



Enhancing Synergies for disaster PRevention in the EurOpean Union



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Challenge 2 “Science vs Legal/policy issues in DRR”: why does it exist and how ESPRESSO will address it?

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Science vs Legal/policy issues in DRR

Being a geophysicist dealing with phenomena (the natural hazard) impacting on all living beings, I feel particularly exposed (and vulnerable, assuming I am also a sensible person) to a risk envisaged by the physicist J.W. Moebius in the play “The Physicists”, by Friedrich Dürrenmatt.

He claims ***“we have struggled onward and forward, but, since no one is following us, we are advancing in the nothingness”***.

Challenge 2 deals with this risk.

Four main gaps hinder the efficient use of advanced scientific information in DRR management:

- 1. Time gap** (huge time delay in the application of novel methodologies)
- 2. Conceptual gap** (preference to use qualitative information rather than quantitative probabilistic information)
- 3. Responsibility gap** (or overlap) (where the scientist role ends and the decision maker role starts ?)
- 4. Gaps in people participation in risk reduction planning**

Time gap

The lack of adequate legislation concerning duties and responsibilities is the reason of a widespread rejection of advanced methodologies, with inherent high uncertainties, to reduce the effects on individuals of natural hazard.

Theses methodologies include:

- Early warning of earthquakes and rapid hazard such as flash floods and fast landslides (see reports of REAKT and SAFELAND);
- The widespread and organized use of early warning networks and social media for rapid rescue.

Further emerging methodologies include those based on the use and elaboration of big data to estimate risk scenarios and emergency scenarios, and the use of resilience in place of risk assessment or of expected loss.

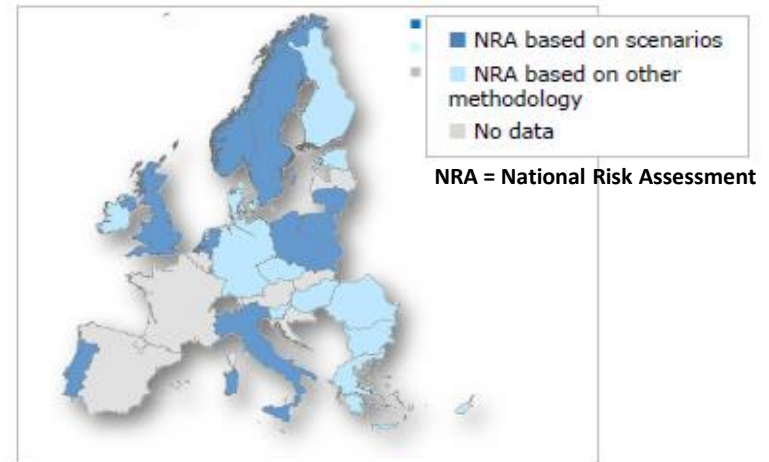
Conceptual gap

They all deal with the apparent difficulties in understanding probabilistic approaches.

This slows down the application of quantitative probabilistic scenarios instead of qualitative scenarios and of multi-hazard and multi-risk concepts.

This also makes any planning considering extreme events (black swans) very elusive.

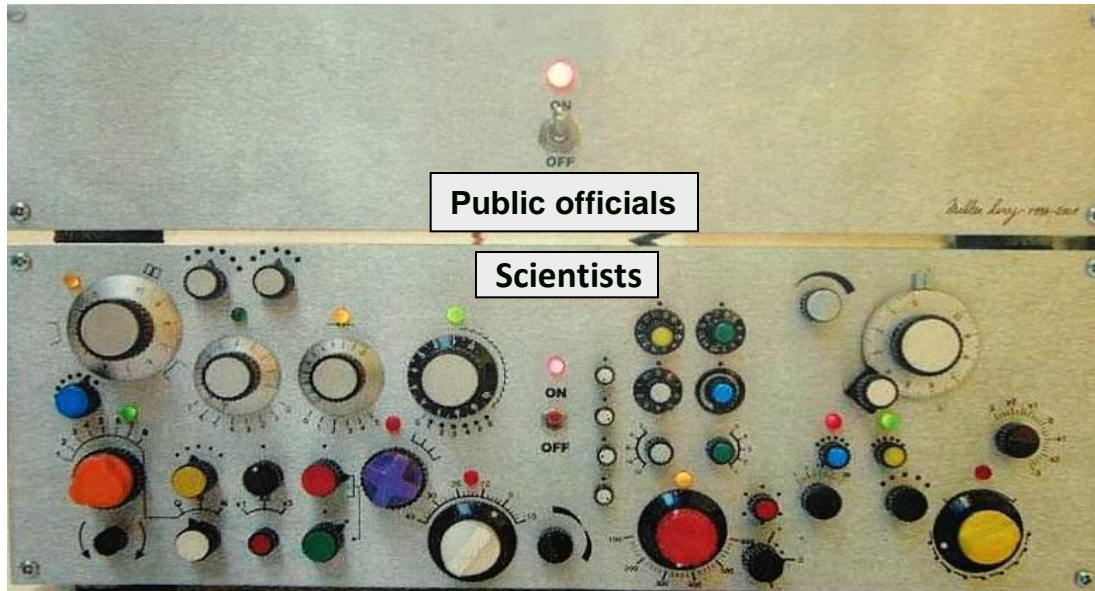
- EU funded more than 30 FP7 projects focusing on the development of Decision Support Tools. How many of them are operational?



Source: JRC, 2015. Science Policy Interfaces in Disaster Risk Management in the EU.

Responsibility gap

The Challenge is for scientists to articulate uncertainty without losing credibility and to give public officials the information they need for decision-making



This requires to bridge the gap between scientific output (probability) and the boolean logic (YES-NO) of decision-makers

Scientist should give all the needed information but they should not be the decision-makers as the final decision should be taken balancing the scientific information with other types of information (politics, socio-economic, governance, etc.)

Gaps in people information and participation in risk reduction planning

The use of many scientific advanced methodologies can be successful only with active participation of people.

In some countries (Japan) people are informed on how to react to alerts given by advanced methodologies.

In most cases during an emergency people are not involved in decision making processes. Involvement of people is theoretically easier in planning safe and resilient cities although this is not the general case.

- ✓ It is very difficult to know whether it is right to oblige people to pursue a happiness that they do not like (Anatole France, *Le procureur de Judée*)
- ✓ Can we achieve an improvement of the respect of right-use rules by nudging methods rather than prohibition? (Richard H. Thaler, Cass R. Sunstein, *Nudges*)

Why?

- **Time gaps** are due to the accelerated speed of scientific progress versus the slow linear speed of legislation progress.
- **Conceptual gaps** are mostly due to mis-concepts about the difficulties of use of probabilistic tools (maths is difficult to understand and in most countries children are trained to approach life problems with a deterministic rather than a probabilistic attitude).
- We are ready to understand and be reactive to events occurring frequently rather than to catastrophic events occurring very rarely.
- **Responsibility overlaps** are mostly due to the fact that the identification of what is risky and what is not (or what is more risky and what is less risky) is an enormous political and economical power. **Responsibility gaps** are mostly due to faults in legal and regulatory frameworks.
- **Gaps in people information** are due to the great complexity of the information process, that cannot be separated by education. People can really take advantage of probabilistic methods if starting from primary school they are trained to think in probabilistic terms. Education to risk must be a compulsory subject of study in primary school.

How ESPREsSO will address this issue?

The answer should come from Think Tank 2 of the SF that is devoted to Challenge 2.

Some hints may be:

- ❖ Clear regulation on risk
- ❖ Teaching probability theory and risk concepts since primary schools (it will contrast with dogmatic teaching)
- ❖ Decision making responsibility starts from the legal framework on disasters
- ❖ Social Investigation on risk acknowledgement and acceptance by involved people must be compulsory before drafting emergency plans (rules on the questionnaires may be part of ESPREsSO guidelines)

Complexity in Disaster Research: Creating a political language for disaster

- The world is inter-connected and vastly complex
- Reciprocity in Conceptual Gaps (Qualitative and Quantitative)
- Avoiding Parallel Structures to address risk
- Poor general inter-linkages between Science and Policy
- Devise a methodology able to simultaneously clarify and present the political decision(s) embedded in risk management.