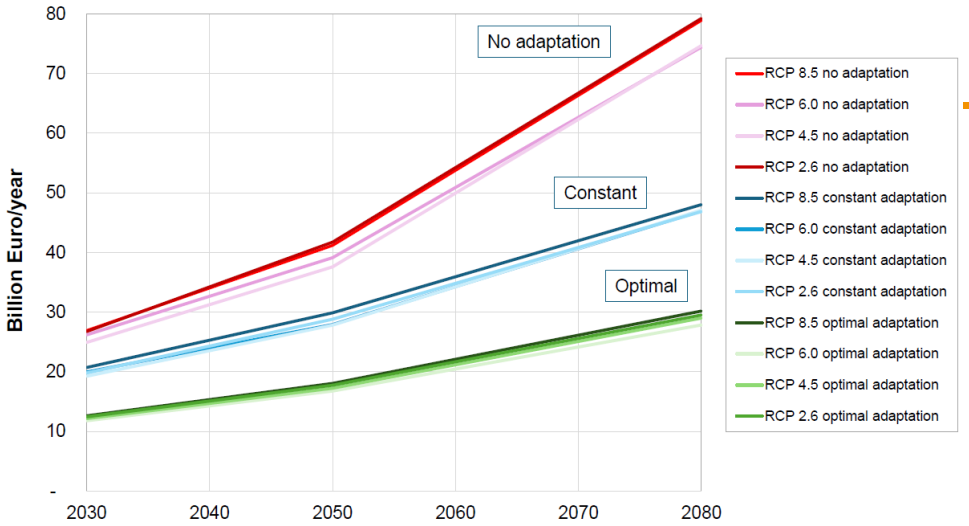
- Updated analysis of economic costs of sea level rise (EAD) in Europe (DIVA)
- Large increases in EAD in baseline (though lower than COACCH)
- Adaptation leads to very large reductions in damage
- Influenced by the objectives set – whether constant or optimal – and trade off residual damage
- High cost-effectiveness and high benefit to cost ratios

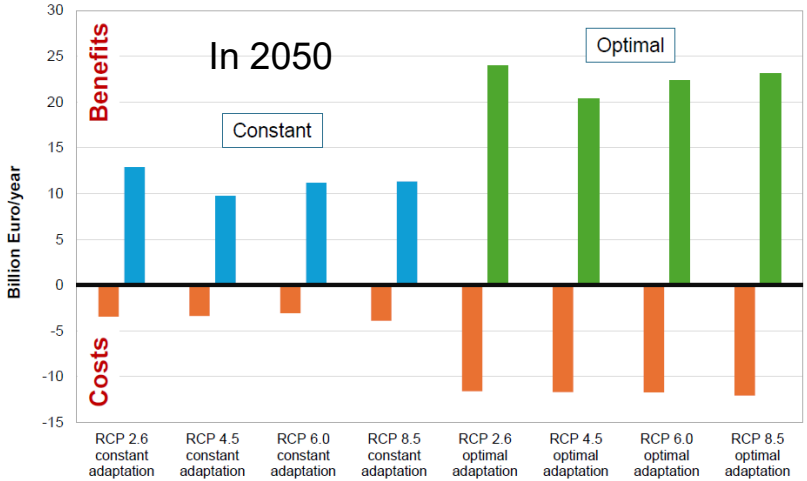




River floods

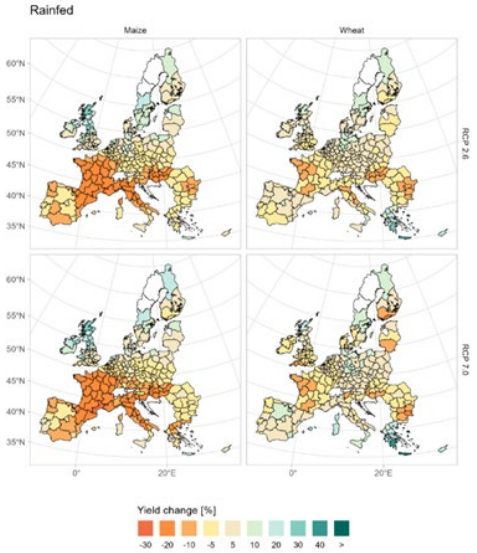
- Similar messages for river floods with rising economic costs (EAD) in Europe (GLOFRIS)
- With adaptation, large reductions in economic costs, though higher residual damage than for SLR
- Objectives again influence the level of risk reduction
- High cost-effectiveness and benefit to cost ratios, though rising costs

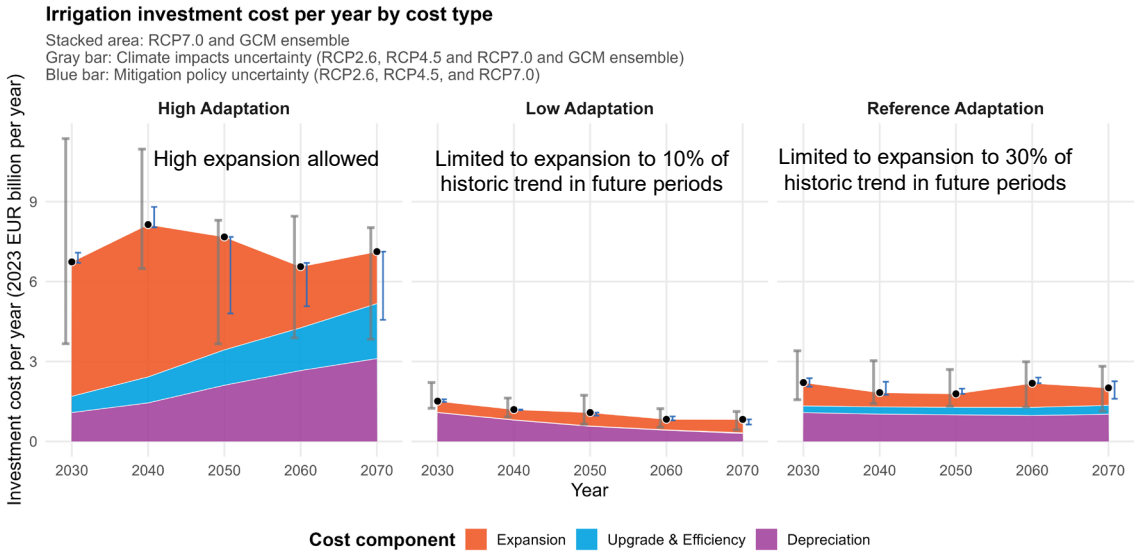




Agriculture

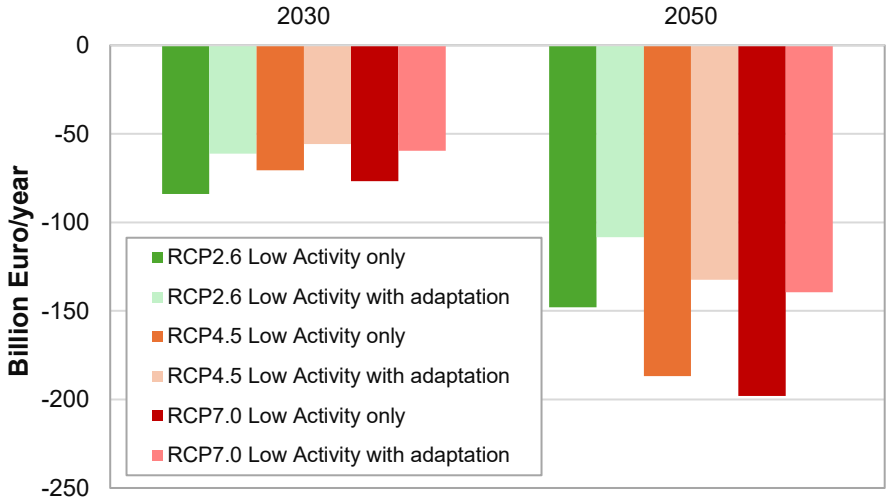
- Climate change will reduce yields in Europe though strong distributional patterns
- Assessed the potential costs of irrigation (economic land-use model, GLOBIOM)
- This indicates high cost-effectiveness and large reductions in impacts – but costs depend on whether limit uptake of adaptation

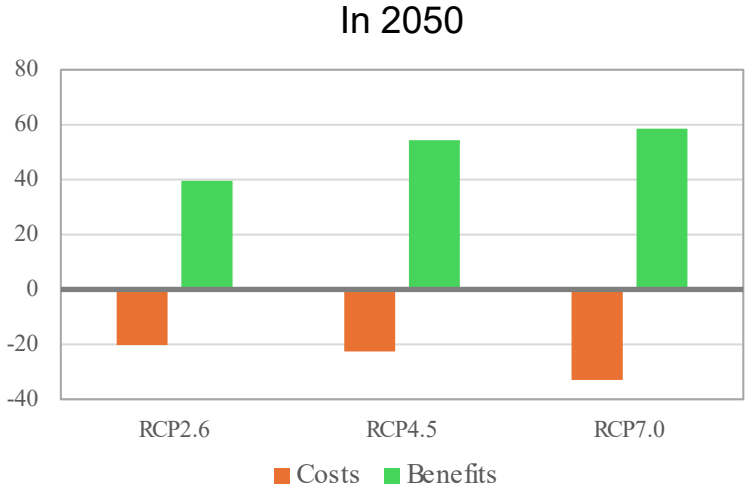




Labour productivity

- Very large potential economic impacts from heat on labour, especially in long term
- For low activity (indoor) impacts, these can be reduced with air conditioning
- Analysis shows adaptation could reduce impacts significantly with good cost-effectiveness and positive benefit to cost ratios – though still large residual damage





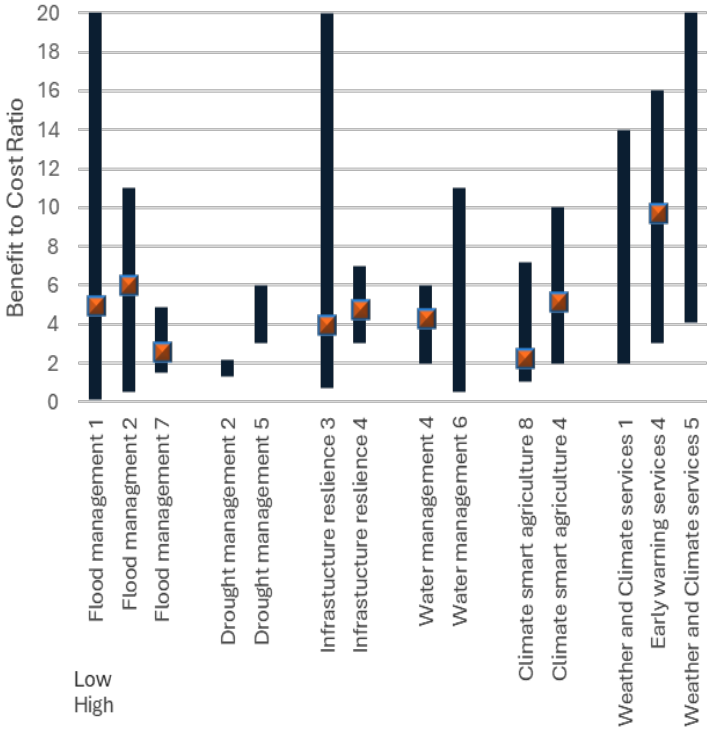
Initial conclusions and next steps for Europe

- Analysis provides updated sectoral analysis of the costs of inaction in Europe – these are estimated at potentially several €hundred billion/year by 2050
- Provides new estimates on adaptation costs and benefits, with new estimates for many sectors from extension of existing models
- Analysis shows that adaptation will involve costs, indicates estimate of €40 billion/year in 2030 rising to €60 billion/year by 2050, but large range
- Modelled adaptation is cost-effective and delivers high economic benefits, with benefits many times costs, though residual damage remains, and ratios vary by sector
- But note adaptation decision paradigm strongly influences costs and residual damage
- The values for Europe now being put into a CGE model

Literature review – costs, effectiveness, limits

- Literature review on the cost-effectiveness and benefit to cost ratios for adaptation
- Umbrella review of reviews, as well as individual studies
- Results indicate growing literature
- Adaptation has high economic returns (mostly)
- But also find very large ranges
- Issue of BCR total versus BCR avoided damage
- Important for level of residual damage
- Financial returns lower than economic

- Reviewed evidence on limits of adaptation
- Low evidence, but does indicate important



Next steps - Functions for Integrated Assessment models

- Analysis of costs of inaction and costs and benefits by sector at the global level
- Generate a set of functions for the IAMs – effectiveness and ratio of avoided damage to cost
- Include with and without limits
- Allow global analysis