The European Commission’s science and knowledge service

Joint Research Centre
Enhancing the science policy interface to support Disaster Risk Management

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Exposure to natural hazards doubled in the last 40 years
The need for evidence to inform policy
Dealing with the information overload
BRIDGING CONCEPT

Scientists

• Science trends
  Complexity
  Acceleration

• Challenges
  Usable and used science
  Distill relevant results

Practitioners

• Implementation trends
  New technological developments
  Impact of events is growing

• Challenges
  Providing feedback
  Benchmarking/exercises

Policy-makers

• Policy trends
  Interconnected
  Global
  Challenges

• Holistic approach
  Evidence-based policy making
Knowledge Centres: The Science-Policy Interface

**Knowledge Centres**
In policy making, the problem is no longer that we have too little information and data, but that we have a lot, and making sense of it all is challenging. The Knowledge Centres operated by the Joint Research Centre bring together experts and knowledge from different sources inside and outside the European Commission. They help policy-makers to understand the latest scientific evidence in a transparent, tailored and concise way.

The Joint Research Centre operates five Knowledge Centres, with one more scheduled to launch in 2018:

- Knowledge Centre for Food and Nutrition Security
- Knowledge Centre for Food Fraud and Quality
- Knowledge Centre for Territorial Policies
- Knowledge Centre for Migration and Demography
- Knowledge Centre for Disaster Risk Management
- Knowledge Centre for Bioeconomy
A. Robust Risk Assessments incentives

➢ Union Civil Protection Mechanism (Decision No 1313/2013/EU)

B. Evidence-based Disaster Risk Management plans

C. Supports cohesion instruments able to finance risk-prevention measures

➢ European Regional Development Fund (ERDF)

D. Link to Surveillance and Early Warning Systems

➢ GDACS, EFFAS, EFFIS, EDO

E. Help improve DRA models

F. Evaluate DRR actions implemented and learn from past events

➢ International Agreements:

G. Quantify losses for loss compensation

➢ Solidarity Funds
Data - monitoring trends of population exposure to floods
Potential population exposure to flood

- Temporal patterns - NL
  - Night vs Daytime periods per Month
  - Flood depth > 3 m

- Daytime exposure higher than Nighttime, and Night vs Day ratio increases in Aug
From Risk Assessment to Risk Management

- Define measures to prevent disaster risk
- Communicate disaster risk
- Invest in research and test technologies
- Plan protocols and resources to be prepared to respond
- Update Surveillance and Early Warning Systems
- Develop financial strategies for recovery

National Risk Assessment

- Damage and loss data after an event
- Lessons learned from exercises, response operations

Evidence for DRM

- Review plans and operative actions
- Update databases and protocols for collecting loss data

Prevention

Preparedness

Response

Recovery

Risk Assessment
- Science based

Risk Communication
- Interactive exchange of information concerning risks

Risk Management
- Policy based
Earthquake and flood impacts on hazardous industry:

Risk assessment & mapping of consequences

Users from about 120 institutions globally

Used by government, industry, academia, practitioners
The European Flood Awareness System (EFAS) provides **complementary, added value** flood early warning & monitoring products to improve the preparedness and emergency response of relevant stakeholders.

- Part of the **Copernicus Emergency Management Service** since 2012
- **Bridging science & operations** — testbed for new products
- **Fostering knowledge exchange** — building a strong community

**Latest development:**
- Using **EFAS impact based forecasts** to **pre-task satellite image acquisitions** for improved flood monitoring & response
- **Example: Seine Floods January 2018**
  - First EFAS flood warnings to national authorities on 14 January 2018
  - Pre-tasking of satellite images on 22 Jan — French authorities activate Copernicus rapid mapping on 23 Jan
  - First flood extent map available 12 hours later!
The European Forest Fire Information System (EFFIS) and the Global Wildfire Information System (GWIS) provide web services supporting European Commission services, national and international administrations responsible for wildfire prevention, preparedness, firefighting and restoration and contribute to Copernicus and GEOSS initiatives on data interoperability.
Monitoring and assessing drought events

Period: 4-12 July 2017
Relief & Response
PESETA III shows that the economic impact of climate change could be over 50% lower for the EU with 2°C warming compared with high warming by the end of the century. Here are some reasons why:

1.5 million fewer people affected by coastal flooding every year²

€210 billion: the economic impact with high warming¹
€100 billion: the economic impact with 2°C warming¹

170,000 fewer people affected by river flooding every year²

75% reduction in declines in labour productivity ³

20,000 fewer deaths each year from heat stress⁴

£54 billion less damages from coastal flooding²

£5 billion less damages from river flooding²

£6 billion
£60 billion
£12.5 billion
£17.5 billion

An 8% decline in crop yields avoided⁵


¹ Assumes future climate change affects the current economy. Impacts are for EU Member States. Reductions in heating demand that are larger than increases in cooling demand result in relatively small economic gains under both climate change scenarios. High warming is a high emissions scenario that results in more than 3°C warming. 2. Coastal damages and river flooding: economic impacts and population affected are for EU Member States and Norway (also Republic of Macedonia for river flooding). Assumes no change from present in socio-economic conditions and that current levels of flood protection do not change in the future. 3. Labour productivity: impacts are for outdoor labour assuming no adaptation across all European countries. 4. Heat-related mortality: assumes no adaptation and no change in population. Results are from PESETA II. Estimates are for all EU Member States. 5. Crop yields: simulations conducted by AgMIP and cover all EU Member States. Assumes no CO₂ fertilisation effect and no adaptation. There is a 0.5% increase in yields with 2°C warming.
Resilient futures of a small island: A participatory approach in Tenerife to address climate change

Outcomes

- Participants discussed resilience as the main governance issue rather than focusing on the lack of adaptation strategies to heat-waves.
- The concept of resilience was explored with the following meanings: energy use reduction, increasing food production sovereignty, and sustainable water resources management.
- Participants pointed out that making the island resilient to external shocks, be it climatic, economic or political was the issue that needed to be addressed.
- Climate change adaptation frame seems to be only a part of resilience especially in contexts characterised by insularity and other specificities.

Objectives

- Explore pathways for adaptation to extreme weather events.
- Develop visions of resilience and climate change adaptation of Tenerife.
- Engage social actors in a participatory process for a better climate governance.

Methodological framework

- Experts in climate change were addressed first in a focus group, in order to outline the current scientific framing.
- Then, three focus groups with citizens were also organised to explore visions of Tenerife in 2040, departing from the current context.

Multi-hazard damages to critical infrastructures in Europe

Escalating **climate hazard damages to critical infrastructures** in Europe with global warming.

**Uneven regional and sectorial distribution** of future losses, adaptation requirements and capacity.

EAD = Expected Annual Damage
Building Standards for long-term resilience: 2G Eurocodes

- **97% of collapsed buildings** built under old building codes,
- **while those complying with the most updated codes accounted for only 3% of the total number of collapsed buildings**

The World Bank: BUILDING REGULATION FOR RESILIENCE

**Partnership of JRC with DG GROW, CEN/TC250, experts on:**
- **Definition of standardization needs**
- **Pre-normative research**: projects under the EU Framework Programmes (FP6, FP7, H2020,...)
- **Definition of Mandate to CEN** for the 2° generation of the Eurocodes (cost 11M €, the biggest grant to CEN)
- **Pilot studies** on expected impacts of climate change on the loading on structures
- **Further standardization needs**: design of tunnels, robustness of design,...
Any questions?
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