Assessment of robust policy responses for adaptation to the impacts of climate change

Mark Rounsevell

Ines Omann, György Pataki, Jill Jäger

Policy Robustness

- A robust policy measure has been defined as one which has benefits across sectors, scenarios and spatial and temporal scales.

- The ultimate goal is human well-being (reducing vulnerability to climatic and socio-economic change)

- Experiment using *policy archetypes*

Analysis using policy archetypes

- Create narratives for a set of policy archetypes
- Narratives describe goals, instruments and mechanisms and how the archetype could be tested in the CLIMSAVE Integrated Assessment Platform (IAP)
- Example: Ecosystem-Based Adaptation
  - GOAL: contributes to the integrity and health of ecosystems and habitats
  - INSTRUMENTS: e.g. ecological corridors, ecological restoration, investing in green infrastructure
  - MECHANISM: e.g. merge climate-proofing and biodiversity-proofing of sectoral policies

Policy Archetypes

- *Ecosystem-based* adaptation (natural capital)
- *Market-based* adaptation (financial capital)
- *Technology-based* adaptation (infrastructural capital)
- *People-based* adaptation (social and human capital)

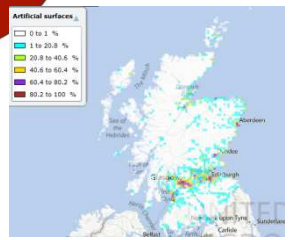
Analysis matrix

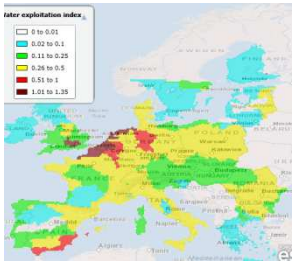
Policy archetypes (4)	Scenario	Sectors	Spatial scale (Scotland & Europe)	Temporal scale (2020 & 2050)	Robust-ness (no. of criteria satisfied)
A1			x		1
A2	x	x	x	x	4
A3					0
A4		x	x	x	3

Testing policy narratives

- Where possible with the IAP, otherwise qualitatively (expert judgement)
- Testing with the IAP against the indicators and thresholds used in the CLIMSAVE Vulnerability Hotspot Analysis
- The IAP can be used to test robustness across scales (EU vs. Scotland), time slices (2020s, 2050s), sectors, socio-economic scenarios

Quantifying cross-sectoral impacts, adaptation and vulnerability – the CLIMSAVE IAP





Vulnerability thresholds (not final)

Indicator	Lower threshold	Upper threshold
Water exploitation index (ratio of water withdrawal to availability) per grid cell	0.2	1.0
Timber production per grid cell (yield x managed forest area)	Parity of supply and demand (1)	0.05
Food security - Food production per capita (per year, based on calorific intake) per grid cell	Mean value from website data Ca. 3300 MJ	Min value from website data Ca. 2000 MJ
Number of people flooded for a 1 in 100 year event (for baseline) per grid cell	1	100
Landscape diversity (representative of multi-functionality of the landscape) OR Intensity shift	To be determined after index computed	To be determined after index computed
Change in number of species (presences) per grid cell relative to baseline (SPECIES output)	Any loss of species	Loss 50% of species

For Example …

Technology-based adaptation

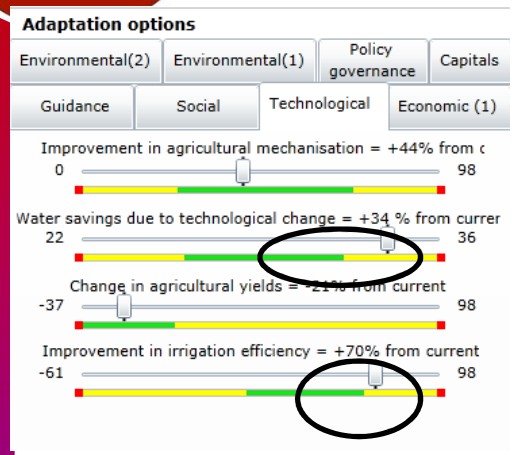
Adaptation measures proposed by stakeholders:

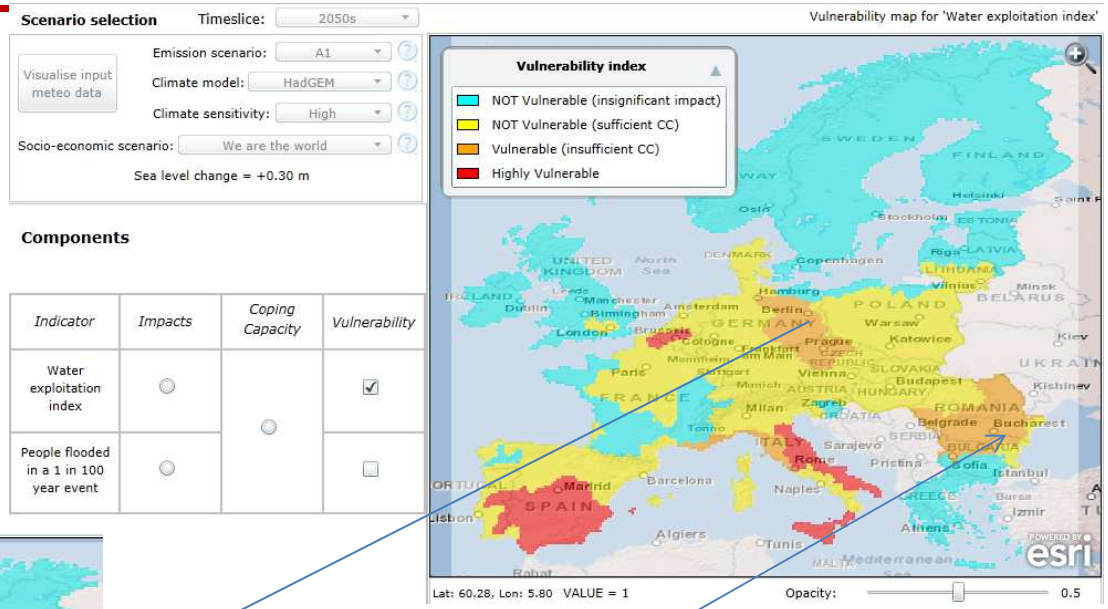
- Improve irrigation efficiency
- Upgrade flood defences
- Recycling systems
- Large infrastructure for water distribution
- Etc…….

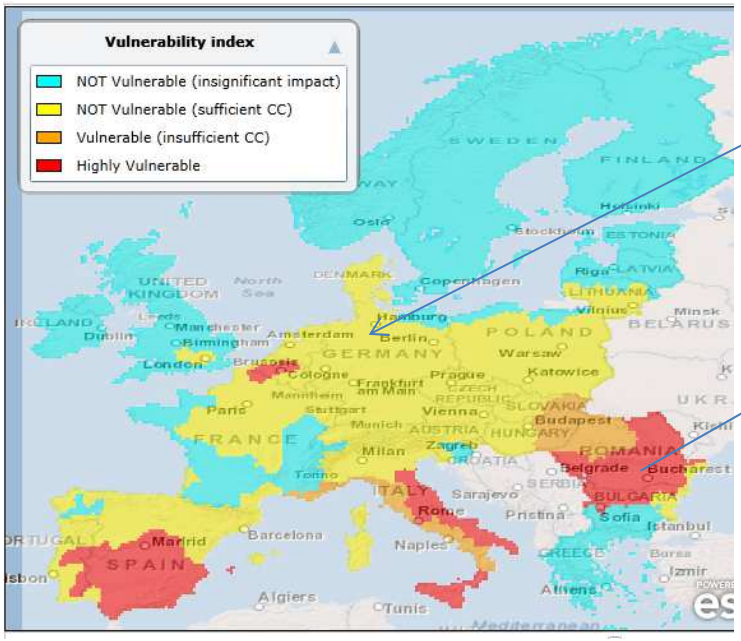
Test using the IAP

- Run “We are the World” scenario (Europe), 2050s timeslice, high climate sensitivity
- Then INCREASE water savings due to technological change AND improvement in irrigation efficiency (Technology-based adaptation)
- Compare the two vulnerability maps for “water exploitation index”

Comparing vulnerability in the IAP

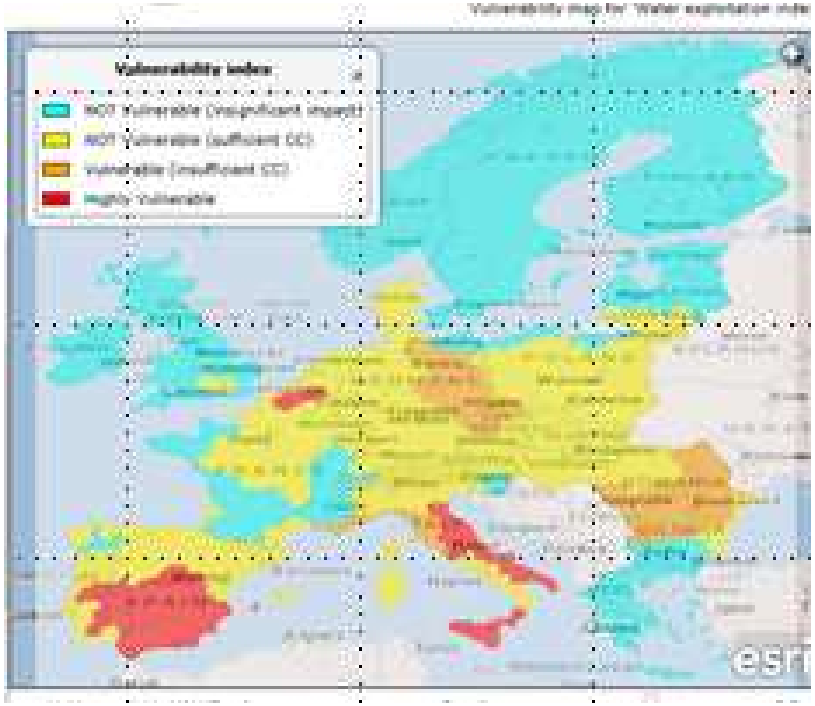




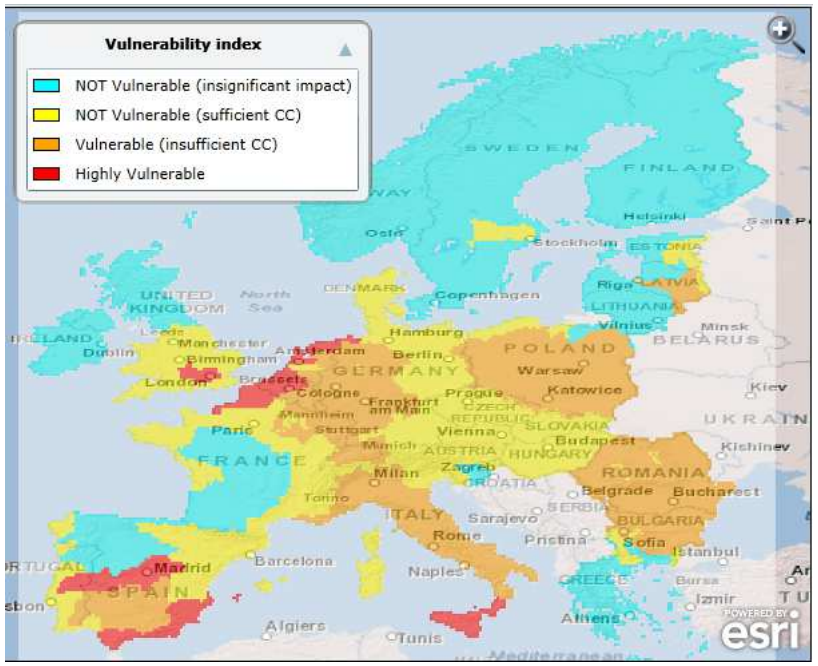


Example differences across socio-economic scenarios

We are the world



Icarus



Next steps

- Running the IAP to test the effects on different sectors of the four policy archetypes for two time slices, for Europe and Scotland, and for different climate and socio-economic scenarios

Thanks for your attention!