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 PEARLfp7  @PEARLfp7  Coastal flood management

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PEARL - Preparing for Extreme
And Rare events in coastaL regions

PEARL collaborates with RISC-KIT and ASTARTE, two other projects under the EU Seventh Framework Programme, to harmonise activities and exchange lessons learned.



The project has received funding from the European Union's Seventh Framework Programme for Research, Technological Development and Demonstration (EU-FP7).



PEARL is developing adaptive risk management strategies for coastal communities against extreme hydro-meteorological events, minimising social, economic and environmental impacts and increasing the resilience of Coastal Regions.

www.pearl-fp7.eu

- PEARL's objectives are to:
- develop a holistic risk governance framework
 - increase the understanding of dominant root causes of vulnerabilities and risks in coastal regions
 - improve the comprehension of the co-evolution of disasters due to extreme hydro-meteorological events
 - develop new monitoring, modelling, forecasting and warning technologies tailored on the social, technical, institutional, organisational and economic realities of coastal communities
 - provide the means to strengthen risk governance and empower all stakeholders
 - build pan-European knowledge to support capacity development for the delivery of cost-effective risk reduction plans

Expected Outcomes

Risk and Root Cause Assessment (RRCA) framework, which extends the existing FORIN methodology in: (a) Refining the scaled analysis of disaster cause; (b) Including response and reconstruction as periods generating impact; and (c) Integrating quantitative and discursive assessment of vulnerability. The RRCA framework is also used to identify key actors and their policies, which in turn provides input into the set-up of institutional agent-based models.

Innovative integrated flood modelling methodology and tools, with an emphasis on floods occurring from multiple sources. It matches two different approaches: (a) joining the existing commercial and public domain software packages; and (b) developing a completely new framework that can model all types of floods individually and in combination.

Holistic and multiple risk assessment framework, identifying the interconnected processes causing risk cascading effects. It also includes the analysis of factors shaping institutional behaviour, risk perceptions and their influence on community preparedness and the adoption of flood risk management strategies.

Early warning systems and technologies, i.e. the improvement of Common Alerting Protocol (CAP) and of Early Warning dissemination. They merge formal approaches for the transfer of information along the chain of command and informal approaches based on interaction among individuals. There is also an effective mobile phone application (Water Detective) that is used for bidirectional dissemination of warnings and communication.



Resilience strategies, which combine traditional engineering and novel nature- or ecosystem-based solutions, operational strategies and governance arrangements, associated with a wealth of new contextual information to help users identify what is relevant in their case.

Stakeholder Involvement in the development of risk management roadmaps. This applies the collaborative modelling and Learning & Action Alliances (LAA) through establishing facts, creating common images and shared ambitions, and developing action-oriented solutions.

Science-policy interface and outreach to enhance communities' involvement and collaboration on the flood risk management for Coastal Regions through a host of dissemination pathways.



Case studies

Denmark, Greve
The municipality of Greve has about 9km of coastline along which the area is densely built-up with residential settlements. This sub-urban area is located in the south of Copenhagen. Holistic risk assessment is devoted to the establishment of a real-time warning system based on a coupled 1D2D coastal flood model considering rainfall as well as water level forecasts.

Germany, the Elbe Estuary
The Elbe estuary is the tidal-influenced section of the river Elbe, which encompasses three federal states being Hamburg, Schleswig-Holstein and Lower Saxony. The research focus within PEARL attracts the development of a platform for the authorities responsible of the management for the estuary, containing both technical and social components. A.o. a Hamburg/Elbe estuary simulation system for early warning and determination of the consequences of failure is developed.

France, Les boucholeurs
Les Bouchouleurs is a district of Châtelaillon-Plage located on the limit of Yves, two cities of the Charente-Maritime county. The main research activities include vulnerability assessment and hazard modelling to improve the operational management through new socio-economic and institutional strategies. Furthermore, framework for strengthening resilience and coping capacities is developed.

Italy, Genoa
The Genoa case study area concerns the coastal area and the Bisagno River Basin. The focus of the case study is on the Bisagno mouth, streaming into the urban area and on the Fereggiano sub-basin. Impact and holistic risk assessment contains the evaluation of possible engineering, environmental, socio-economic and institutional strategies. A.o. a 3D visualisation tool for supporting risk assessment is developed.

Spain, Marbella
The city of Marbella is located in the southeastern part of Spain at the Mediterranean Sea. A holistic risk assessment in view of testing several adaptation and mitigation strategies based on a collaborative platform for the involvement of stakeholders, is done. Within the research activities in the Marbella case study

a new methodology for the assessment of economic indirect impact in flood events is developed. Furthermore, an early warning system based on radar data (both deterministic and probabilistic) and short-term forecast data will be established.

Greece, Rethymno
The area under concern includes the Port of Rethymno and the adjacent coastal areas and is located at the prefecture of Rethymno, Crete, Greece. A specific actionable roadmap for flood risk management through a Decision Support System (DSS), in collaboration with local stakeholder, is being developed. In addition, a platform as an interface between the developed tools and the stakeholder is established. This interactive platform enables visualisation of the effect of alternative choices on possible future risk mitigation/adaption measures. Thereby, future analysis and decision-making process are assisted.

St. Lucia
The study area is the administrative capital of the small island nation in the Caribbean. In St. Lucia the main research activities focus on the enhancement of existing methodologies and tools for real-time coastal flood modelling and flood hazard mapping.

St. Maarten
The study area comprises of the Dutch side of the island territory in the Caribbean. Here, the implementation and evaluation of the RAFT methodology to investigate surge impacts of hurricanes is carried out.

Thailand
In Thailand, the case study area includes the largest river basin; the Chao Phraya In the Thailand case study the work includes strategic flood management on a large river basin scale, including long-term planning, implementation of infrastructural measures, and dissemination to local people.

Taiwan
The case study area in Taiwan includes the east coast of the island (Yilan, Hualien and Taitung counties) as well as Tainan county. Taiwan is exposed to tropical cyclones (typhoons) hitting the island territory several times a year, causing severe damages. The research activities includes holistic and multiple risk assessment of frequently occurring coastal disasters.

