Disaster Risk and Climate Change Adaptation at JRC DRM Unit

Disaster Risk Management
Directorate for Space, Security and Migration
Joint Research Centre
Scientific support to policies: EU policy making and international frameworks

### The EU Strategy in a Nutshell

<table>
<thead>
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<th>Priority 1: Promoting action by Member States</th>
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<tr>
<td>Action 1. Encourage MS to adopt Adaptation Strategies and action plans</td>
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<td>Action 2. LIFE funding, including adaptation priority areas</td>
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<td>Action 3. Promoting adaptation action by cities along the Covenant of Mayors initiative</td>
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<th>Priority 2: Better informed decision-making</th>
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<td>Action 4. Knowledge-gap strategy</td>
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<td>Action 5. Climate-ADAPT</td>
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<th>Priority 3: Key vulnerable sectors</th>
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<td>Action 6. Climate-proofing the Common Agricultural Policy, Cohesion Policy, and the Common Fisheries Policy</td>
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<td>Action 7. Making infrastructure more resilient</td>
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<td>Action 8. Promote products &amp; services by insurance and finance markets</td>
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**Sendai Framework for Disaster Risk Reduction 2015 - 2030**

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**#ParisAgreement**

Project weather-related extremes and their impacts

Climate hazards
- Frequency and intensity of hazards
- Port in Estonia
- Nuclear power plant in Spain

Exposure

Vulnerability

Future human and economic impacts

Present

Future
Future wind hazard and risk in Europe

Return levels of wind speed (m/s) corresponding to 100-year return period for the baseline (1981-2010) and changes between baseline and warming levels (1.5 °C, 2 °C) and 2050 under the RCP4.5. Dashed lines correspond to regions in which less than two thirds of simulations agree on the sign of change.
Future heat and cold impact on EU population

Return period [years] of baseline 50-year heat waves (left) and 20-year cold wave (right) for 3°C warming level according to scenario RCP8.5.

Damage relation between fatalities and Risk Index ~ f(hazard intensity, exposed population, wealth)

Naumann et al., PESETAIV (2018)
By the end of this century, 5 million Europeans currently under threat of a 100-year Extreme Sea Level could be annually at risk from coastal flooding.

Present expected annual damage of €1.25 billion is projected to increase by two to three orders of magnitude by the end of the century, ranging between 93 and €961 billion.

Vousdoukas et al., Earth’s Future, 2017
Vousdoukas et al., Nature Climate Change, 2018
Understanding vulnerability is key research priority

Declining global vulnerability to different climate hazards

Formetta et al., Environmental Research Letters (2019)
Disaster Risk Management Knowledge Centre: Fostering Partnership, collective Knowledge and Innovative solutions

- Reinforcing and supporting **scientific partnerships**
  - Scientific WS
  - Trainings
  - Transfer of knowledge and technologies

- Contributing to the **science-policy interface**
  - **Cross-cutting topics** are addressed to facilitate an harmonized approach in support to policies:
    - MH-Early Warning Systems
    - Impact assessment: Damage and Loss Data collection (post-event)
    - Risk Assessment (pre-event)
    - Climate Adaptation
  - It allows an **enhanced coordination** across policies, increasing their effectiveness

- **Gaps identification**: new research programs

Because **Together Everyone Achieves More**
Database of DRM Research Projects and Results

Science-Policy Interface: Needs and Gaps Assessment

**Contents:** Who has been working on what and with whom?
- 1413 Projects
- 5612 Organizations

**EXAMPLES of key actions to be triggered by the different stakeholders based on the findings of the research projects:**

**POLICY MAKERS**
- Strengthen cooperation between management agencies and countries
- Promote education and training on wildfire risk
- Develop flexible fire management plans and policies and assess their efficiency
- Improve fire preparedness through participative, multilevel governance
- Encourage development of new tools and methods
- Define and promote the further advancement of standards in fire management
- Integrate fire management with sustainable forest management

**PRACTITIONERS**
- Make a full use of science-based findings and innovations through improving the knowledge transfer
- Hold awareness campaigns and training using the best available methods
- Provide guidance for the best forest fire management
- Empower local communities with tools, information and skills
- Adapt new approaches for long-term biomass management

**SCIENTISTS**
- Study the long-lasting social and health impacts of forest fires and recognize how various vulnerabilities could be addressed by policies
- Advance predictions of wildfire propagation and real time risk analysis
- Incorporate direct environmental and indirect losses into the economic assessment of fire damages
- Simplify the research output
- Develop new tools and demonstrate the usefulness of their use

**Multi-hazard approach**

**One single hazard**

**Explore DRM Projects**

**Project filters**
- Projects with document
- Export by project

**Legal notice/cookie declaration/privacy policy/enquiries**
DRMKC Risk Data Hub

- Based on scientific partnership
- Support policy implementation

Implemented examples:
- Risk Data Hub overview
- Reinforcing Prevention and Adaptation
- Linking Risk Assessment (future) with Impacts collection (past)
- Damage and Loss Data: Learning from the past.
- Planning for the Future: Supporting the development and monitoring of DRR strategies –RM Plans including Climate Change Adaptation Strategies evidence-based.
EU - Covenant of Mayors

+ 8,800 EU CITIES

230+ MILLION PEOPLE

EU - CoM COVERS 47% EU POPULATION 2005
Pie chart: number of signatories per country; 40 cities have been assessed, covering 11.8 million inhabitants.

Bar chart: number of signatories per population range.
Climate hazards reported by signatories of the Covenant of Mayors: present and future

- Forest fires
- Extreme heat
- Floods
- Droughts
- Extreme precipitation

Present: 3, 3, 9, 32, 32
Future: 22, 34, 34, 22, 32
Sectors potentially exposed to climate change, as reported by the signatories of the Covenant of Mayors: present and future.
More frequent adaptation actions, as reported by signatories of the Covenant of Mayors

- Studies: 36%
- Greening: 21%
- Information, communication & promotion: 16%
- Efficient water use: 10%
- Resilient buildings: 7%
- Infrastructure rehabilitation: 5%
- Regulations: 5%
- Infrastructure rehabilitation: 5%
Collaboration JRC DRM Unit and EEA

- Provide input for EEA Reports
- Provide input to Climate-ADAPT platform on Weather/climate hazards
- Synchronize database of DRM Project Explorer with Climate-ADAPT database
- Coordinate Risk Data Hub with Climate-ADAPT platform (and the Urban Adaptation Map Viewer)