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The COHERENT Project

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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Larsen, M. A. D., & Halsnæs, K. (2017). The COHERENT Project. Poster session presented at DTU Sustain 2017, Kgs. Lyngby, Denmark.

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The COHERENT project

Coastal hazard risk reduction and management

2017-2020, Innovation Fund Denmark (project no. 7048-00004A)



Key personnel

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General project description

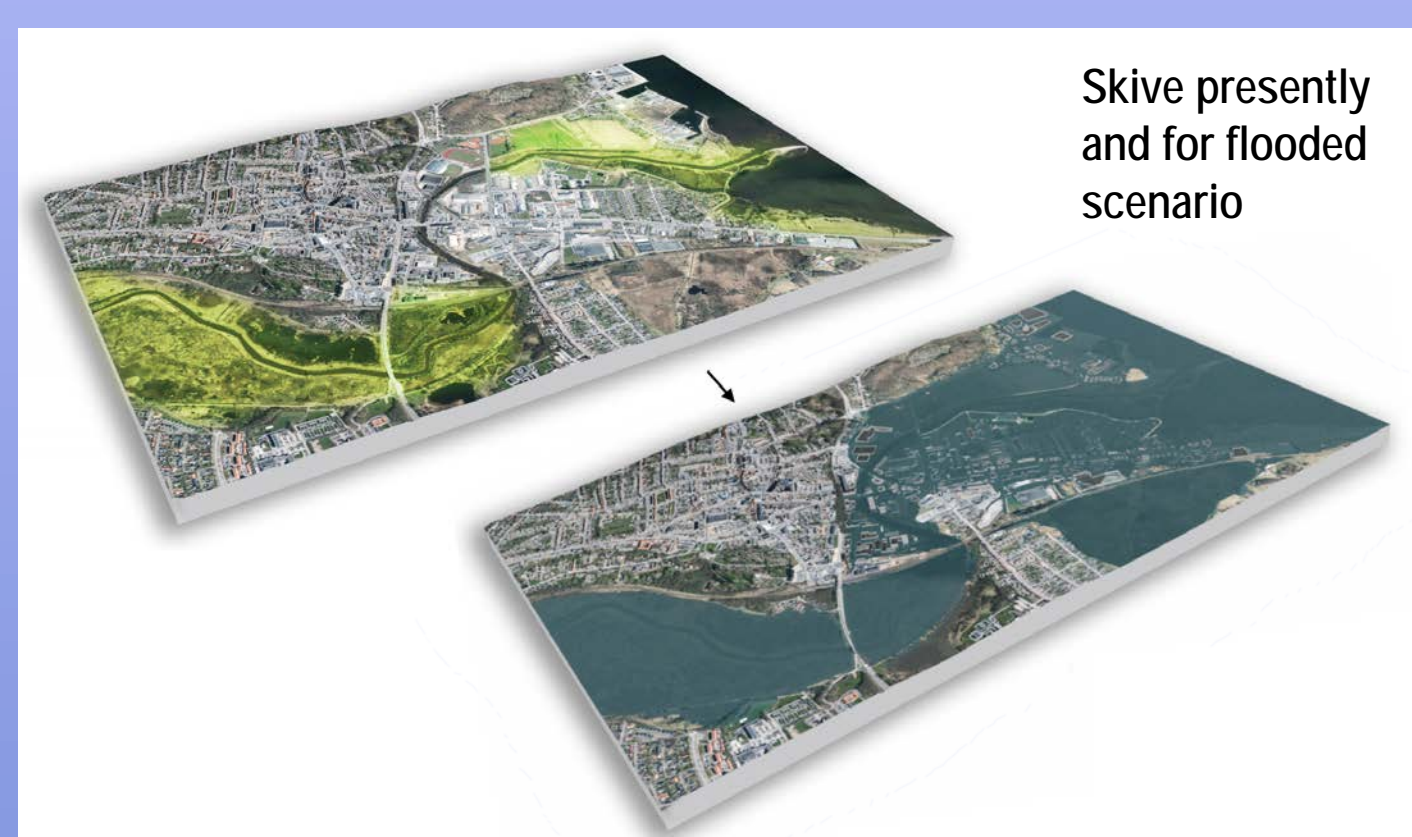
The aim of COHERENT is demand driven knowledge co-creation regarding coastal hazard risk reduction and management by professionals, governments and the business sector. The project is positioned in the value chain between research to innovation, integrating new and established research in science, economics and the social sciences and confronting it with the needs of decision-makers, civil society, operational hazard managers and business.

WP 1 - Physical pressures on the coastal system: – hazards and impacts, Lead: Bo B Christensen (DHI)

WP1 aims to develop novel approaches with the aim of improving estimates of 1) the **probability distribution curve for storm surge events**, as well as 2) the **probability of breaching coastal barriers**. Improving probability estimates will involve analysis of the meteorological drivers for historical events and modelling of the storm surge consequences, including impacts on barriers.

WP 2 - Hydrology-land use interactions in the coastal zone, Lead: Morten A D Larsen (DTU)

WP2 addresses current and future **interactions between** and the combined effects of physical impacts from **the hydrological side, flooding from the sea and anthropogenic practices** concerning land use, management, development and planning in the coastal zone. This will provide a framework for assessing the impact and associated social and economic costs of a certain hazardous event on the basis of a **matrix of interconnected natural and human-made conditions** reflecting a complex environment for the planning and management of **current and future planning and decision-making**.



Project partners



Main project output

Research

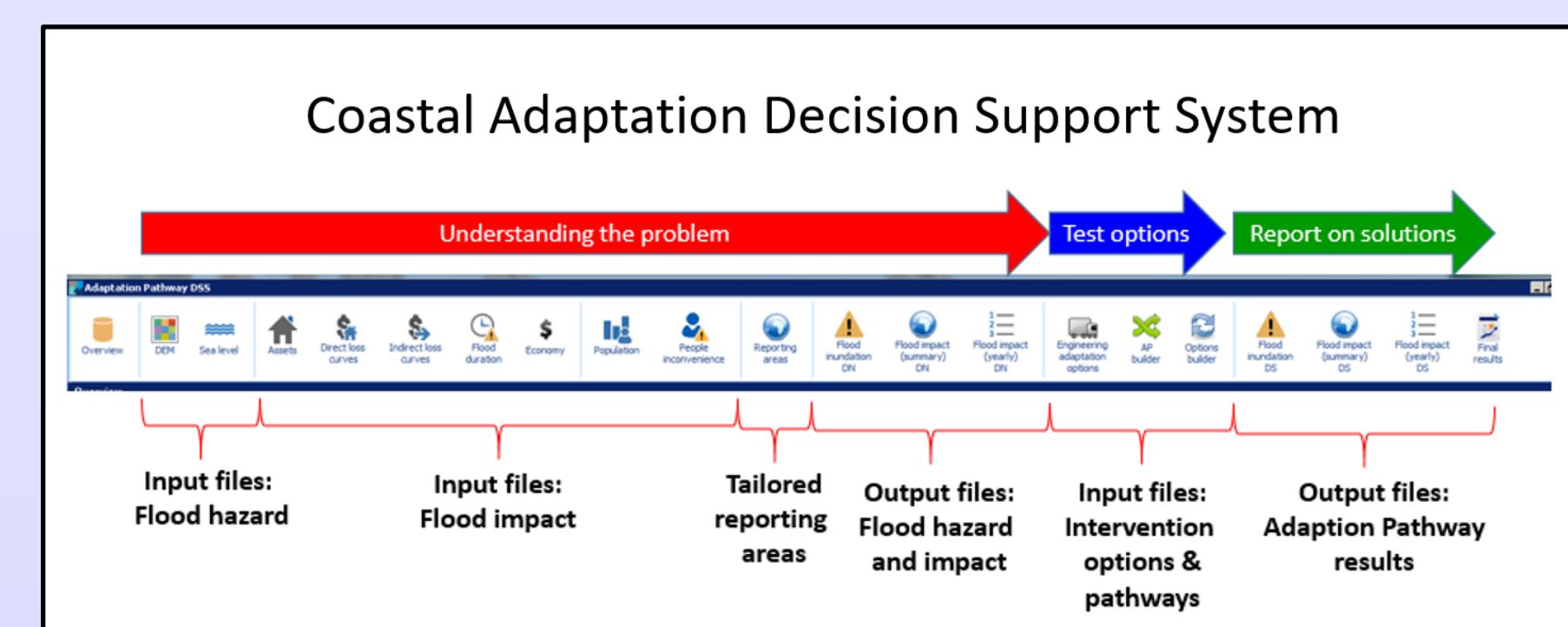
- New approach for estimating most severe storm-surge events and costs
- Integrated modelling of ocean, land-use and inland hydrology
- Dynamic damage cost curves
- Updating of warning system, hazard development and management
- Behavioral experiments and studies linking research, governance and risk

Business products

- Adaptation/decision software toolkit, covering all major decision gates, combining technologies + human behavior available for consultants, SMEs, municipalities + exports
- Software suite expected to reach market quickly (1–3 months after project) Data, models and methods combined + integrated into ICT-based framework

Key impacts to society

- Efficiency in hazard management
- Improved technical basis for coastal, land-use and hydrological planning
- Learning-based system for damage costs and insurance
- Knowledge creation/testing technologies + hazard management supporting business/exports
- Improved governance of national and local authorities.

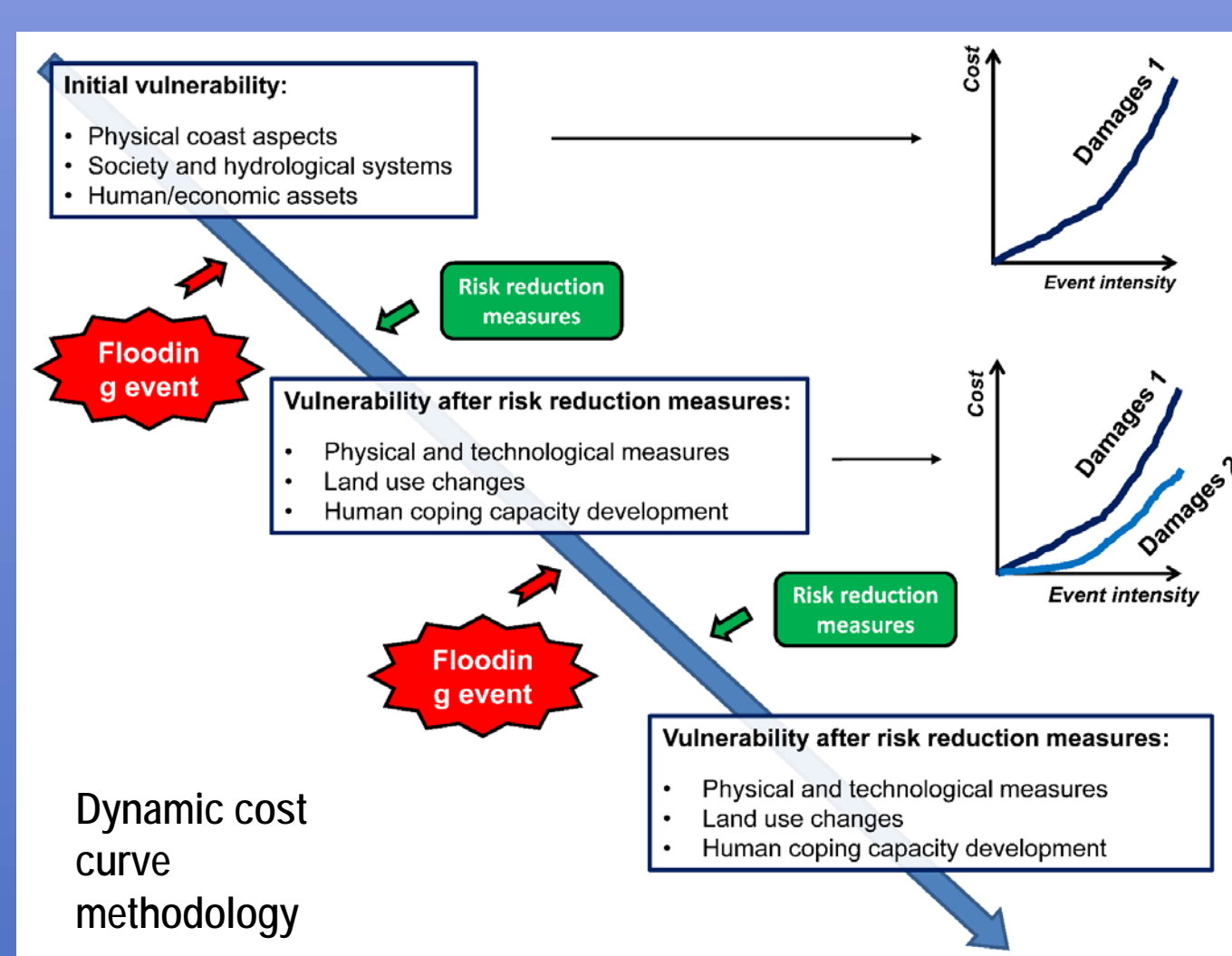


WP 3 - Hazard management, response capacities and human dimensions, Lead: Carlo Sørensen (The Danish Coastal Authority)

WP3 will engage **civil society** in the management of coastal hazard risk reduction and climate change adaptation and develop shared strategies and increased coping capacity through transdisciplinary work with national and municipal administrations, emergency management, universities, and private enterprises. The work includes structured studies in terms of **interviews and dialogues** with national and local governments, emergency operational units, and civil society in order to reveal risk perceptions, and strengths and limitations facing coastal flooding. Case study experiences will be shared and related to the international context. The potential efficiency improvements and learning aspects of risk reduction will be assessed and tested in experiments and through “learning-by-doing”.

WP 4 - Dynamic damage curves reflecting coping options and human capacities, Lead: Kirsten Halsnæs (DTU)

WP 4 will develop a **dynamic flooding damage curve tool** for cost reduction calculations depending on physical protective measures, response capacity and vulnerabilities reflecting physical assets, society and hydrological systems. Climate change adaptation and increased and more efficient emergency capacity efforts will be reflected including warning systems, human behavior, and operational management.



WP 6 - Project management and dissemination, Lead: Kirsten Halsnæs/Morten A D Larsen (DTU)

Project management and dissemination.

WP 5 - Risk reduction options, intelligent planning, warning systems and business strategies, Lead: Nils Drønen (DHI)

WP5 will develop an easy-to-use **planning and early warning system framework and software tool** for testing “do nothing” and different risk reduction strategies, technologies, and management options for flooding. The **system is open-ended** in the sense that hydraulic models and economical models can be added to the system, where flood hazard simulations and the economic model results are synthesized into relevant information that the end-user can access. Input from WP1+WP2 constitutes the “plug-in” for the coastal flooding hazard part. Damage cost functions from the models developed in WP4 constitute the “plug-in” for the economic part. The connection between the external software and the generic framework will be developed **streamlining the transfer of data** to the framework. The interface (features and accessibility) is **developed in the dialogue facilitated in WP3 and feed-back from the end-user is integrated** into the user-interface.

Kick-off meeting 29-30 Nov. 2017, DTU campus



Case studies

Four diverse case studies still reflecting common Danish/(German) conditions and problems:

- **Skive**; fjord flooding, stream interaction, urban development.
- **Ringkøbing-Skjern**; barrier, fjord.
- **Aabenraa**; surges.
- **Emden**; human dimensions, coping strategies.

