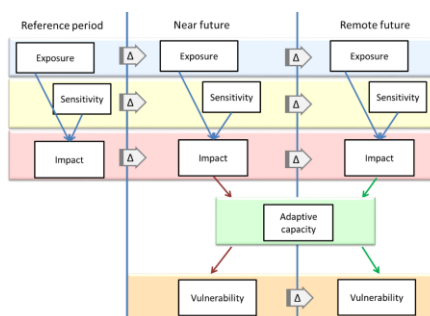


Territorial Development and Adaptation to Climate Change

Stefan Greiving

1. Climate change impacts and vulnerability in Europe

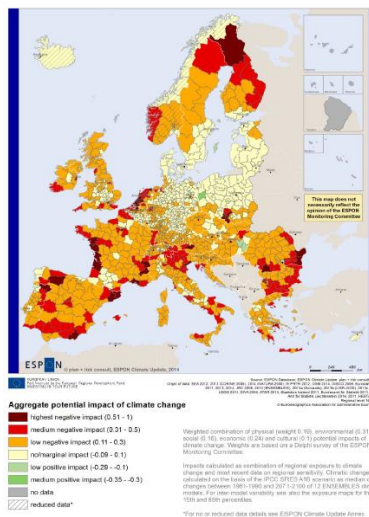
- Extent and territorial patterns of climate change impacts cannot be precisely predicted
 - uncertainty of further greenhouse gas emissions
 - socio-economic developments that influence the sensitivity to changes in the climatic system and also the ability to adapt to these changes.
- Parallel modelling approach: projection of demographic and socio-economic changes in parallel to the changes of the climate in order to assess the future impacts of climate change on future society.



Greiving et al. (2015)

Key impacts in Europe

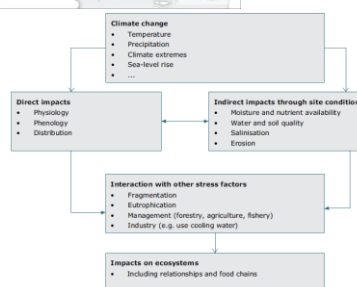
- Scandinavian regions exhibit high impacts due to the significant climatic changes.
- Many metropolitan regions and some of the most developed coastal regions of Europe are expect to be highly affected due to their exposure to sea level rise, coastal flooding and urban heat and the given sensitivity of these densely populated areas.
- Parts of Eastern Europe exhibit high impacts due to their exposure to various extremes.



ESPON & PRC (2014)

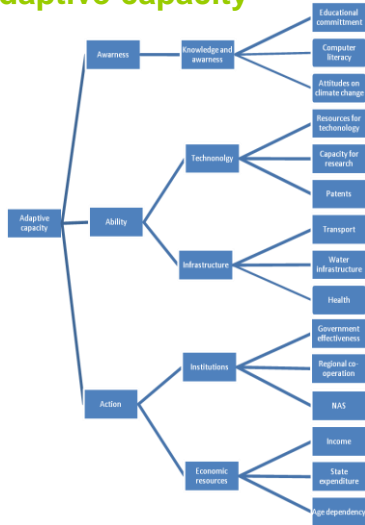
Cross-border impacts

- Alps and the Carpathian Mountains as they depend on international (winter) tourism.
- Large transnational river basins:
 - relevant for freshwater resources,
 - as international transportation pathways,
 - renewable energy sources,
 - prone to extreme floods
 - these issues have to be managed transnationally
- Many habitats of European interest, which are often of a cross-border nature, are potentially threatened by climate change

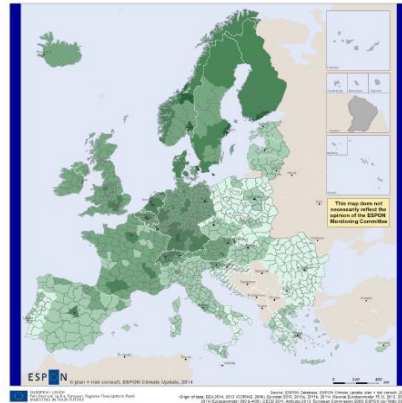


EEA (2012)

tu technische universität dortmund
Adaptive capacity



IRPUD



Overall adaptive capacity

- Highest capacity (0.81 - 1)
- High capacity (0.61 - 0.8)
- medium capacity (0.41 - 0.6)
- low capacity (0.21 - 0.4)
- very low capacity (0 - 0.2)
- no data
- reduced data

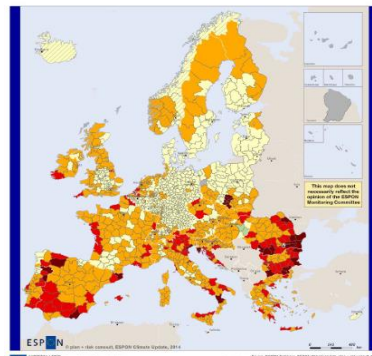
The overall adaptive capacity was calculated as weighted contribution of economic capacity (weight 0.31), infrastructure capacity (0.15), technological capacity (0.25), knowledge and awareness (0.23) and institutional capacity (0.1). Weights are based on a Delphi survey of the IRPUD Monitoring Committee.

ESPON & PRC (2014)

tu technische universität dortmund
Vulnerability

- Adverse regional variations of adaptive capacity lead to high vulnerabilities in Southern and South-eastern Europe.
- Patterns roughly correspond to socio-economic patterns in Europe.
- Scenario runs counter to territorial cohesion.
- Climate change could trigger a deepening of existing socio-economic imbalances between the core of Europe and its periphery.

IRPUD



Potential vulnerability to climate change

- Highest negative impact (0.51 - 1)
- medium negative impact (0.31 - 0.5)
- low negative impact (0.19 - 0.3)
- nonnegative impact (0.09 - 0.1)
- low positive impact (0.20 - 0.1)
- medium positive impact (0.43 - 0.3)
- no data
- reduced data

Vulnerability was calculated as the combination of regional potential exposure to climate change and a qualitative combination of observed economic, social, environmental and cultural attributes. Observed exposure to climate changes was calculated on the basis of the IPCC (2007) scenario as indicator of the changes between 1980-1999 and 2017-2100 at 9 climate scenarios of 22 (ENR) and 13 climate models and 2 indicators of the IPCC (2007) and 20 scenarios for sea level rise. The results are shown in the map. The vulnerability indicator is the average made for the 10th and 90th percentile. Adaptive capacity was calculated as a weighted contribution of economic, infrastructural, technological and institutional capacity as well as knowledge and awareness of climate change.

ESPON & PRC (2014)

2. Connections between territorial development and climate change adaptation

- Territorial development is regarded to be responsible for and capable of reducing regional impacts of climate change and developing climate adaptation capacities.
- Trends like the current financial crisis in Europe as well as the rapid decline and ageing of the population in parts of Europe, deteriorate the capacity to adapt to climate change.
- Climatic change elsewhere has profound effects on European societies, economies and on Europe's security.
- A more balanced territorial development would be beneficial in order to enable Member States and regions to adapt to the impacts of climate change and to enhance their resilience to any kind of crisis.
- Taking into account regional imbalances and the estimated inequalities of climate change impacts in Europe is important when considering the future of Cohesion Policy.

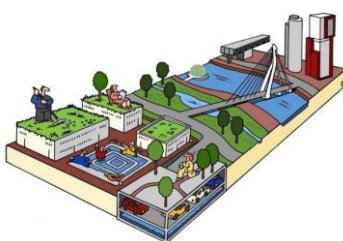
3. Existing connections between adaption and territorial development

- The Commission adopted the EU adaptation strategy in 2013. It points to mainstreaming climate change adaptation into EU policies, but does not mention territorial development or territorial cohesion.
- At national level, most of the 21 existing adaptation strategies refer also to territorial development in general and to spatial planning in particular.
- Very little attention is spent to adaptation in the Europe 2020 Strategy.
- European Commission's Sixth Cohesion Report discusses climate change developments in Europe within its chapter on sustainable growth and acknowledges the importance of socio-economic factors.
- Territorial Agenda 2020 identifies climate change and related impacts as one of six key challenges, but doesn't address connections between adaptive capacity and territorial development.
- Some directives reflect climate change (EIA, MSP) others not.

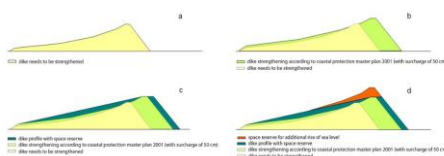
4. Mainstreaming climate change adaption into territorial development policies

- Adaptation as cross-cutting issue needs to be mainstreamed at all levels and cross-border character of several climate change impacts needs to be addressed.
- Climate change impacts and adaptation should be integrated in the directives on water, floods and habitats in order to optimize the fit between the scope of the problem and the scope of decision making.
- Adaptation is embedded into a given national legal-administrative and cultural setting, providing context specific characteristics.
- Good institutional fit between the scope of the problem and the scope of decision-making, and an effective interplay between governments and other societal actors.
- Interreg promotes trans-boundary cooperation. Regions need greater access to information and harmonized methods for understanding local climate change impacts and their specific vulnerabilities.

- Addressing the deep uncertainty of the future status of both climate and society calls for flexible, resilient adaptation strategies.
- “no-regret”: multifunctionally justifiable solutions and therefore more acceptable for affected population as pure adaptation measures.
- Examples:
 - Water City Rotterdam
 - “Klimadeich” Schleswig-Holstein, Germany



Source: www.rotterdamclimateinitiative.nl



Source: http://www.schleswig-holstein.de/Umwelt/Landwirtschaft/DE/WasserMeer/09_KuestenschutzHaefen/06_Bemessungsverfahren/ein_node.html

- Adaptation to climate change and EU development policy need to be coordinated in order to mitigate international migration and to avoid risks for Europe's security.
- Climate-sensitive development policy should highlight the severe consequences of a creeping change of the climate on food security, poverty and migration and support adequate adaptation strategies.
- In some locations responses could also require transformational changes such as managed retreat.
- Monitoring and evaluating climate change adaptation policies is crucial in order to assess their effectiveness, but also potential side effects on other policy fields.
- Need for a broad, and depending from its scope even transnationally coordinated, stakeholder involvement.
 - Relevant for acceptability, but also applicability of adaptation measures.
 - Political decisions based on uncertain knowledge need a broad mandate from all social groups in order to implement actions in practice.

Thank you for your attention!

stefan.greiving@tu-dortmund.de