RISK: An Interdisciplinary Project on Risk Assessment and Management

VAO Symposium, Grenoble
March 14, 2018

« Managing risk for a more resilient world »

An interdisciplinary IDEX* project towards a risk management institute
A consortium of 15 research labs

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Scientific and socio-economic issues

UNISDR Sendai 2015-2030: An exponential increase of disasters over the last 30 years

Some facts:
- 2005-2015: 700,000 deads, 23 millions of homeless persons;
- financial costs × 5 over the last 30 years (> 250 billions € per year)

Main reasons?
- Increase of the world population with densification of urbanized areas, greater human impact on ecosystems
- Emerging risks: climate change, technological hazards in dense areas, cascade events & effects

Main issues?
- Better prevent and mitigate disaster risks:
  - Improve understanding & scientific methods through an inter-disciplinarity approach
  - Develop the culture of risk (perception & acceptance)
  - Improve risk management schemes via a participatory approach
  - Take the complexity and specificities of real situations
Scientific challenges faced by the project

1. Deal with the heterogeneity of data (hazards, vulnerabilities, resilience) by using a participatory approach: data collecting strategy, processing, modeling and use of data

2. Take unobserved/highly sensitive/rare or emerging events into account and consider complex cascade effects merging natural, technological, and human hazards

3. Move from a static/reactive approach of risk assessment and management to a dynamical/proactive one, by taking uncertainty and human behavior into account

4. Propose some effective tools and disaster risk mitigation strategies apart from a relevant assessment of vulnerabilities and local cultures

5. Develop some innovative methods and tools in order to assess existing risk governance models

6. Define some accepted risk governance models with and built an well-adapted communication strategy to develop the culture of risk
Scientific approach / work plan

WP I – Risk Management & Governance for a sustainable development

WP II – Hazards & Stakes: Data Collection, Processing and Modeling

WP III – Living Risk Assessment & Decision-Making Support

WP IV – Risk Institute Proposal

Field Projects
- Alpes (Grenoble Area, Massifs)
- Andes (Peru)
- Lebanon (Beyrouth)
- Haïti
- Nepal

Recommenderations for data collecting and dissemination
Tools for data collecting and dissemination
Expression of needs for risk metrics & decision-making support
Model specifications
Models for assessment and decision making
Interdisciplinarity

Winter/Summer Schools

Geosciences & Engineering: Mapping of Hazards and Vulnerabilities


WP I - Risk Management & Governance

Maths & Information Sciences: Collaborative & Multi-Agent Approaches, optimization, statistics & data analysis

WP III - Living Risk Assessment & Decision-Making Support

Maths & Information Sciences: Reliability & diagnosis, system modeling & observation, Sensor Networks, Signal Processing, Human/Machine Interface

WP II - Hazards & Stakes: Data Collection, Processing and Modeling

Workshop on Analysis and Modeling of Cascade Events

Workshop on Complex Decision Making in Risk Management

Social & Human Sciences: Decision Theory & Finance, Psychology of Risk, Urban Planning

Geosciences & Engineering: physical monitoring, modeling and simulation of environmental systems

Transversal Workshop on Resilience
Interdisciplinarity through 11 PhD thesis

WP I - Risk Management & Governance for a sustainable development

- #T2 Coordination in management of crisis
- #T9 Human–Computer Interfaces in natural risk programs
- #T11 Analysis of post-disaster reconstruction projects

WP II - Hazards & Stakes: Data Collection, Processing and Modeling

- #T5 Emerging risks: the ‘dark side of the Alpine cryosphere’
- #T6 Heterogeneous data in the context of gravitational hazards
- #T10 Archeoseismology for Seismic hazards and Risk Estimation
- #T4 Monitoring and preventive maintenance of torrent check dams

WP III - Living Risk Assessment & Decision-Making Support

- #T7 Seismic risk modelling approach including human behaviour
- #T3 Testimonies, perception and management of landslides hazards
- #T8 Seismic band in masonry wall to improve earthquake resilience
- #T1 Extreme risk measures & insurance of natural disasters

Emerging risks: the ‘dark side of the Alpine cryosphere’
Main deliverables

After 2 years

- Publications
  - Courses of winter/summer schools (from year 2)
  - Proceedings of an international workshop (year 2)
  - First scientific reports & publications

- Achievements
  - Website and Intranet (March 2018)
  - Benchmark study of Risk Centers/Institutes
  - Specifications of a mobile application for risk information
  - Specifications of a digital demonstrator

After 4 years

- Publications
  - Proceedings of an international conference (end of year 4)
  - Final report, Risk Institute proposal, international publications, PhD

- Achievements
  - Analysis of risk management models and recommendations for the studied areas
  - Observatories & risk mapping
  - The mobile application for risk information
  - The digital demonstrator
## Main deliverables

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<tr>
<th>Deliverable</th>
<th>Target</th>
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<tr>
<td><strong>Joint publications in peer-reviewed international journals</strong></td>
<td>At least 20</td>
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<td><strong>Special issues in peer-reviewed international journals</strong></td>
<td>At least 2</td>
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<td><strong>Publications in international conferences per PhD thesis</strong></td>
<td>At least 2</td>
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<td><strong>Plenary/Invited sessions in large audience international conferences</strong></td>
<td>At least 3</td>
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<td><strong>Industrial chairs induced by the project</strong></td>
<td>At least 1</td>
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<td><strong>European H2020 or FEDER projects jointly submitted with socio-economical partners</strong></td>
<td>At least 1 as coordinator</td>
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<td><strong>ERC (European Research Council) Grant</strong></td>
<td>1</td>
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National and international partnerships

Strong anchorage on local issues and partnerships:
- Lausanne, Turin, Vienna, Zurich, ...
- Decision-makers: Grenoble Metropolis, Cerema, ...
- the socio-economic sphere

A research consortium unique in France
Some inspiring models: Risk Center ETH Zurich, DPRI Kyoto, Wharton ...

An International Advisory Board
with top-ranked universities
(ETH Zurich, DPRI/Univ. Kyoto ...) and future memberships to networks dedicated to risk management

International partnerships: in compliance with IRD and Univ. Grenoble Alpes strategies, linked to local stakeholders and humanitarian organizations
Organization and project governance

15-Lab Referent Group

Steering Committee
Sandrine Caroly (PACTE), Dominique Daudon (3SR), Philippe Garnier (AE&CC), Didier Georges (GIPSA-lab), Denis Jongmans (ISTerre), Rémi Kouabnenan (LIP), Didier Richard (IRSTEA)

Extended Steering Committee
IDEX Research Executive Chair
The research departments and doctoral schools

International Advisory Board
(12 members)

Coordinators of WP 1 to 3 and internal workshops

WP4 – Risk Institute Proposal

Technical and administrative staff (1 full-time for 3,5 years)

Funding: 1,5 M€, IDEX partner support: 14,3 M€, support outside IDEX: 3 M€ - 88 full-time equivalent research staff
A response to a world key issue, for the decades to come, strongly affected by the climate change

An effective development tool for the interdisciplinary synergies of a scientific consortium, unique in France

A strong contribution to the structuration and the international recognition of Univ. Grenoble Alpes on risk management issues

- **Research**: develop innovative working methods and methodologies based on a true interdisciplinarity
- **Transfer of knowledge**: strong links with companies (SNCF, EDF, STMicroelectronics, consulting & engineering companies...), and operational organizations
- **In education and training**: develop some innovative curricula and life-long training for risk managers, at the master/doctorate levels
THANK YOU! VISIT OUR WEBSITE!