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## SEVENTH FRAMEWORK PROGRAMME

Environment (including climate change)

Call: FP7-ENV-2010



## MATRIX

New **Multi-HAZard** and **MULTI-RISK** Assessment Methods for Europe

Collaborative Project  
Small or medium-scale focused research project

Work programme topic ENV.2010.1.3.4-1:  
New methodologies for multi-hazard and multi-risk assessment

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**WHY MATRIX PROJECT?**

A variety of natural extreme events, including earthquakes, landslides, volcano eruptions, tsunamis, river floods, winter storms, wildfire, and coastal phenomena, threaten different regions of European countries. Planners and policy-makers, and the scientists who inform their judgment, usually treat the hazards and risks related to such events separately from each other, neglecting interdependencies between the different types of phenomena, as well as the importance of risk comparability. Fixing this deficit will improve their ability to take risk reduction measures in a cost-effective way.

**How to focus risk mitigation policies?**



**WHAT IS NEEDED TO?**

- Quantitative risk assessment (probability) needed for decision makers.
- Ranking of risks.
- Interaction among risks.

**WHAT DO WE HAVE IN MIND?**

The core objective of the MATRIX project is to develop methods and tools to tackle multiple natural hazards in a common framework.

The proposal addresses four major sub-objectives related to that core:

1. To develop new methodologies for multi-type hazard and risk assessment, with focus on
  - a: risk comparability;
  - b: cascading hazards;
  - c: time dependent vulnerability in the frame of conjoint or successive hazards.
2. To compare this new multi-hazard and multi-risk analytical framework with the state-of-the art in probabilistic single-risk analysis.
3. To set up an information technology (IT) framework for test case analysis in a multi-risk approach.
4. To disseminate our results to multiple communities.

**from CLASSICAL RISK APPROACH...**

starting from the ADVERSE EVENT

**RISKS ARE TREATED SEPARATELY**

**Different approaches to Hazard:**

- Geological hazard can be considered constant with time
- Hazard affected by climate change are not constant with time.

**Different Time scales**

**Different Criteria of damage assessment**

Specific vs. systemic vulnerability

**Different Spatial definition**

**RISKS ARE NOT COMPARABLE!!!**

**...to MULTI-RISK APPROACH**

starting from the TARGET AREA

Better consistency using DAMAGE-from-SOURCE.

**RISKS TREATED COHERENTLY**

**Comparable Time scales**

**Same Type of damage**

**Comparable Spatial definitions**

**Comparable Approaches to evaluate hazard**

Interaction and cascade effects easier to be accounted for

**RISKS ARE COMPARABLE!!!**

**THE ROLE OF AMRA**

AMRA is in the coordinating team of the MATRIX project with a direct involvement in almost all planned WPs.

In particular, it participates to review the present single hazard practices and to define a possible strategies for their homogenization. AMRA also participate in defining a time-dependent vulnerability and risk that represents an innovative field of engineer researches. A particular effort will be devoted to the definition of triggering and cascade events in a multi-hazard/risk perspective; specifically, AMRA leads a WP devoted to the description and quantification of the multi-hazard effects.

Finally, AMRA takes part actively in describing real examples of application of the multi-risk assessment and is also involved in the dissemination program.