



Knowledge gaps in risk management for critical infrastructure: insights from four case-studies

Trond Husby – PBL / TNO

12 May 2016

This research has received funding from the European Union Seventh Framework Programme under grant agreement no 606799. The information and views set out in this presentation are those of the author(s) and do not necessarily reflect the official opinion of the European Union.

Research question, objectives, and approach

Research question

- Does seemingly insufficient risk management and underutilisation of risk assessment tools reflect deliberate decisions or does it reflect gaps in tools, method or data?

Objectives

- Identify and characterise knowledge gaps in risk management
- Provide recommendations on tools and methods matching information needs in actual cases of EWE causing CI disruptions.

Approach

- A desktop analysis of 4 well-documented historical cases relevant to the INTACT project, complimented with input from project partners.



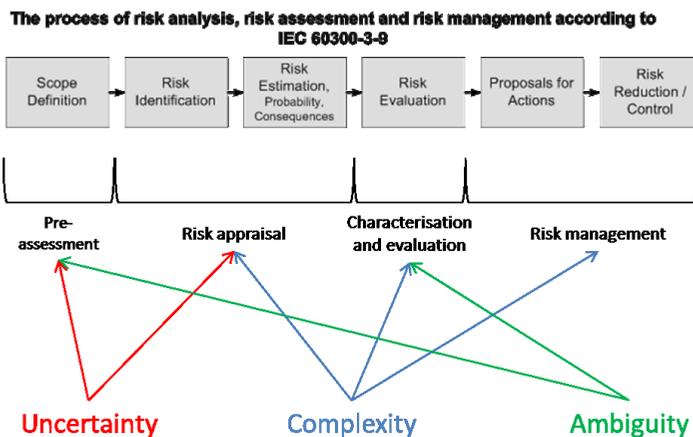
Categories of risk problems

- Uncertainty: causal effects cannot be identified due to inadequate or incomplete reduction of complexity.
 - Aleatory versus epistemic.
- Complexity: difficulties to identify and quantify causal links between a number of potential candidate causes and adverse effects.
- Ambiguity: different and potentially divergent streams of thinking about the same phenomena.
 - Interpretative versus normative.



Source: Ortwin, Renn. "Risk Governance: Towards and Integrative Approach." Geneva: International Risk Governance Council (2006).

Main challenges for risk management



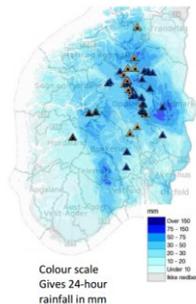
Case 1 Winter storms affecting power plants, Finland 2011



Source: HS / Sami Kero (<http://www.hs.fi/kotimaa/a1420340698412>)

	Uncertainty	Complexity	Ambiguity
Pre-Assessment			Difference in risk perception between laypeople and experts.
Appraisal	Lack of information about location of impacts; little focus on impacts from climate change.	Lack of knowledge about interdependencies between e.g., electricity and telecom network.	
Characterisation and evaluation			
Management		Organisational problems during crisis response.	

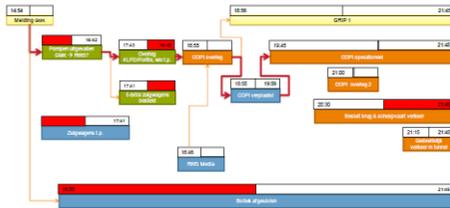
Case 2 Floods affecting road and rail infrastructure, Norway, June 2011



Sources: www.varsom.no, Niklas Eriksson, (NPRA, 2012)

	Uncertainty	Complexity	Ambiguity
Pre-Assessment			Competing objectives within municipalities leading to development in hazardous areas.
Appraisal	Hazard mapping of tributary rivers.	Interactions between flood and avalanche; impact of climate change.	Risk and vulnerability analyses reflect subjective perceptions.
Characterisation and evaluation			Lack of universal criteria for tolerable and acceptable risk.
Management			

Case 3 Heavy precipitation affecting road network, the Netherlands 2008

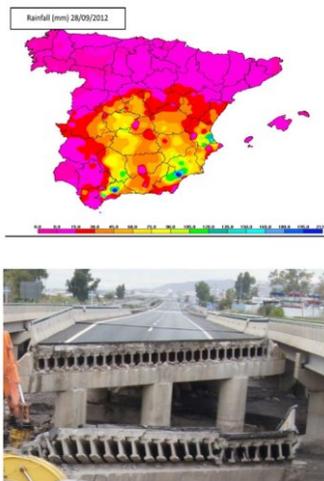


	Uncertainty	Complexity	Ambiguity
Pre-Assessment			Relatively low awareness regarding extreme precipitation events among road owners.
Appraisal	Difficulties in predicting of location and intensity of extreme hazard event.	Lack of knowledge on how adverse effects on one CI affects other CIs.	
Characterisation and evaluation			Impacts from heavy precipitation events may not be seen as a major concern.
Management			



Source: Rosmuller N, Lievit M, Snelder M, Tonnaer C (2011) Incidentmanagement en stroomingskosten: vergelijking van een weg- scheepvaart- en spoorincident. Stichting Platform Transportveiligheid

Case 4 Storm and heavy rainfall affecting road network, Spain 2012

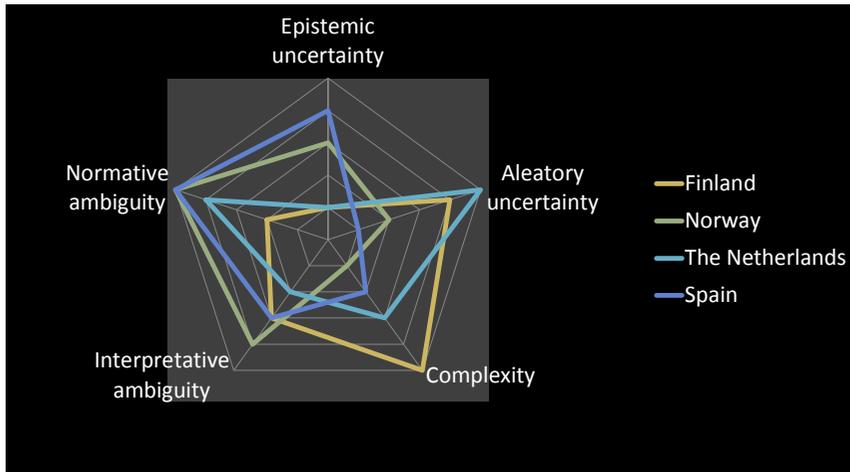


	Uncertainty	Complexity	Ambiguity
Pre-Assessment			Local authorities treat floods as unpredictable.
Appraisal	Lack of data on flood hazards and flood maps.		
Characterisation and evaluation			The impacts of floods are seen as inevitable, and therefore tolerable.
Management		Urban planning may have increased potential impacts of floods.	

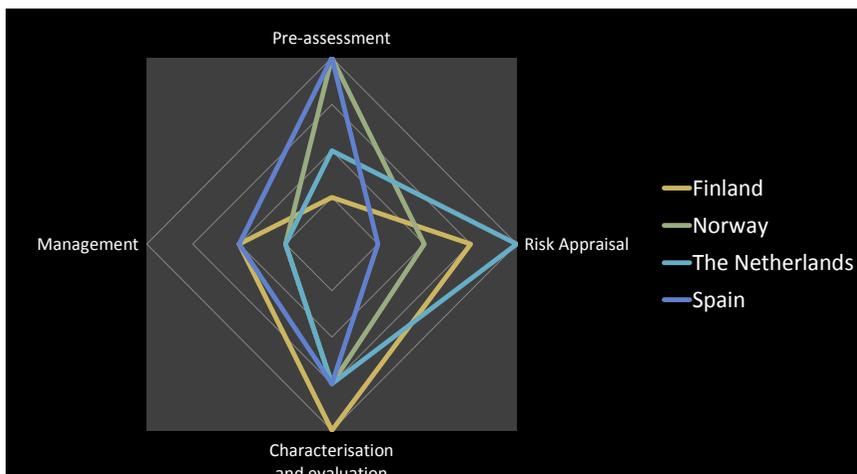


Source: INTACT Deliverable D3.2: Factors Contributing to CI Vulnerability and Resilience

Summary of results (Ranked)



Conclusion: Implications for risk management



Questions?

- INTACT project: www.intact-project.eu

