On evaluating the benefits of risk prevention: the KULTURisk integrated assessment framework (KRIAF)

Department of Economics
Ca' Foscari University &
Corila

C. Giupponi, S. Balbi, S. Briceño, M. Brilly, G. Di Baldassarre, A.K. Gain, V. Gallina, A. Marcomini, V. Mojtahed, R. Ranzi, S. Torresan

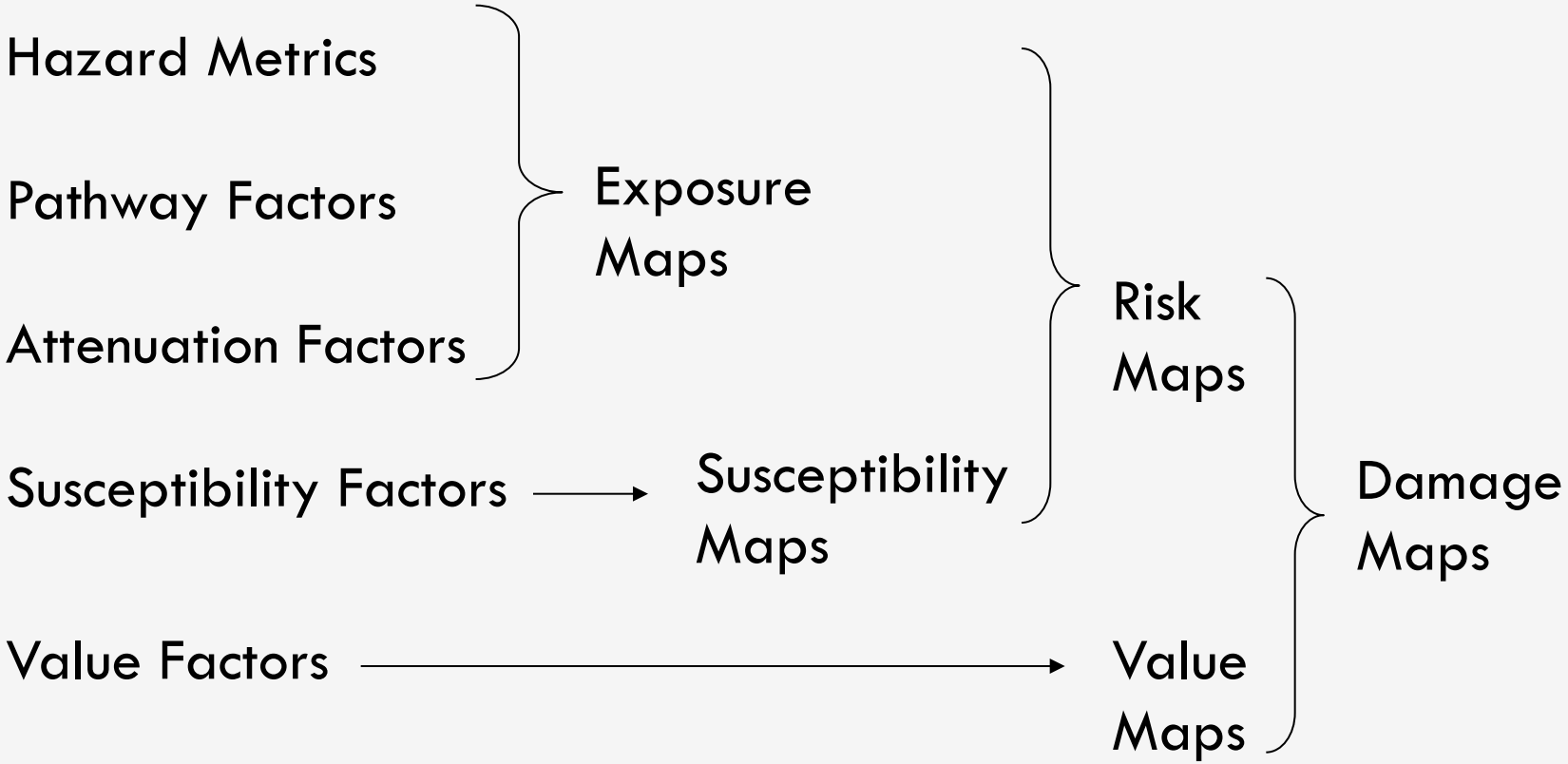
KULTURisk-IAF background (1/3)

- Definitions are inconsistent and unstable
- At least two distinct research streams: DRR & CCA
- A “one-size-fits-all” approach seems impossible

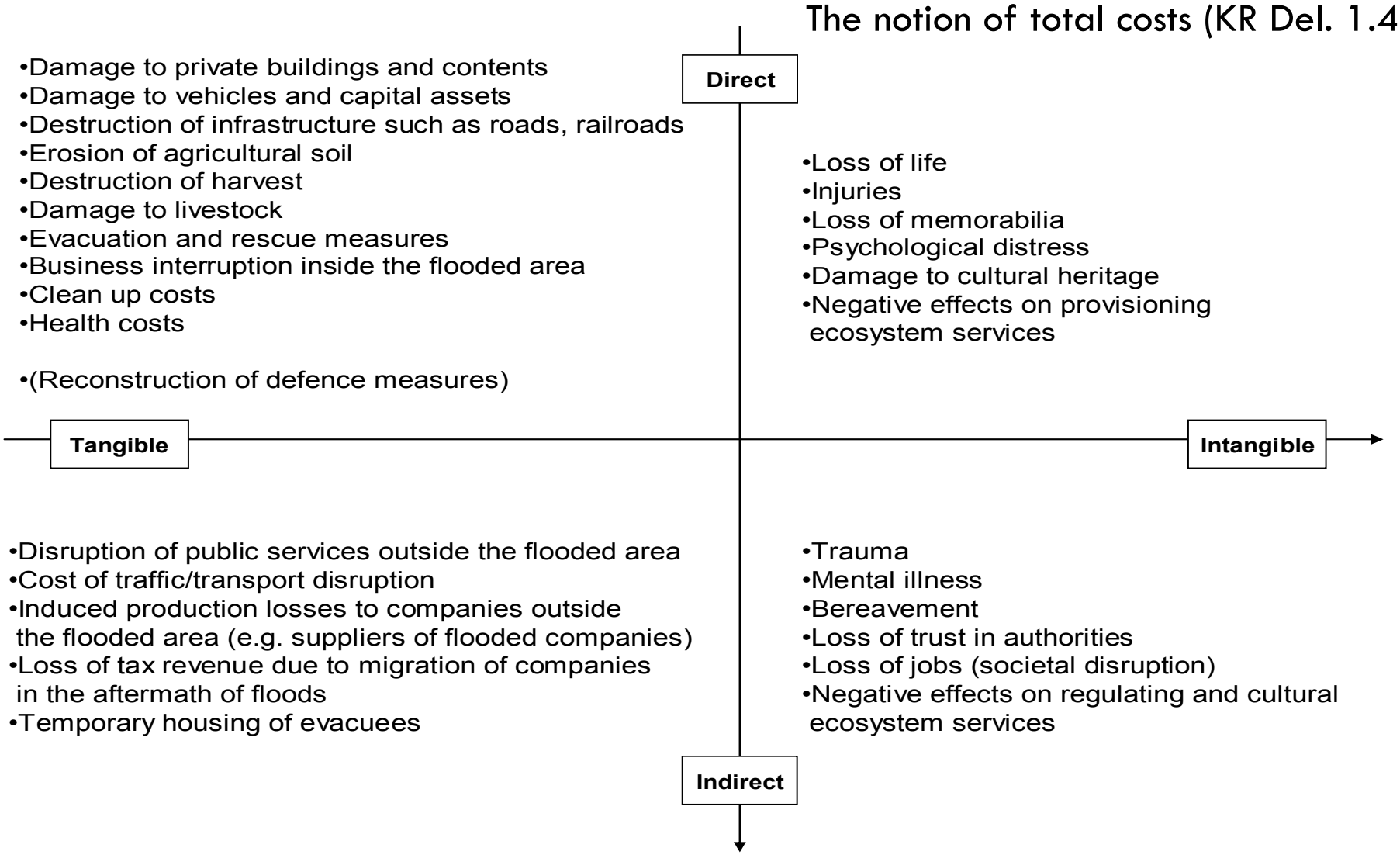
- Very hard to unify the terminology in use
- IPCC-SREX has provided a new reference
- In the assessment of costs and benefits non physical aspects are crucial: go beyond direct tangible costs

KULTURisk-IAF background (2/3)

The RRA methodology (KR Del. 1.2)

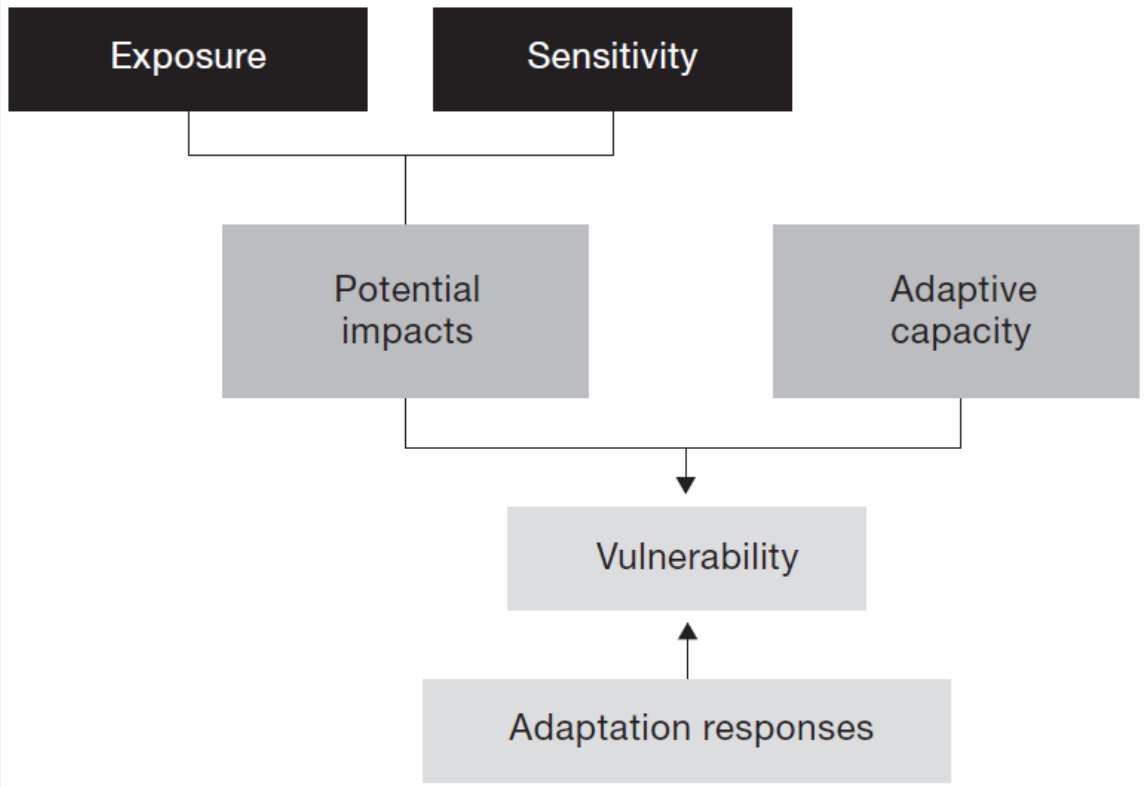


KULTURisk-IAF background (3/3)



Searching for a reference framework 1/n

Adaptation to climate change

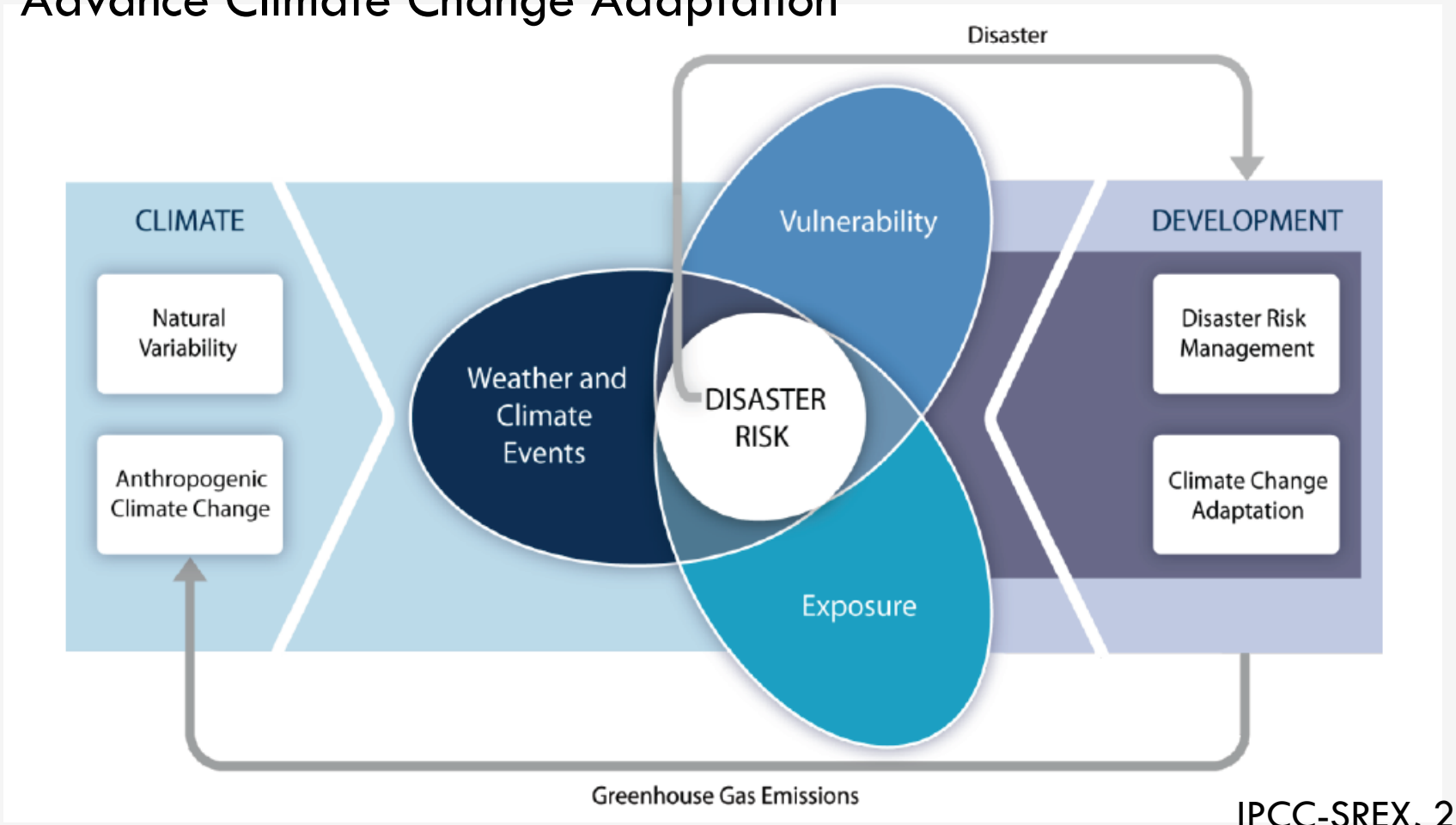


Vulnerability = f (exposure, sensitivity, adaptive capacity)

Klein, 2004 (IPCC-AR4, 2007)

Searching for a reference framework 2/n

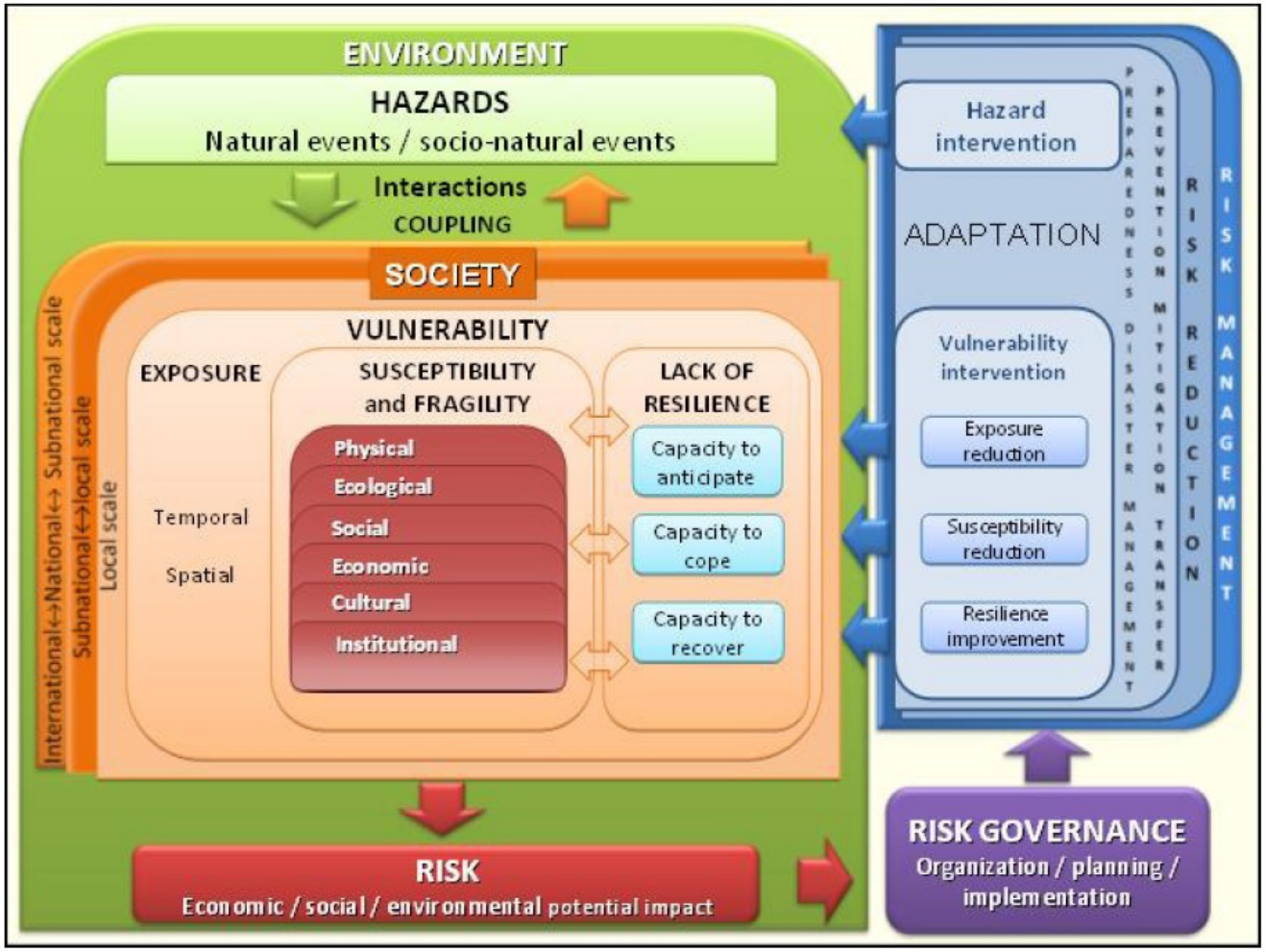
Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation



IPCC-SREX, 2012

Searching for a reference framework 3/n

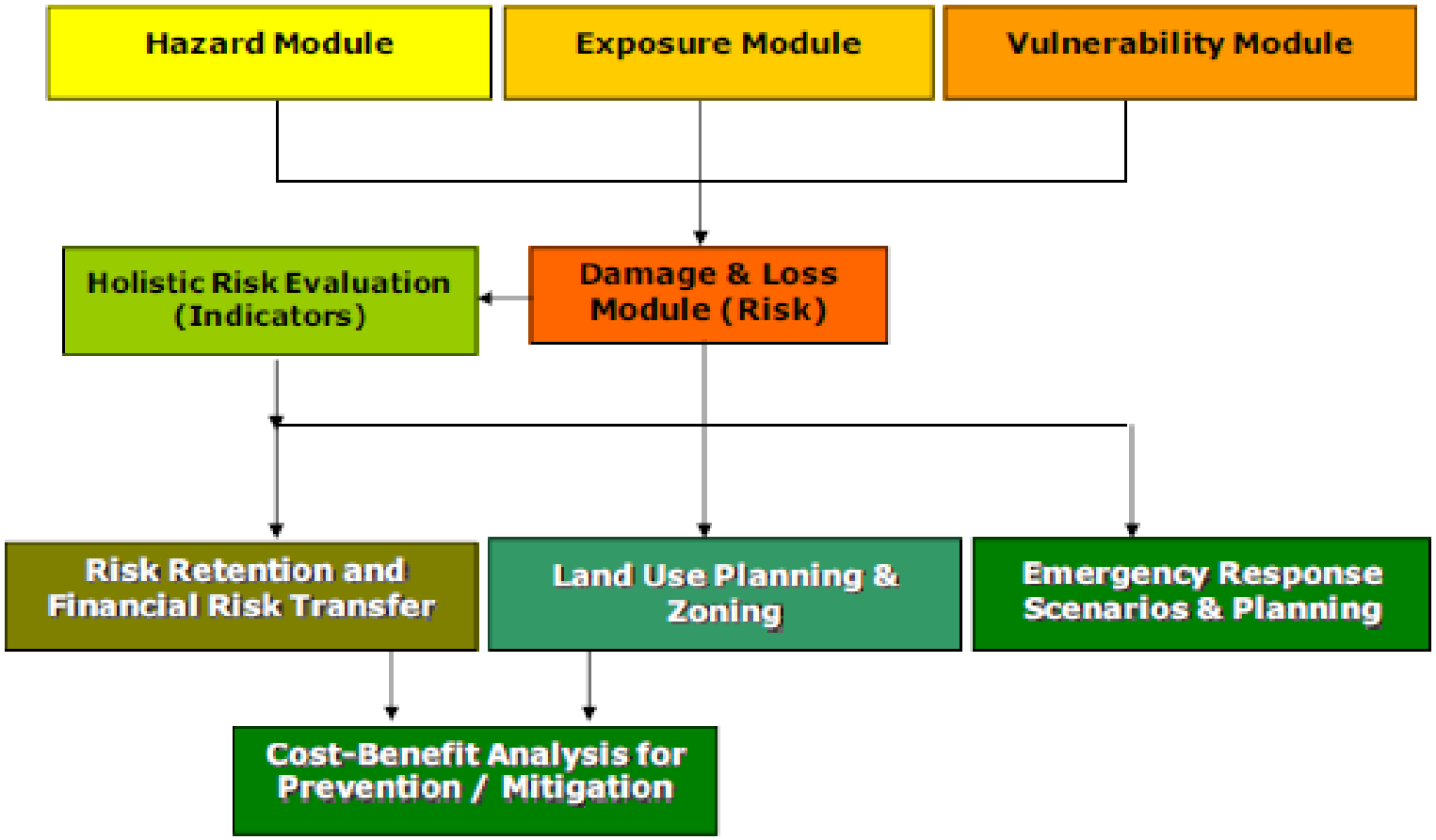
An integrated non directional (cyclic) framework (MOVE)



MOVE, 2011

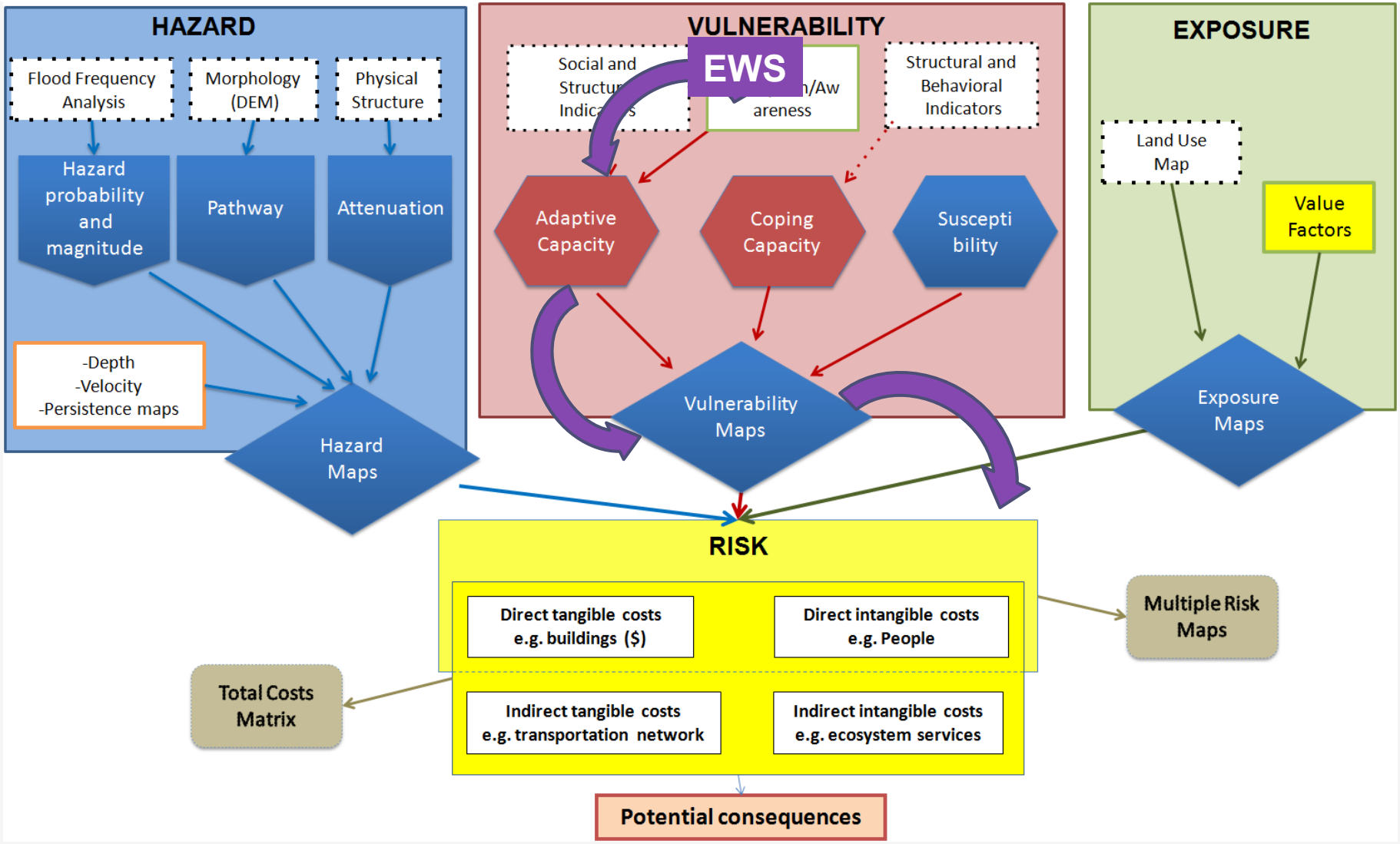
Searching for a reference framework 4/n

Probabilistic risk assessment (CAPRA)



Cardona et al. 2010

The KR framework: KRIAF

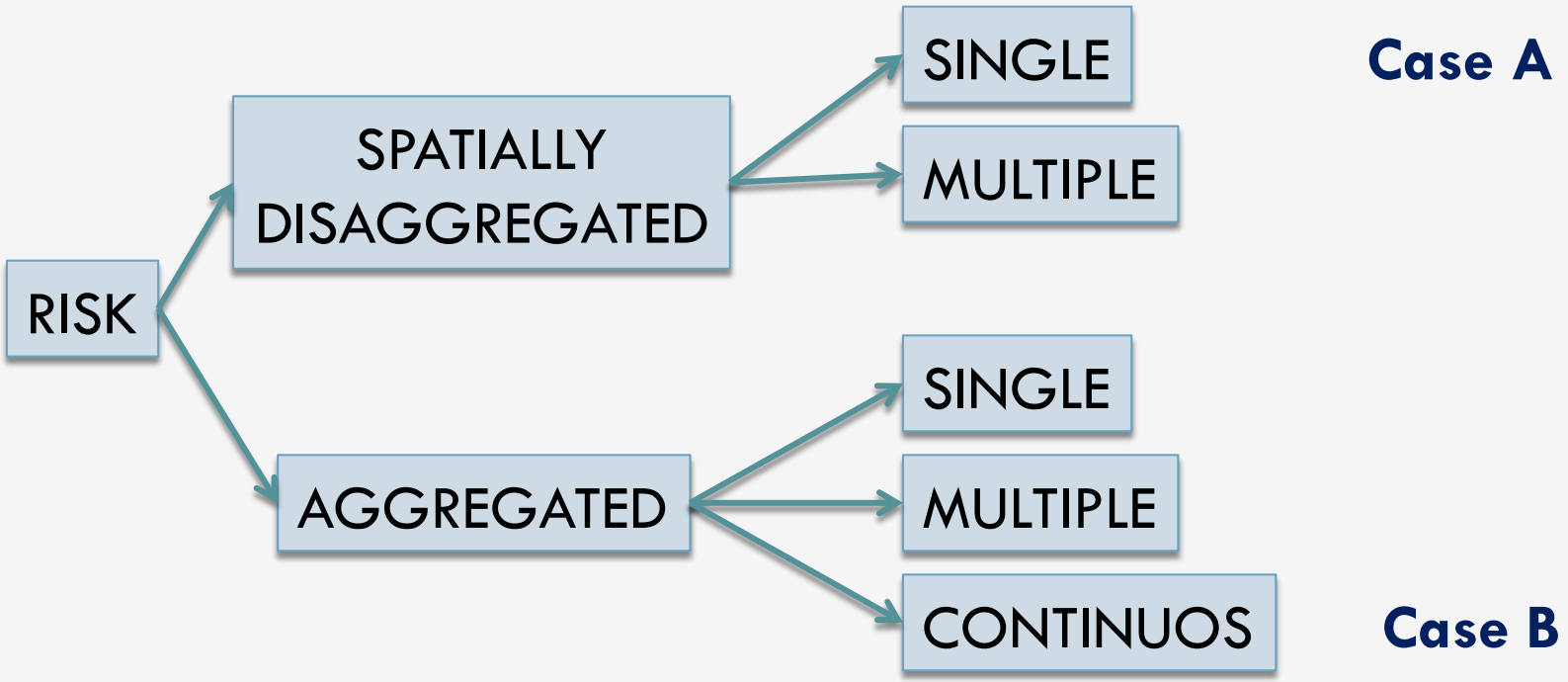


Operationalisation of the framework

Main issues:

- Identification of application contexts: scenarios and measures (baseline vs. alternatives)
- Indicator selection
- Normalisation
- Weighting
- Aggregation
- Uncertainty

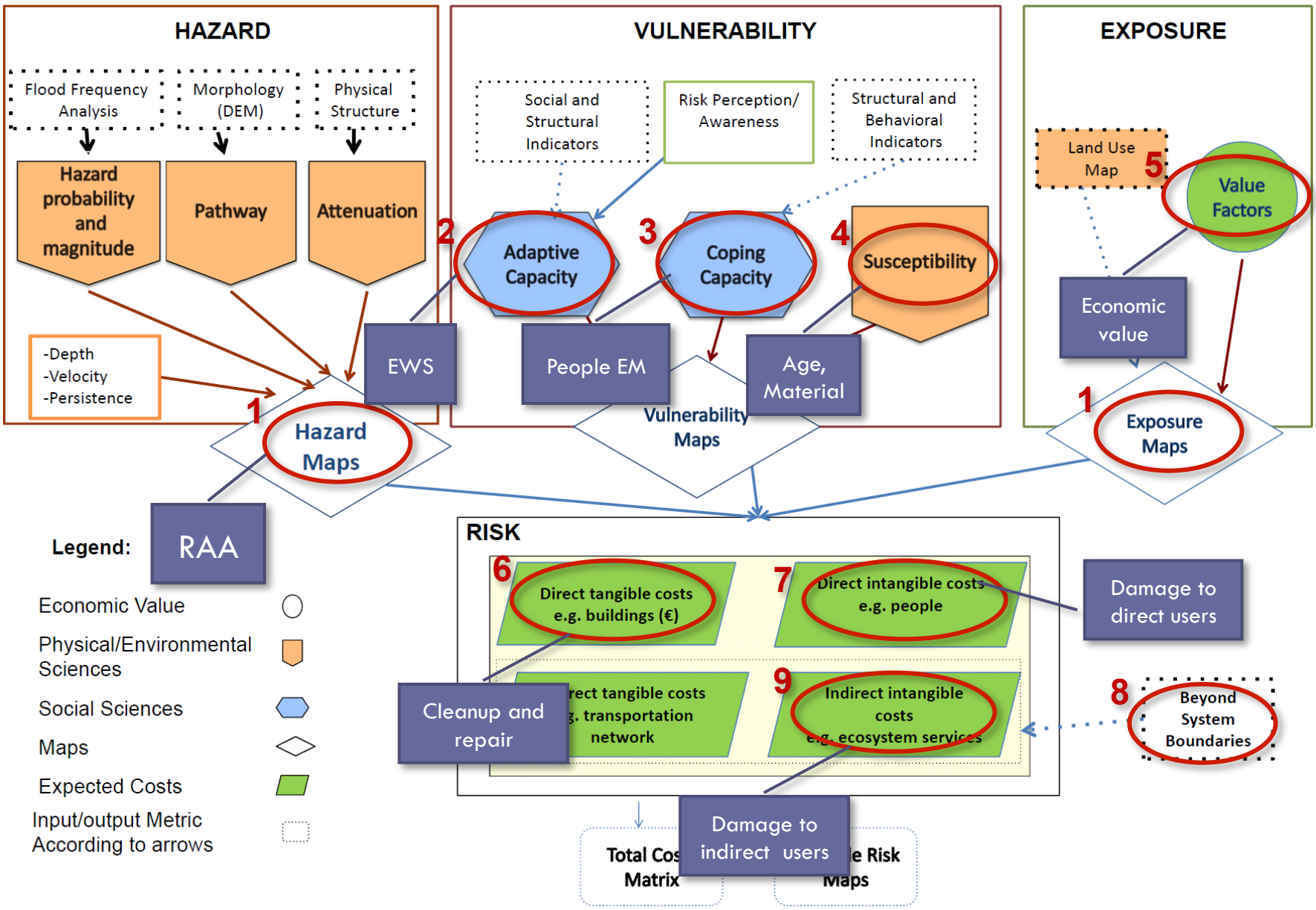
Valuation cases



KRIAF approach to Case A

- 6 risk assessment maps (1 per each receptor: people, residential, commercial and industrial buildings, infrastructure, agriculture, cultural heritage, environment)
- RRA to assess physical/environmental risk
- Selected RRA inputs or outputs used by SERRA to assess social and economic dimension
- Capacities maps
- Overlaying (spatial MCA)
- 1 to 4 maps corresponding to cost quadrants [DT, DI, (IT, II)
- Outcomes:
  - Identification of hot spots
  - Spatial scenario analysis (ex ante valuation of measures)

CULTURAL HERITAGE IN THE KRIAF



Balbi et al., 2012; Giupponi et al., 2012

CULTURAL HERITAGE IN THE KRIAF WORKFLOW EXAMPLE

1. RRA maps of Exposure and Inundation (Hazard) → classes
2. Indicators of EWS;
3. People involved in emergency measures;
4. Age; material; % of multi-storey

Normalised V index → 0-1

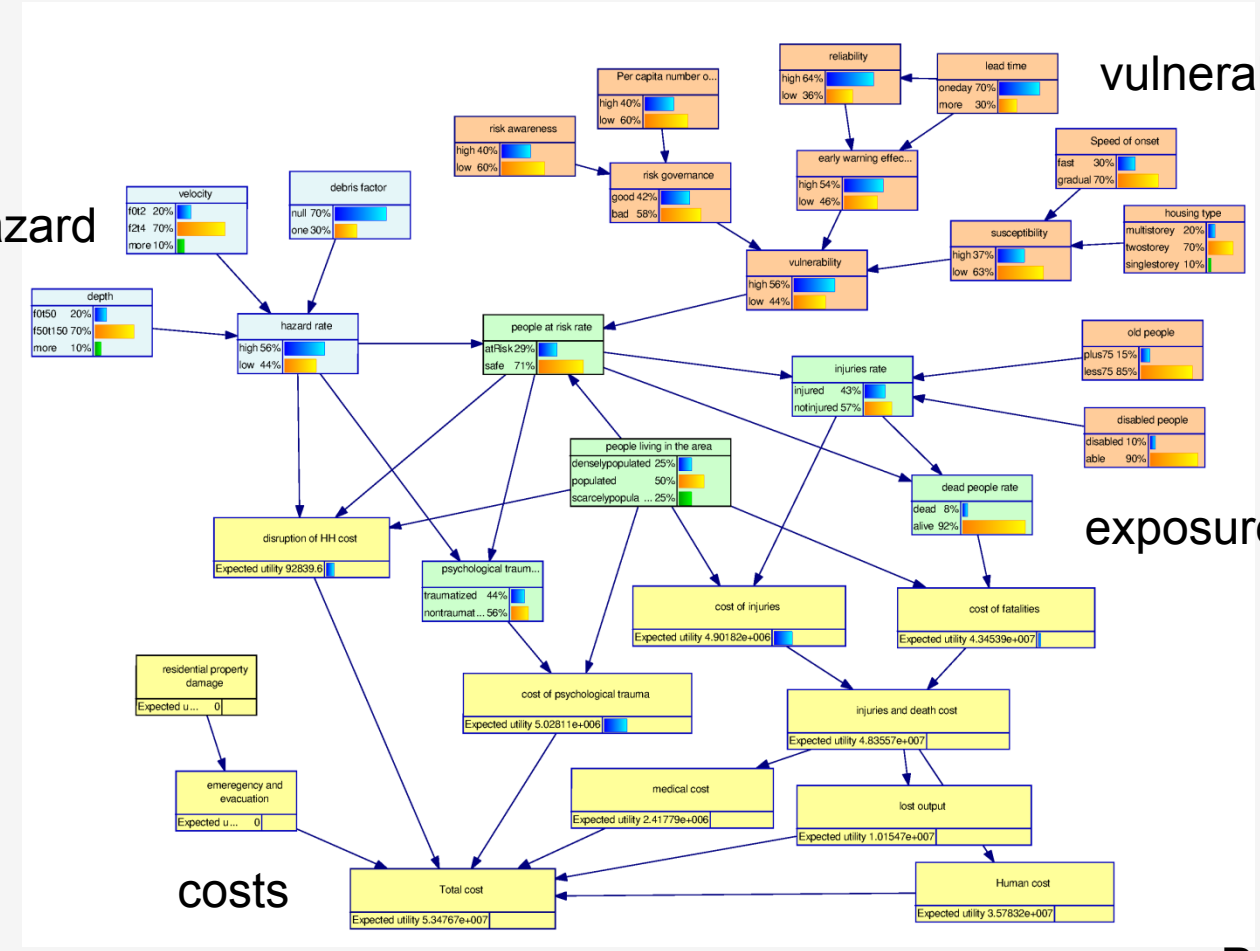
5. Value factor: value transfer functions/tables → €/m²
6. Classes ↔ V index x (€/m²) Cleanup & repair (DT) → €
7. Damage to direct users → €
8. Contingent valuation, value transfer, etc.
9. Damage to indirect users → €

KRIAF approach to Case B

- 6 risk assessment functional analyses (1 per each receptor: people, residential, commercial and industrial buildings, infrastructure, agriculture, cultural heritage, environment)
- 1 to 4 aggregated values corresponding to cost quadrants [DT, DI, (IT, II)
- Outcomes:
  - Monetised and probabilistic quantification of risk
  - Scenario analysis (ex ante valuation of measures)
- Potential to be applied on a spatial object basis (e.g. grids)

KRIAF implementation for people case B

EWS



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KRIAF key messages:

- An integrated framework for the assessment of risk has been developed by the KULTURisk Project
  - allowing for integrated assessment of the potential benefits of measures to cope with flood risk,
  - going beyond the 'traditional' approaches to RA, by enhancing the consideration of social and economic dimensions of vulnerability , and
  - providing solutions for the assessment of 'total costs', but,
  - not guaranteeing – and even searching for – full monetisation, and
  - requiring tailoring of the approach adopted for risk assessment to case specific contexts
- *compliance with EU and national legislation to be finalised*
- *generalised implementation rules to be consolidated through case study implementations*