IIASA‘s research on risk and foresight

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Early risk highlights at IIASA

- **1978** Public acceptability of nuclear power; Otway et al.
- **1983** LNG siting controversies; Kunreuther, et al.
- **1986** Hazardous Waste Policy; Wynne et al.
- **1992** Risk and Fairness; Schelling, Thompson, Raiffa, Linnerooth
- **1999** Human Choice and Climate Change; Douglas, Rayner, et al.
Four short policy stories and the IIASA science behind them

- Global
- Regional
- National
- Local

+ an emerging policy story
Global policy story

Safety nets for vulnerable countries exposed to climate extremes

IIASA played a key role in a climate risk pooling proposal that became part of the UNFCCC COP16 negotiating text.

IIASA developed the concept of a financial mechanism with 2 layers:

- **Layer 1** would "reinsure" extreme weather losses to public infrastructure of the most vulnerable countries;
- **Layer 2** would support novel risk-transfer instruments, like index-based weather insurance and sovereign catastrophe bonds.

Which countries are the most vulnerable to weather extremes?

What is the necessary capitalization of a facility that would reinsure governments of these countries?
Global policy story: Safety nets for climate extremes

The Science – The CATSIM model

Probabilistic estimate of public sector losses

Government's post-disaster financing ability

Probability of losses not exceeding a certain level

100 year event

10 year event

Diversion from budget

Reserve fund

Domestic bonds and credit

Et cetera

Source: Hochrainer-Stigler et al. 2013
Global policy story

Which countries are most vulnerable to weather extremes?

Less than EURO 10 billion to capitalize reinsurance facility

Warsaw Loss and Damage Mechanism

Regional policy story

*Climate change and flood risk in Europe*

IIASA was asked by the EU Parliament to provide expert witness at hearings addressing reforms of the EU Solidarity Fund.

- How robust is the Fund in light of climate change?
- Does it promote solidarity?
- Does it provide incentives for risk reduction?
Regional policy story: the science

Correlated flood risk in Europe


Borgomeo, Pflug, Hochrainer-Stigler, Hall (submitted) Water Resources Research
Based on an IIASA-led project, the Finnish Government chose risk & resilience as one of the cross cutting themes of the their Futures Review 2030, which has become the basis of strategic planning in government agencies.

Partners:

- 6 ministries
- 4 industrial federations
- 3 companies

National policy story
A flexible and agile Finland

The approach

Broad participation

- Identify shocks
- Identify their direct and indirect impacts
- Collect ideas on actions
- Assessment of actions by experts
- Robust portfolio modeling

Foresight assessments on-going in Scotland and South Korea.

Nokia relocates out of Finland
Local policy story
Reconciling conflicts for managing landslide risk in Nocera Inferiore

IIASA designed and ran a 3-year participatory process, resulting in an agreed compromise on reducing the risk of landslide.
Local policy story: Reducing landslide risk in Nocera Inferiore

The approach

Analytical-deliberative process
- Beyond interests (winners and losers)
- To values/cultural identities
  (contending voices/lenses)
- Co-production of policy options
- Compromise not consensus
Emerging policy story

Systemic risk

The likelihood and consequence of cascading failures in networks characterizing a broad range of natural and human-made systems.

The stage was set by examining the challenges of managing “femtorisks” in complex adaptive systems, where a seemingly small-scale event can cascade to trigger consequences throughout the system.


Financial systems

Food webs/ecosystems
National policy story
A flexible and agile Finland

The approach

Broad participation

- Identify shocks
- Identify their direct and indirect impacts
- Collect ideas on actions
- Assessment of actions by experts
- Robust portfolio modeling

Foresight assessments on-going in Scotland and South Korea.
Refocusing disaster aid

Should donors consider switching priority from post-disaster aid to supporting pre-disaster insurance and other financial instruments?

Are financial instruments needed by the poor? Can these instruments provide affordable safety nets?

Linnerooth-Bayer et al 2005
Flood resilience project: a new cross-sector collaboration to catalyze change
Chosen by UN’s Momentum for Change initiative as an exemplary Lighthouse Activity in 2014 at COP 20 in Lima

Science for policy and practice

Private sector sponsor

Global Reach

Innovation
Baseline correlation of floods highly important for risk management of extremes.
Combining financial system risk with extreme event shocks
1. Descriptions of shock environments

2. Success strategies for each shock environment

3. Assessment of activities’ benefits

4. Potential portfolio that will produce success no matter what happens

A femtorisk is a seemingly small-scale event that can cascade to trigger consequences at higher levels of organization.

Managing femtorisks (resilience):
Flexible and adaptive response inspired by, for example, the human immune system:
- diversity of response options,
- functional redundancies
- modularity.