# RISC-KIT

## Resilience-Increasing Strategies for Coasts – toolKIT

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RISC-KIT

RESILIENCE-INCREASING
STRATEGIES FOR COASTS - TOOLKIT
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# Problem statement

- Recent and historic low-frequency, high-impact events expose risks to coasts

- This is only to get worse, because risk (prob. hazard * consequence) is increasing due to
  1. Increase in hazard intensity/frequency
  2. Increase in consequence due to increased coastal development

- This requires a re-evaluation of coastal disaster risk reduction (DRR) strategies and a new mix of *prevention* (e.g. dike protection), *mitigation* (e.g. limiting construction in flood-prone areas) *and preparedness* (e.g. Early warning systems, EWS) *measures*.


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La Faute sur Mer, FR

Sandy, NY

Cinque Terre, IT

1953 Flood, NL, BE, UK

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# This raises questions:

- What DRR measures work where and can they be used in other locations?
- What are the socio-cultural and historic aspects of DRR measures?
- How can we rapid-assess coasts at threat?
- How can we quantify the effectiveness of DRR measures?
- How does a generic approach work out across Europe, in data-rich and data-starved environments?
- How do we involve and transmit information to stakeholder, end-user and policymakers?


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# RISC-KIT concept

- Develop a Resilience-Increasing Strategies for Coasts – toolKIT (RISC-KIT) of
  - methods
  - tools
  - management approaches

- to reduce risk and increase resilience to low-frequency, high-impact hydro-meteorological events in the coastal zone, from the sea and the land
- So: marine floods, wave attack and flash floods


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# Context

- Fits in supranational efforts:
  - United Nations Office for Disaster Risk Reduction (UNISDR)'s Hyogo Framework for Action (HFA),
  - EU Floods Directive.

- Both are not specific on coastal risk, specifically:
  - Hazards of overtopping, breaching, and erosion.
  - Non-stationarity of surge and flash flood events.
  - Morphodynamic response
  - EWSs are recommended, but are not implemented


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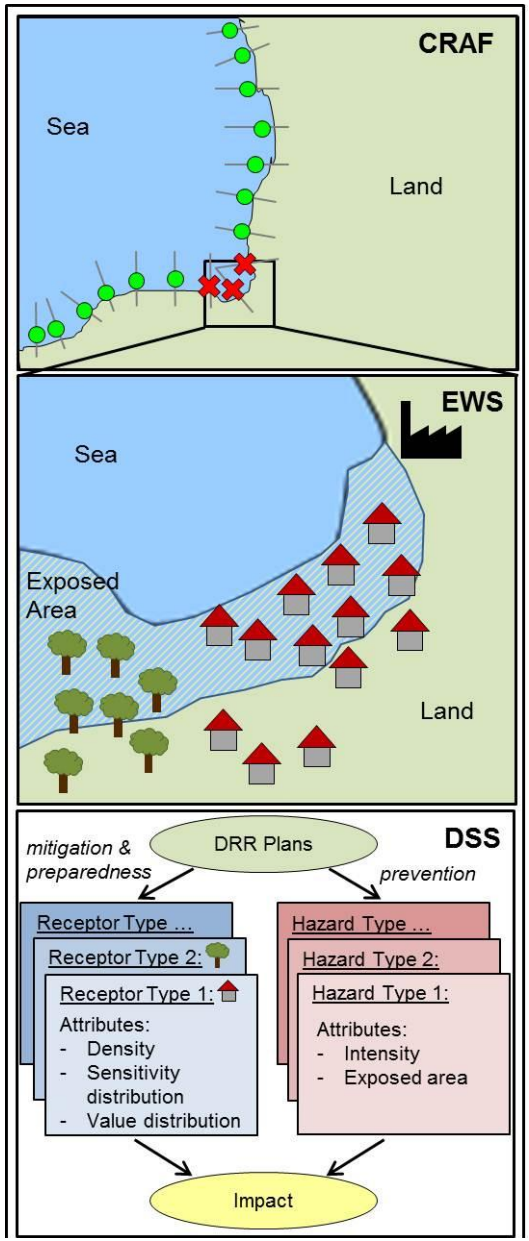
# What is in the RISC-KIT Toolkit?




1. A Coastal Risk Assessment Framework (CRAF) which - at the regional scale (100's km) - can quickly assess present and future hot spot areas of coastal risk
2. A quantitative, high-resolution Early Warning and Decision Support System (EWS/DSS) for use on these hot spots (with a scale of 10's of km) and
3. A web-based management guide offering innovative, cost-effective, ecosystem-based DRR measures;
4. A Coastal Risk Database of present and historic socio-economic and physical data.

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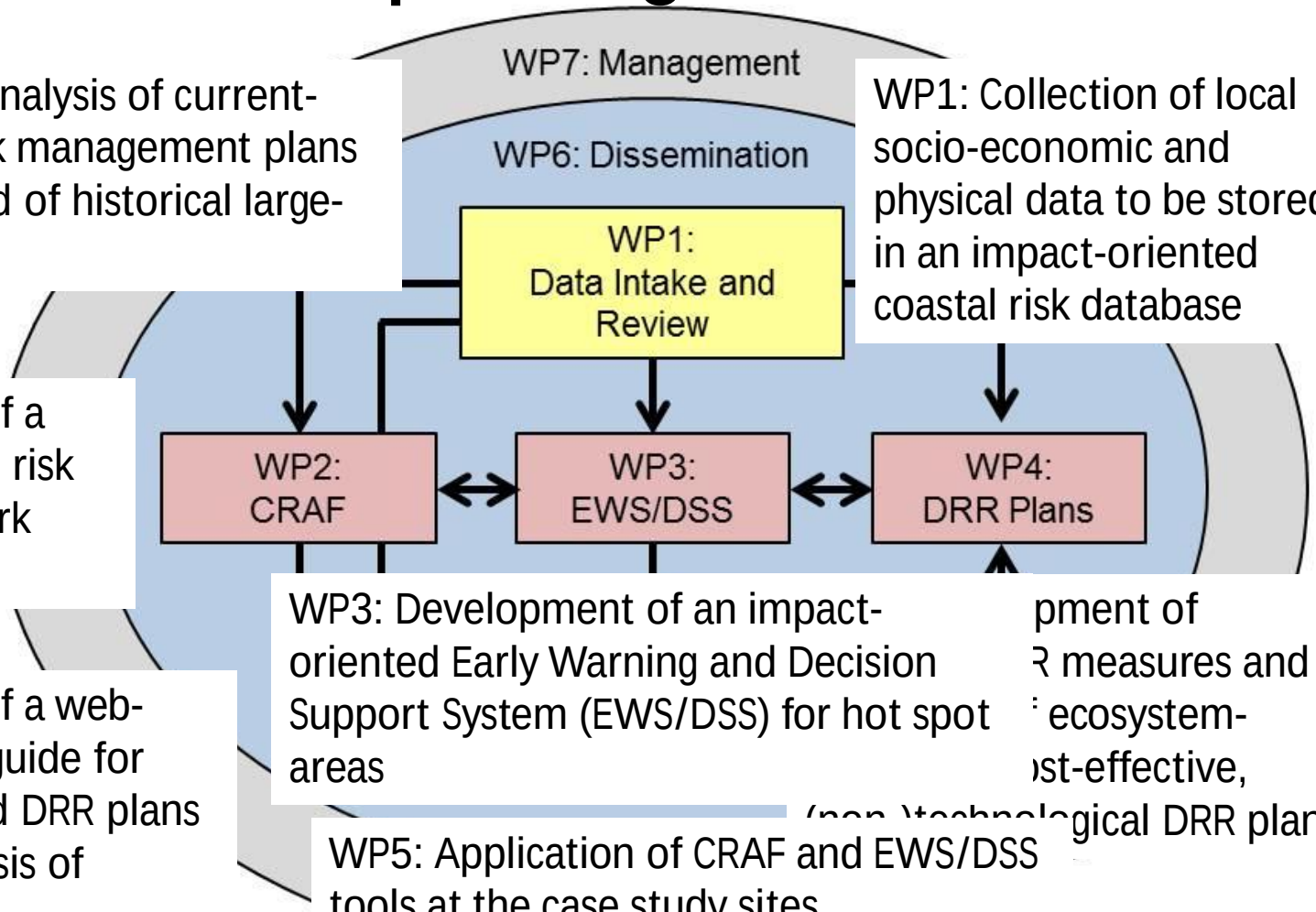
# Workpackages

WP1: Review and analysis of current-practice coastal risk management plans and lessons-learned of historical large-scale events

WP1: Collection of local socio-economic and physical data to be stored in an impact-oriented coastal risk database




WP2: Development of a regional-scale coastal risk assessment framework (CRAF)

WP3: Development of an impact-oriented Early Warning and Decision Support System (EWS/DSS) for hot spot areas

pment of
R measures and
ecosystem-
st-effective,
gical DRR plans

WP6: Development of a web-based management guide for developing integrated DRR plans and provide a synthesis of lessons learned

WP5: Application of CRAF and EWS/DSS tools at the case study sites

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# Application at 11 case study sites


- 10 Located on all EU regional seas (★)
- One site in Bangladesh
- Lead end-user and project partner at every site

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# RISC-KIT partners

- 18 partners of different background

| | | |
|---|---|---|
| Deltares (NL) | CNRS LIENS (FR) | Eurocean (PT) |
| Ecologic (DE) | TU Delft (NL) | SEI (SE) |
| CfR (IT) | WMO (Int/CH) | MU (UK) |
| UAlgarve (PT) | UPC (ES) | UniCaen (FR) |
| IMDC (BE) | CIMA (IT) | UCAM (UK) |
| IO-BAS (BG) | BaW (DE) | UNESCO-IHE (Int) |

- Background in physical geography and oceanography, coastal geomorphology, coastal engineering, risk assessment, environmental sciences, climate change, socio-economics, history, meteorology, policy.
- Local end-user at each case study site


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# Three months into the project

- WP1: collecting physical and socio-economic qualitative data
- WP1: conducting interviews with stakeholders, and end-users to socio-cultural and socio-ecological qualitative data
- WP1: analysis of historic storms for FR, UK, PT case study sites


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# WP3: Early Warning System

- Based on a free-ware Coastal FEWS system in combination with a Bayesian DSS.
- To be used as an operational EWS tool and as an ex-ante scenario evaluation tool to evaluate the optimal mix of prevention, mitigation and preparedness measures.


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# WP3: Model adapters in Coastal FEWS

- Surge: Delft3D, Untrim, SELFE, Telemac, JMA, ROMS
- Wave: SWAN, Wavewatch III, WWMII, k-model
- Morpho: Xbeach

- Model adapters to be built in April, FEWS configurations in July.


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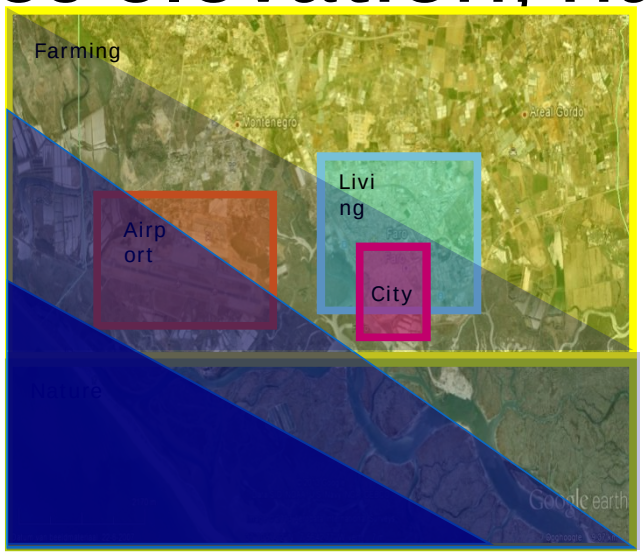
# WP3: Bayesian support system

- GOAL:

Transition from Hazard Oriented (HO) EWS to Impact Oriented (IO) EWS including uncertainty bands.

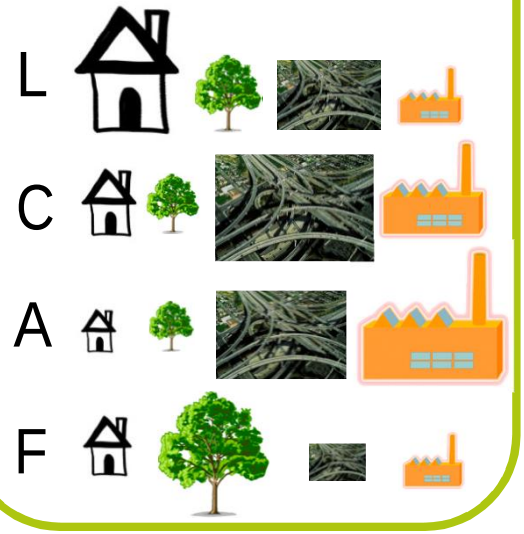
- Dealing with
  - DRR measures
  - Geographical variation in functions
  - “genericity”
  - visualization

# Combination of land use, type, attributes elevation, haz intensity




Value

Exposure




Hazard Intensity

Sensitivity Receptors

Impact

# RISC-KIT Collaboration with PEARL

- Clustering meeting after kickoff to share and further explore the methods, tools and approaches.
- Joint meeting in Brussels, coinciding with the network meeting (Month 16) to compare preliminary results and joint work on FR and IT case study sites.
- Final Conference to be held in Brussels (Month 40) to demonstrate results from both projects.
- A joint meeting on Flood Early Warning tools.
- Collaboration on deliverables regarding "extreme coastal events in Europe: where do we stand“ and two policy briefs.
- Joint organization of Summer Schools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# Deliverables

| Del. N° | Deliverable name | WP N° | Lead participant | Nature | Dissemination level | Delivery date |
|---|---|---|---|---|---|---|
| D1.1 | Review report of key challenges and lessons learned from historical extreme hydro-meteorological events | 1 | CFR | R | PU | 19 |
| D1.2 | Synthesis of data collection consultations | 1 | EI | R | CO | 6 |
| D1.3 | WEB-GIS impact-oriented database | 1 | CFR | P | PU | 12 |
| D1.4 | Policy Brief on Lessons Learned | 1 | EI | R | PU | 12 |
| D2.1 | Coastal Hazard Assessment module | 2 | UPC | P | PU | 19 |
| D2.2 | Coastal Vulnerability Indicator Library | 2 | MU | P | PU | 17 |
| D2.3 | Coastal Risk Assessment Framework Tool | 2 | MU | P | PU | 24 |
| D3.1 | Coastal FEWS free ware | 3 | Deltares | P | PU | 12 |
| D3.2 | Updated physical models | 3 | IHE | P | PU | 18 |
| D3.3 | Bayesian decision support system | 3 | TUD | P | PU | 17 |
| D4.1 | Potential prevention, mitigation and preparedness measures for each case study site | 4 | SEI | R | PU | 19 |
| D4.2 | Evaluation of DRR plans | 4 | SEI | R | PU | 36 |
| D4.3 | Web-based management guide | 4 | EI | P | PU | 39 |
| D4.4 | Synthesis report | 4 | EI | R | PU | 41 |
| D5.1 | CRAF application for all study sites | 5 | UALG | R | RE | 32 |
| D5.2 | Results of the scenario testing | 5 | IMDC | R | RE | 29 |
| D5.3 | Report on the structure of EWS/DSS | 5 | UALG | P | RE | 35 |
| D6.1 | End-User and Stakeholder Identification and Mapping | 6 | EurOcean | R | CO | 3 |
| D6.2 | Dissemination Plan | 6 | EurOcean | R | RE | 4 |
| D6.3 | RISC-KIT Web Portal | 6 | EurOcean | O | PU | 3 |
| D6.4 | Dissemination and Knowledge Transfer Products | 6 | EurOcean | O | PU | 42 |
| D6.5 | Submission of Academic Papers in Special Issues of leading Journals | 6 | EurOcean | O | PU | 42 |
| D6.6 | National and EU level policy guidance and recommendations | 6 | EI | O | PU | 42 |
| D7.1 | Minutes of Project Progress Meetings | 7 | Deltares | O | CO | 7,13, 19, 25, 31, 37 |
| D7.2 | Minutes of the Steering Committee Meeting | 7 | Deltares | O | CO | 7,13, 19, 25, 31, 37 |

# Expected impacts

1. Faster attainment of the disaster risk reduction goals of UNISDR (United Nations International Strategy for Disaster Reduction).
   - Products geared to meet the Hyogo Framework for Action (HFA)'s five Priorities for Action.

2. Design of cost-effective risk-reduction plans, based on the proposed tools and solutions.
   - RISC-KIT tools of CRAF, EWS/DSS, database and management guide will help coastal design.

3. Improve risk governance and preparedness through the provision of timely information and warnings to decision-makers.
   - Development of EWS/DSS tool for events.
   - CRAF and the scenario evaluation tool help decrease the ex-ante coastal risk.




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# Looking forward to a fruitful cooperation!


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Preparing for Extreme and Rare
Events in Coastal Regions