

enhance

Partnership for Risk Reduction



Enhancing Risk Management **Partnerships** for Catastrophic Natural Disasters in Europe

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ENHANCE project



Enhance society's **resilience** to catastrophic natural hazard impacts, by addressing

[i] **new risk scenarios and knowledge** in selected cases;

[ii] **multi-sector partnerships** (MSPs) to reduce, prepare for or redistribute risk.

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Knowing the **risk is a key**

Economic damage and losses caused by natural hazards in Europe are driven by **small number of highly damaging events** (70% of damage caused by 3% of registered events).

Hazard **interdependencies and correlated loss probabilities** critical for designing robust insurance schemes. Vulnerability a key hazard variability explains a minor part of the observed variation in the recorded damage.

Expected sequence or chain of events, possible amplifiers, interdependencies and **spillovers**, speed of recovery and distribution of impacts important.

Implicit and explicit liabilities of the natural hazard risks. Fiscal impacts and **debt sustainability**.

Managing risk in **partnership yields better outcomes**

- *Risk and cost sharing arrangements between public and private actors designed to improve provisions of products or services.*
- *Assemblies of users of a resource (often water), instituted to empowered community solutions to resource and/or development challenges.*
- *Territorial, typically cross-border cooperation between communities united through sense and/or identity conferred to a physical place, and commitment to collaborate for economic development or environmental protection*
- *Horizontal and vertical cooperation between public agencies and authorities for the sake of a better public service provision and more efficient allocation and use of public resources*

Pilot studies

Hazard	MSP	Issue topic	Hazard	Scale	Location	Public and Private Stakeholders	
HYDRO	R	Drought management in Júcar River Basin District (Spain)	Drought	Basin	South Europe	Conf. Hidrográfica del Júcar, USUJ, Iberdrola power	
	R	Risk culture, perception, & management (North Sea coast)	Storm surge	North Sea	North Europe	Wadden Sea Forum	
	F	Flood risk and climate change implications for MSPs (UK)	River flood	National-City	West Europe	Insurance Industry, Willis, Greater London Authority, Department for Environment, Food and Rural Affairs. Environment Agency	
NON-HYDRO	E	Health preparedness and heat wave response plans (Europe)	Heatwave	EU-wide	EU	HO Europe Bonn and Denmark, EEA	
	R	Air industry response to volcanic eruptions (Europe)	Volcanic eruption	EU-wide	EU	Icelandic Aviation Administration	
	F	Insurance & forest fire resilience, Santarem District, Portugal	Forest fire	City, local	South Europe	City of Chamusca, City of Mação, CPA, ACHAR, Ch. Firefighters, DRF-LVT, Empremedia	
MULTI	E, F	Climate variability & technological risk in the Po basin, Italy	Multi-hazard	Basin	South Europe	Munich Re Italy, Civil Protection Agency	
	R, F	Flood risk management for Rotterdam Port infrastructure (NL)	Multi-hazard	City	North Europe	Port of Rotterdam, Safety Region, SNS-Reaal	
	R	Building railway transport resilience to alpine hazards, Austria	Multi-hazard	National	Alpine, Central Europe	strian Railways - ÖBB, WLV	
	F	Testing the Solidarity Fund for Romania and Eastern Europe	Multi-hazard	EU	Eastern Europe	EC DG Regio, DG CLIMA, World Bank	

Stress test EU Solidarity Fund

Continental flood risk assessment considering spatial and temporal correlation of flood hazard and losses and various degrees of adaptation.

Average annual payoffs could increase from the current 350 million to 1.29 billion Euro (9% annual probability of depletion) by 2050.

The EUSF allocates more aid to countries capable to withstand the flood financial impact.

Stefan Hochrainer-Stigler et al (2015b), Mysiak (2016)

Flood RE and London flood risk

Public Private Partnership for affordable flood insurance in transition to risk pricing. Subsidized insurance provision for residential properties in high hazard prone areas.

Agent based model (ABM) capturing 6 agents' behavior shows that climate change and socio-economic development can exacerbate flood risk.

Optimal response (development regulation + individual protection and SUDS).

Surminski and Eldridge (2016), and Jenkins et al (2016a, b)

Controlled flooding as a last resort

Disruption of infrastructure designed to drain low-altitude areas in the downstream part of the Po river.

Areas exposed to amplified flood risk as a result of inoperable DS under different scenarios.

Economic losses caused by the controlled floods, in terms of capital stock damage and production losses. Compensation and cost recovery options.

Mysiak et al (2015)

Risk assessment and critical infrastructure

Risk analysis in the unembanked industrial areas within the Port of Rotterdam. Estimation of economic damage and losses for low probability/high impact type of events. Disruptions of infrastructural nodes may cause indirect losses that are not accounted for by the standard risk analysis. Cascading effects of a flood in Rotterdam, may lead to substantial indirect losses and distributional effects across EU regions.

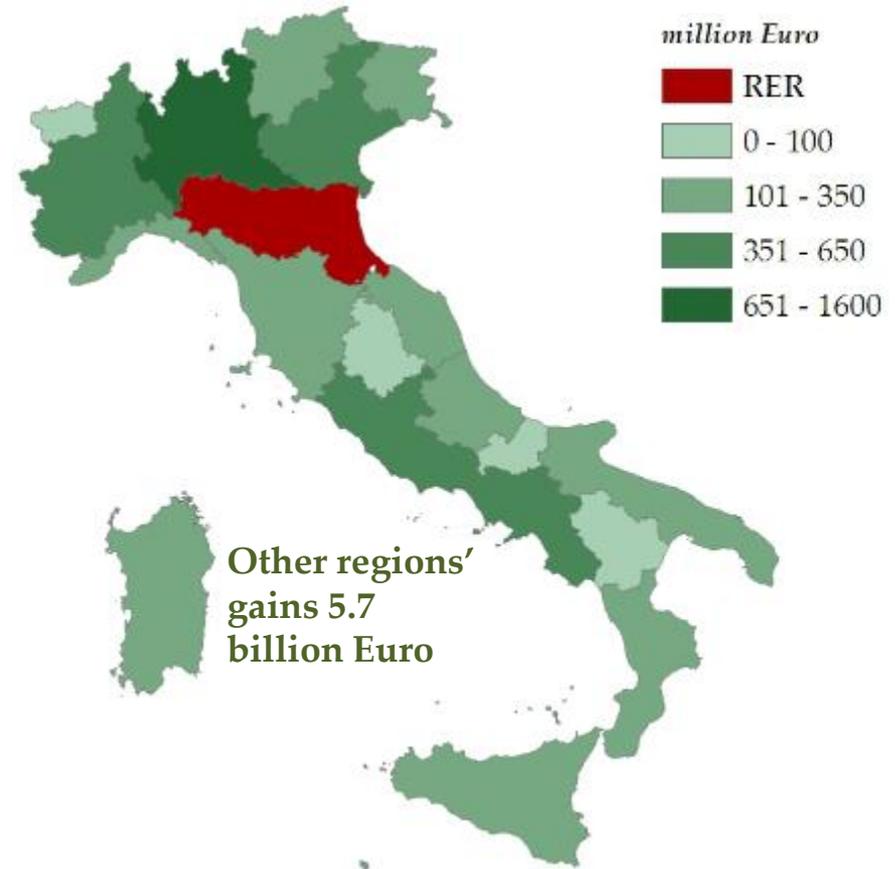
Nicolai et al (2015)

Controlled flooding as a last resort

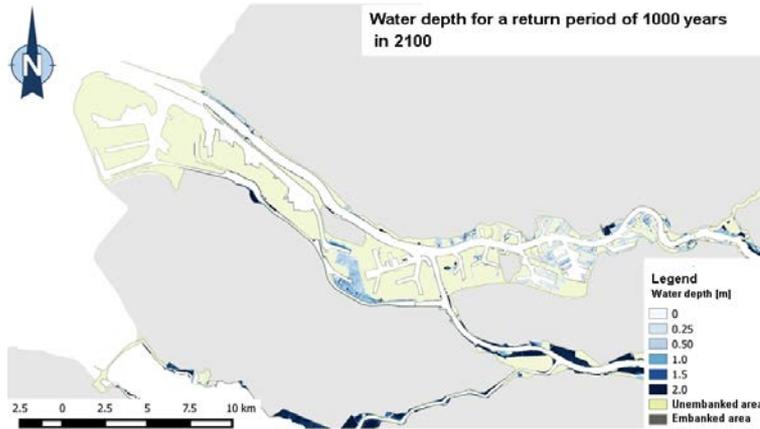
The 99.6 percentile of the annual damage/loss distribution that equates under current climate to **5 billion Euro**



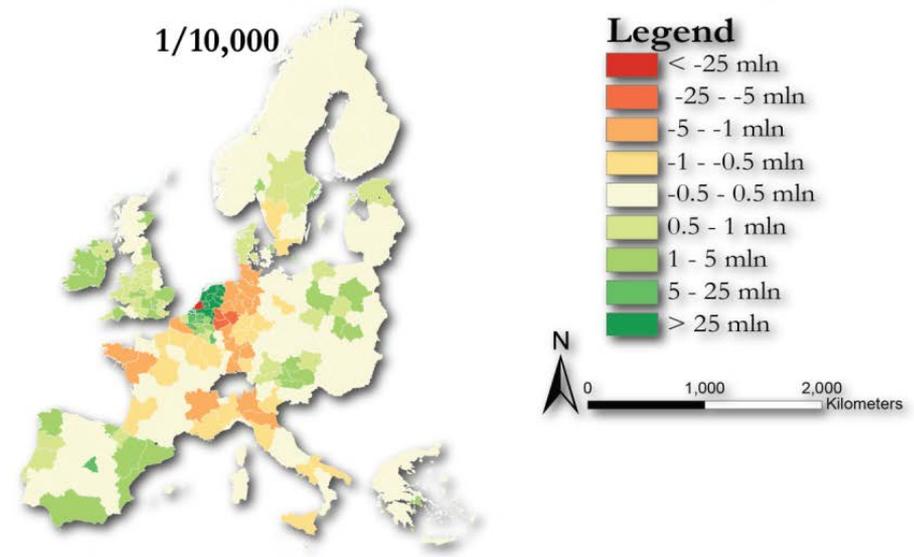
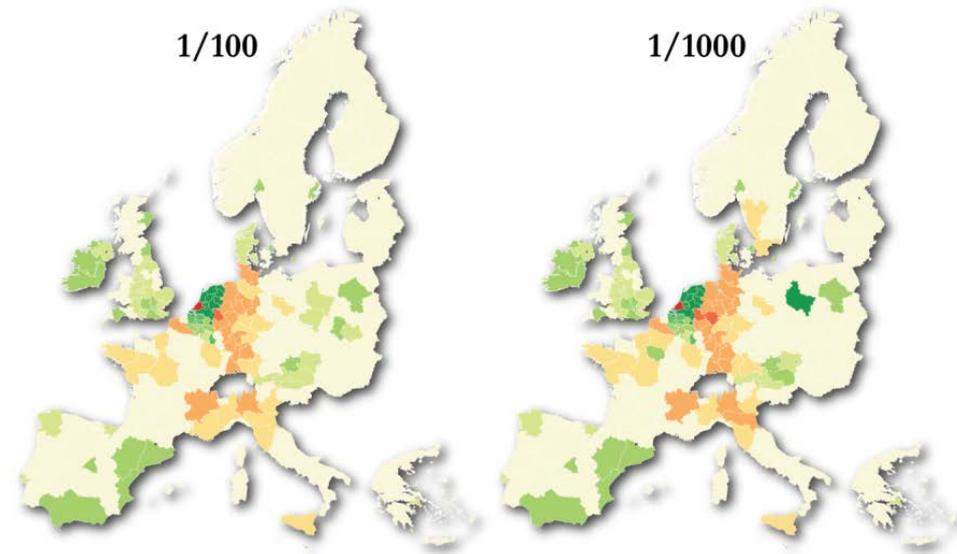
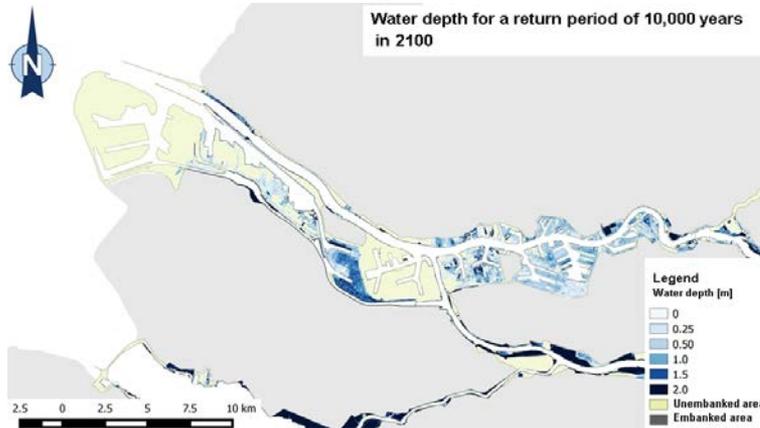
Under flexible model set-up the initial loss is higher (>**10 billion**)



Risk assessment and critical infrastructure



Water depth of inundated areas
Port of Rotterdam for a return
period of 10,000 years in 2015 and
2100



Summary

Public-Private Partnerships (PPPs)

Public-Public Partnerships (PuPs)

Mutually beneficial cost and/or risk sharing arrangements

Collective benefits with no direct individual financial or competitive gains contemplated

Scope: partnership targeted at market failures or where public investments or performance are likely less effective or successful

Openness: sincere efforts to engage all relevant or representative parties, both public and private, in a genuinely concerted and collaborative pursuit; allowing other parties to join in.

Additionality: where substitute or sustain actions would not materialise anyway

Flexibility: enable redefinition as the scope of collaboration evolves

Consistency: Partnerships not to harm the incentive for risk reduction

Transparency: partners sponsor the partnership with their knowledge and skills, competences and standpoints in good faith, and share the outcomes in plain way

Efficiency: sound use of public resources and limiting to the extent possible the distortion of competition

Accountability: objectives and principles of the partnership are well specified and respected

Transparency, equal treatment, effective analysis and monitoring

Constructive dialog: partners preserve the sense of common purpose, while accommodating the dissents and fertile divergences

Sustainability of the partnership based on clear rules of viability and legitimacy

Summary

ENHANCE made **contributions to international and EU risk management policies and frameworks**: *Sendai Framework for DRR* (risk analysis and measuring progress), *Insurance of natural and man-made disasters*, *water allocation reform* in water-stressed MSs, etc.

In regional and pan-European pilots Enhance contributed to **improving risk analysis** targeted at *low-probability, high impact* events, building upon observed and projected environmental (including climate) and societal changes, using qualitative and quantitative techniques.

Enhance **informed existing and helped forging new partnerships** that builds up resilience to extreme weather and climate related events.

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Thank you for your attention

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