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KULTURISK
Evaluating the benefits of risk reduction

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KULTURISK

Knowledge-based approach to develop a cULTUre of Risk prevention

- *Instrument: EC FP7, Collaborative project*
- *Duration: 36 months*
- *Start Date: January 2011*
- *Consortium: 11 partners from 6 countries*
- *Project Coordinator: Giuliano Di Baldassarre, UNESCO-IHE Delft*

KULTURISK

The KULTURisk project aims at developing a ***culture of risk prevention*** by evaluating the benefits of different risk prevention initiatives.

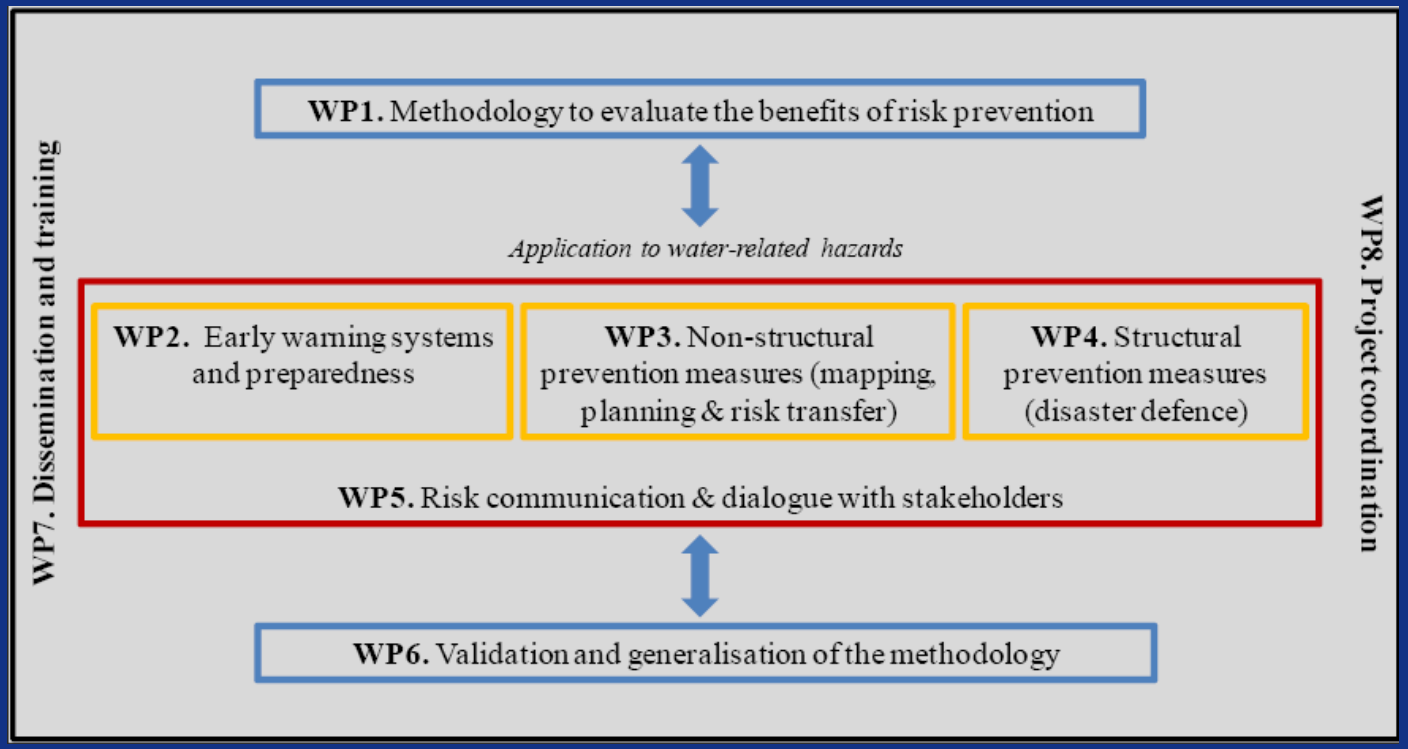
- The costs of preventive measures are less than those of post-event recovery
- This evaluation will be carried out by developing a novel methodology
- referring to different types of water-related catastrophes
- using specific European case studies
- evaluating the benefits of state-of-the-art prevention measures, such as early warning systems, non-structural options (e.g. mapping and planning), risk transfer strategies (e.g. insurance policy), and structural initiatives, will be demonstrated.

Measure !

Measure what is measurable, and make measurable what is not

Galileo Galilei, 1564- 1642

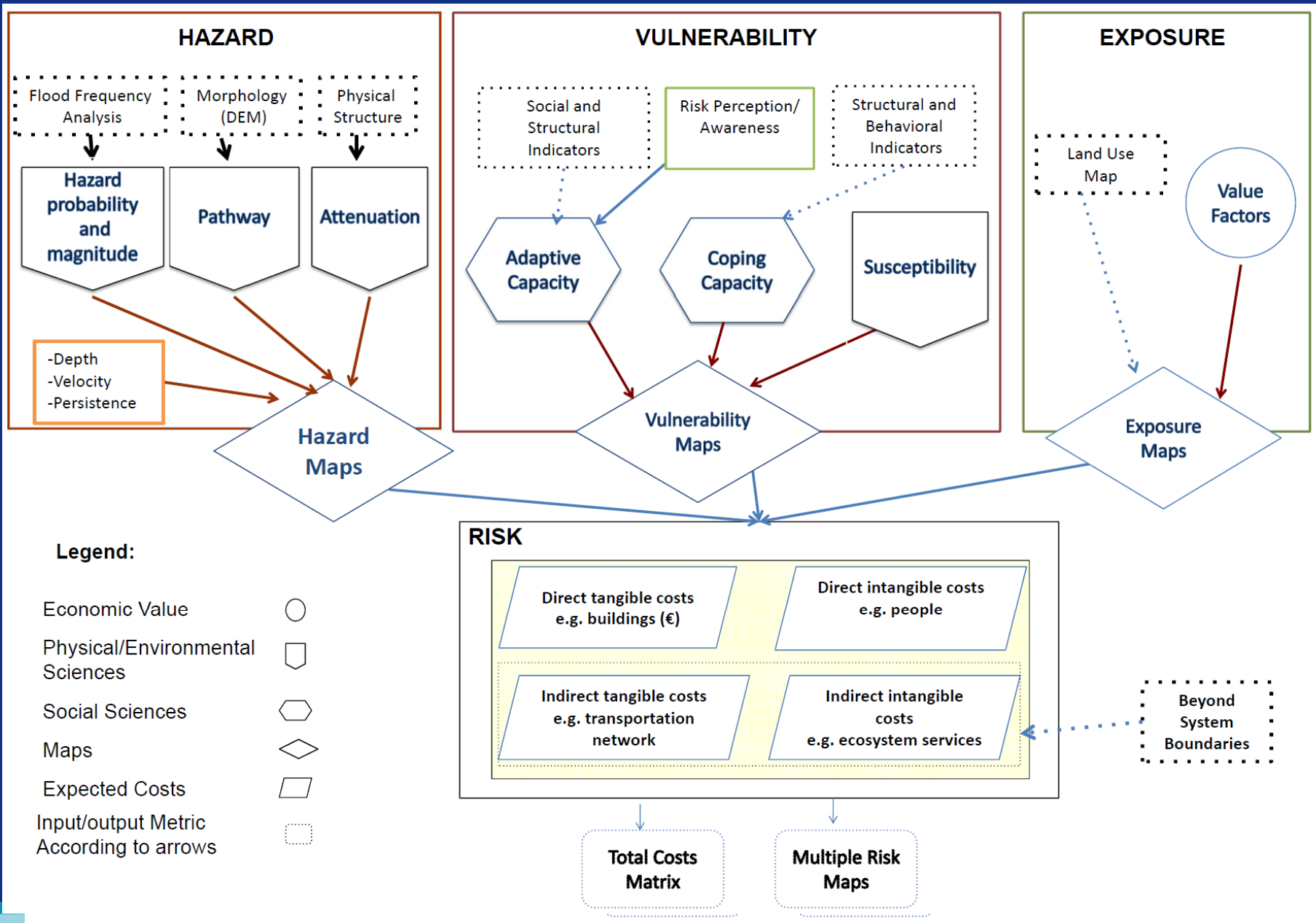
KULTURisk - Structure



Case studies

Name	Type	Water-related hazards
Alpine areas (MAP D-PHASE)	Small catchments	Floods & Landslides
Danube	Trans-boundary large river	Large-scale inundations
Barcellonette	Mountainous catchment	Landslides & debris flows
Carlisle	Urban area	Urban floods
Soča-Isonzo	Trans-boundary catchment	Floods & landslides
Somerset	Coastal area	Storm surges

KULTURISK Conceptual framework



Balbi et al., 2012; Giupponi et

RRA Methodology

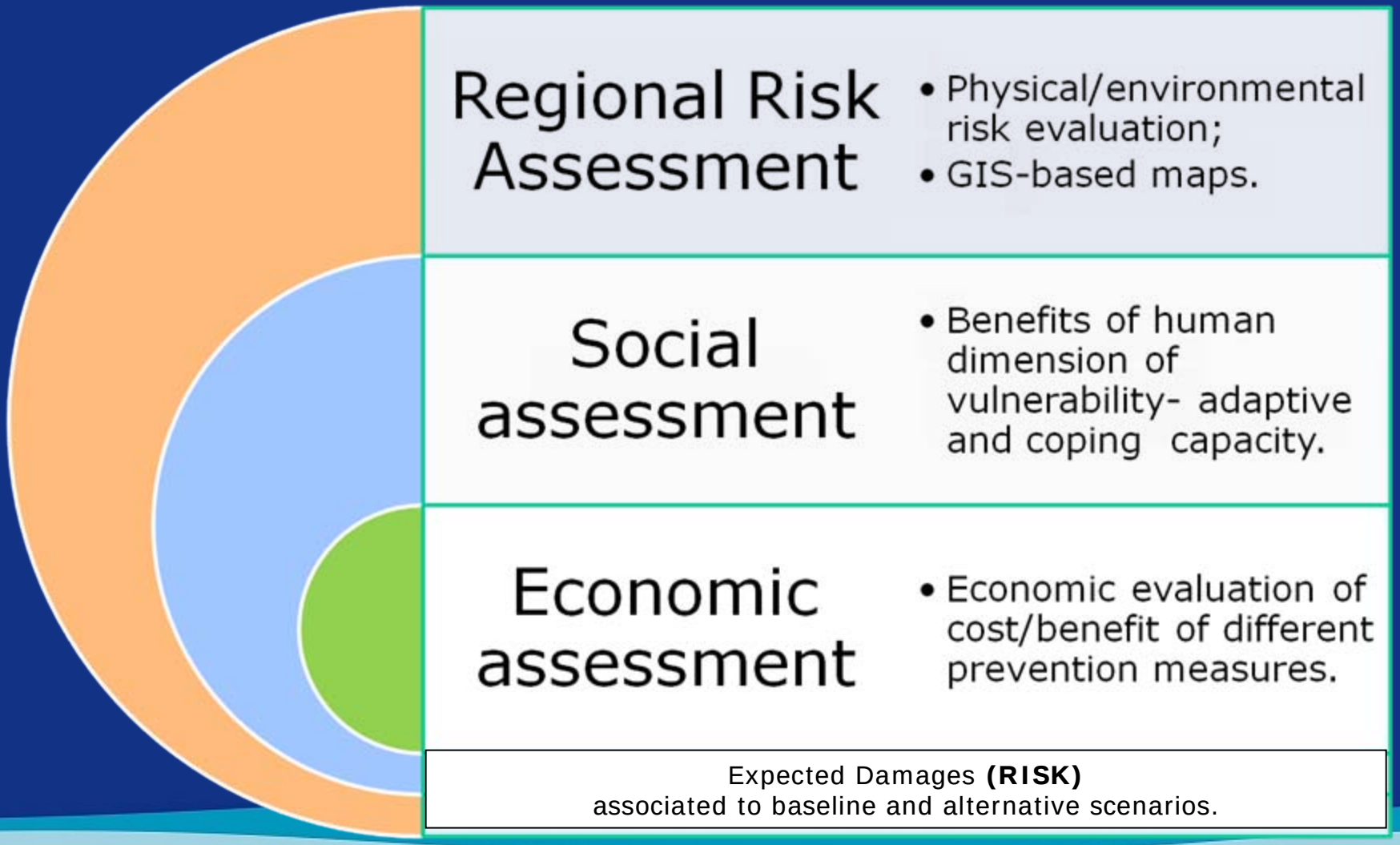
General objectives:

- Provide a general methodology for the integrated assessment of risks levels associated to flood hazards on multiple receptors/elements at risk (i.e. population, economic activities, natural and semi-natural systems, cultural heritages);
- Provide a methodology that allows to identify and prioritize areas and targets at risk in the considered region and to evaluate the benefits of different prevention scenarios;
- Provide a methodology that could be applied in different problem contexts, case studies and spatial scales representing a benchmark for the implementation of the Floods Directive at the European level.

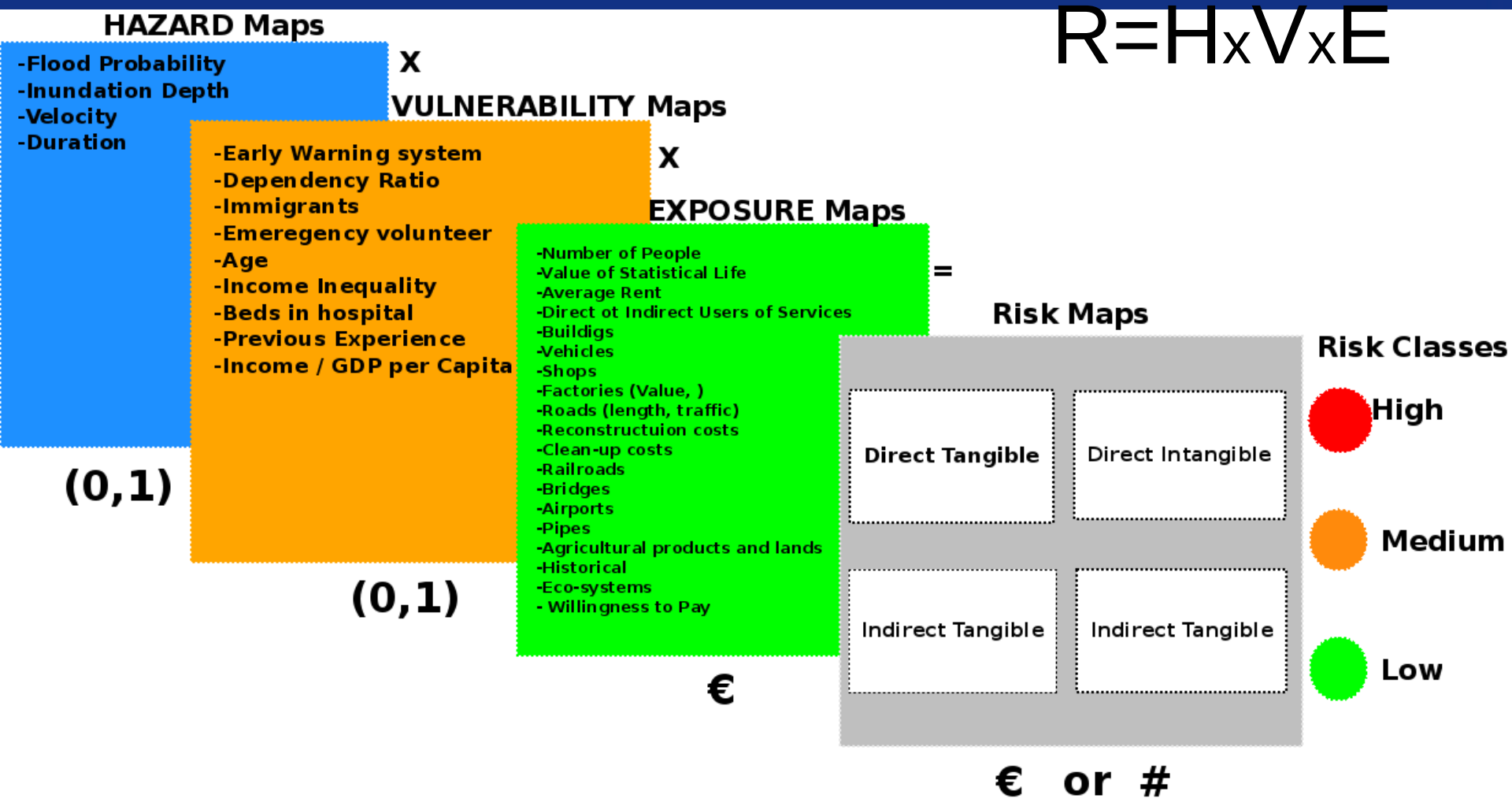
Specific objectives:

- Provide a set of indicators for the different physical/environmental components of the KULTURisk framework;
- Provide a set of equations to normalize and aggregate these indicators in a (spatially resolved) integrated Risk Index.

THE KULTURisk METHODOLOGY TO ESTIMATE RISK LEVELS



Risk Maps



$$R = H \times V \times E$$

List of the selected receptors

- According to the 4 macro-categories proposed in the Floods Directive (2007/60 CE);
- Considering the CORINE Land Cover classes (Büttner et al., 2006) as main dataset for the identification of receptors and spatial unit of analysis at the meso-scale.

- PEOPLE;
- BUILDINGS;
- INFRASTRUCTURES;
- AGRICULTURE;

ECONOMIC ACTIVITIES

- NATURAL & SEMI-NATURAL SYSTEMS;
- CULTURAL HERITAGE.

Physical/environmental risk to cultural heritage

Number of monuments, surface (km^2) and percentage of historical buildings and archeological/anthropological sites.

The aim of the risk-based methodology at the meso-scale for cultural heritage is to define the cultural heritage (i.e. monuments, historical buildings, archeological/anthropological sites) inundated by a flood event.

Indicator	Data source
Hazard metrics	
Flood extension	Flood/hydraulic map
Exposure	
Cultural heritage	Regional technical map, UNESCO cultural heritage map

UNESCO cultural heritage map.

At the **micro-scale** the **physical susceptibility** can be defined considering the material construction, the state of conservation and the dimension of the cultural heritage in order to have a more detailed analysis of the physical/environmental risk.

Socio Economic Regional Risk Assessment (SERRA)

SERRA is an integrated and comprehensive methodology for assessing the flood risk and also evaluating the costs, benefits, and consequences of different risk reduction measures that helps decision makers to achieve the best alternative given the set of legal and financial constraints.

SOCIAL RRA

- Includes the **human dimension of vulnerability** by incorporating selected indicators of adaptive and coping capacity.
- Produce an assessment, which can accompany the RRA - Physical/environmental risk assessment - to produce a **more comprehensive** but **non-monetary** index of risk.

- Per receptor and/or aggregated

Indicator	Adaptive	Coping
Trust		X
Risk Perception	X	X
Risk Governance	X	X
Employment	X	
Social Disparity	X	X
Disabled	X	X
Gender		X
Age		X
Economic Diversification	X	X
Economic Interconnectivity	X	X
New Comers		X

Adaptive and Coping

Indicator	Adaptive	Coping
Trust		X
Risk Perception	X	X
Risk Governance	X	X
Employment	X	
Social Disparity	X	X
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Gender		X
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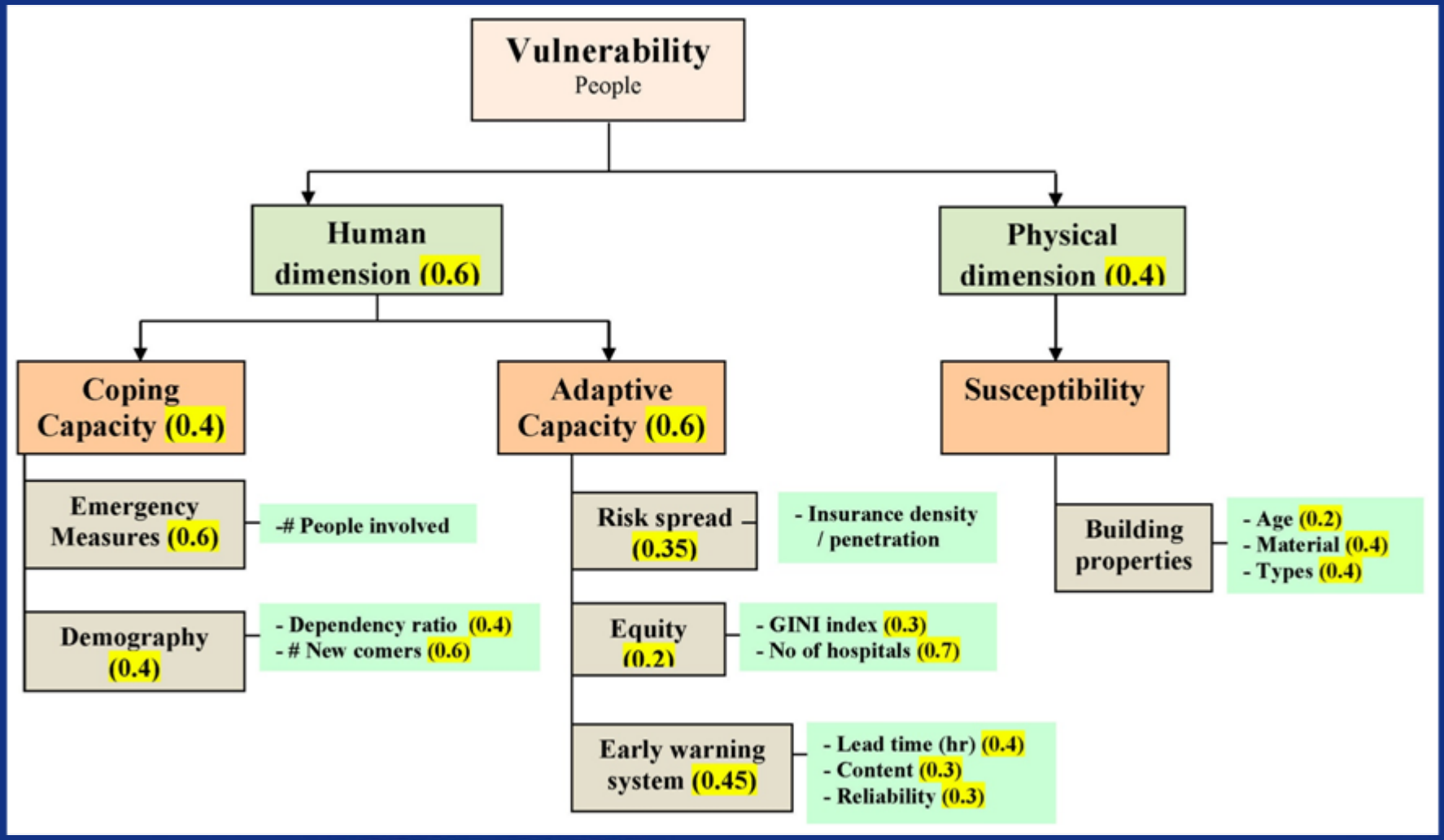
Vulnerability for a Single Receptor



Vulnerability Index

- Identification of application context
- Data Availability
- Indicator Selection
- Normalization:
  - transforming indicator values of different metrics into a dimensionless number.
- Weighting
- Aggregation

Economic RRA

- Use components of the RRA and some social indicators to arrive at the **quantification of economic values** for different quadrants of the total cost matrix.
- Per receptor and/or aggregated

Total Cost Matrix

1) Direct Intangible	2) Direct Tangible
3) Indirect Intangible	4) Indirect Tangible

Total Cost Matrix

Flood Risk Reduction Measures

- Economic Appraisal:
  - is a type of decision method applied to a project or policy that systematically takes into account a wide range of costs and benefits, in monetary terms or for which a monetary equivalent can be estimated.
- Baseline Scenario: Identify the risk to receptors (People, Economic Activities, Cultural Heritage, Naturals systems, etc.) before implementing a RMM.
- Alternative Scenarios: Evaluating different scenarios (structural or non structural) of reducing flood risk.

Conclusion

- The metodology is able assess risk at different scales (Micro, Macro, Meso).
- The scale depends on the size of inundation, aspiration of decision maker, political boundaries, data availability.
- There is tradeoff between accuracy and cost of effort to collect data.
- Citizens' participation is essential for evaluation
- Risks maps (R= HxVxE) are requested by EC Flood directive, but the approach can be extended to other kinds of risk