



*The Xerochore Conference 23-25/02/2010*



# ***Bridging science and policy oriented conceptual models for integrated vulnerability assessment***

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Doctoral School  
**ChangeS**  
Global Change Science and Policy



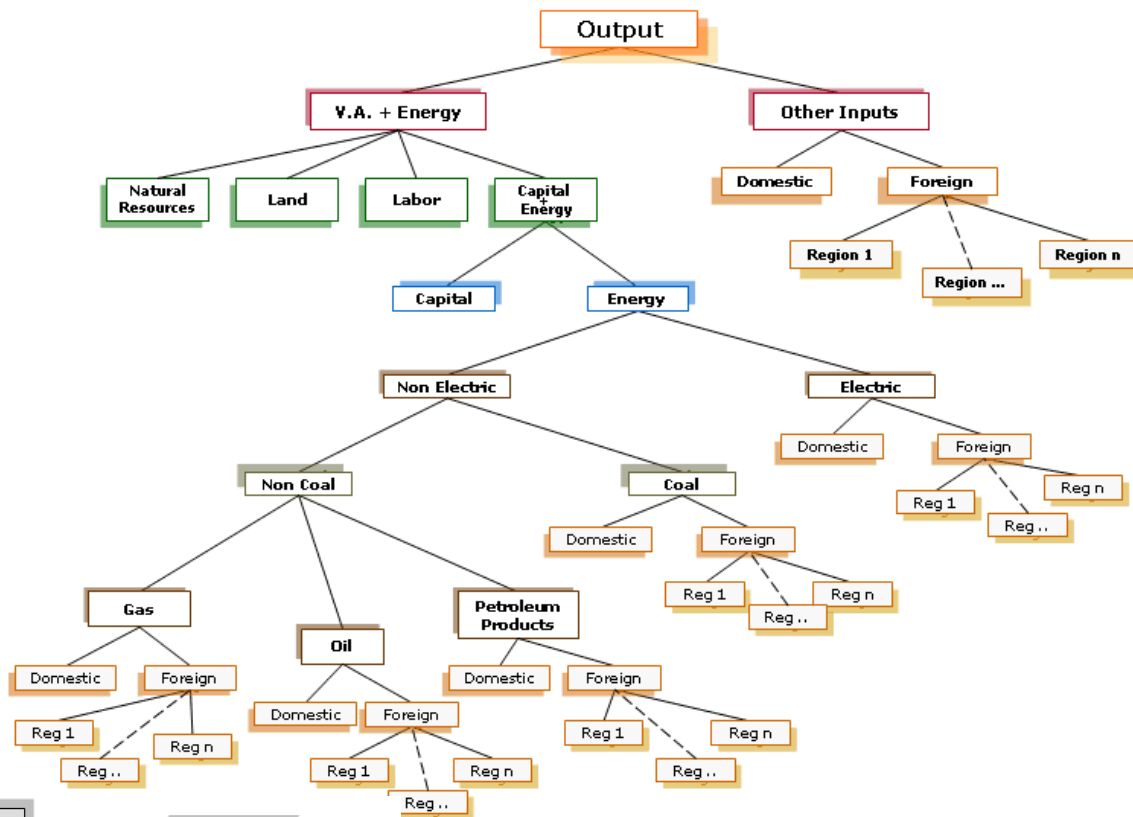
# Preamble

- **Researchers** have their own networks, communication systems, languages, priorities, tools,...
- **Policy makers** have their own networks, communication systems, languages, priorities, time scales,...
- **Stakeholders** have their own networks, communication systems, languages, priorities, preferences,...
- *Research in support to policy/decision making should – at least attempt to – bridge the gaps between the different communities, providing:*
  - ↪ **methods for managing the roles of different actors through the policy making process**
  - ↪ **scientific models coherent with conceptual models of policy makers**

# ***Research objectives***

- To propose an approach for integrating models developed by the research community within conceptual frameworks adopted by policy makers, and
- To propose an operational approach for integrating multiple sources of knowledge within a common participatory modelling for scenario analysis and decision support

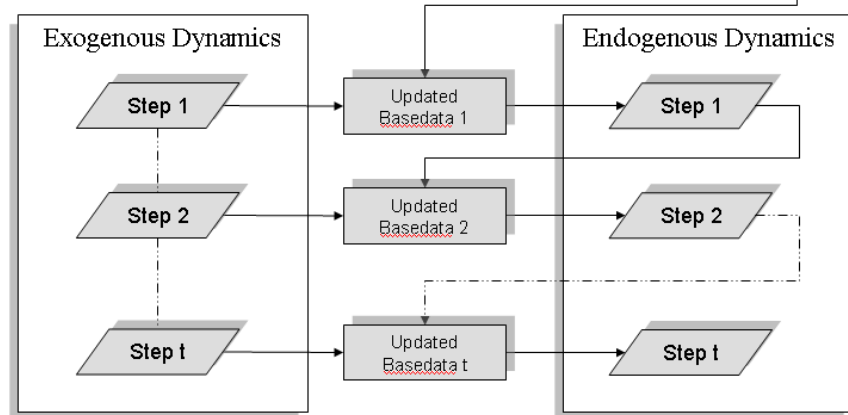
# Research: e.g. CGE model



*Preliminary Step*



*Recursive Simulation*

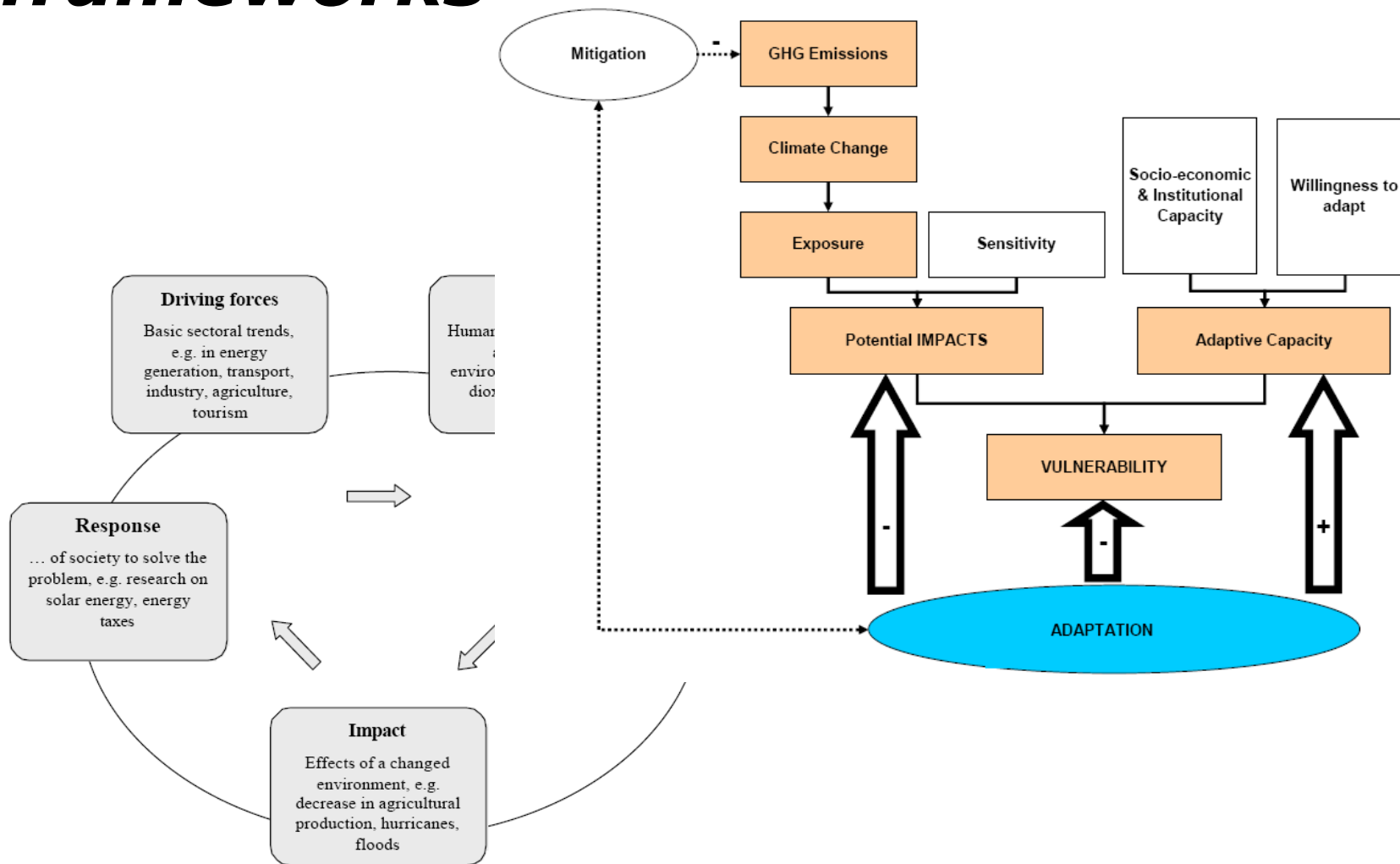


# Policy making: conceptual frameworks



COMMISSION OF THE EUROPEAN COMMUNITIES

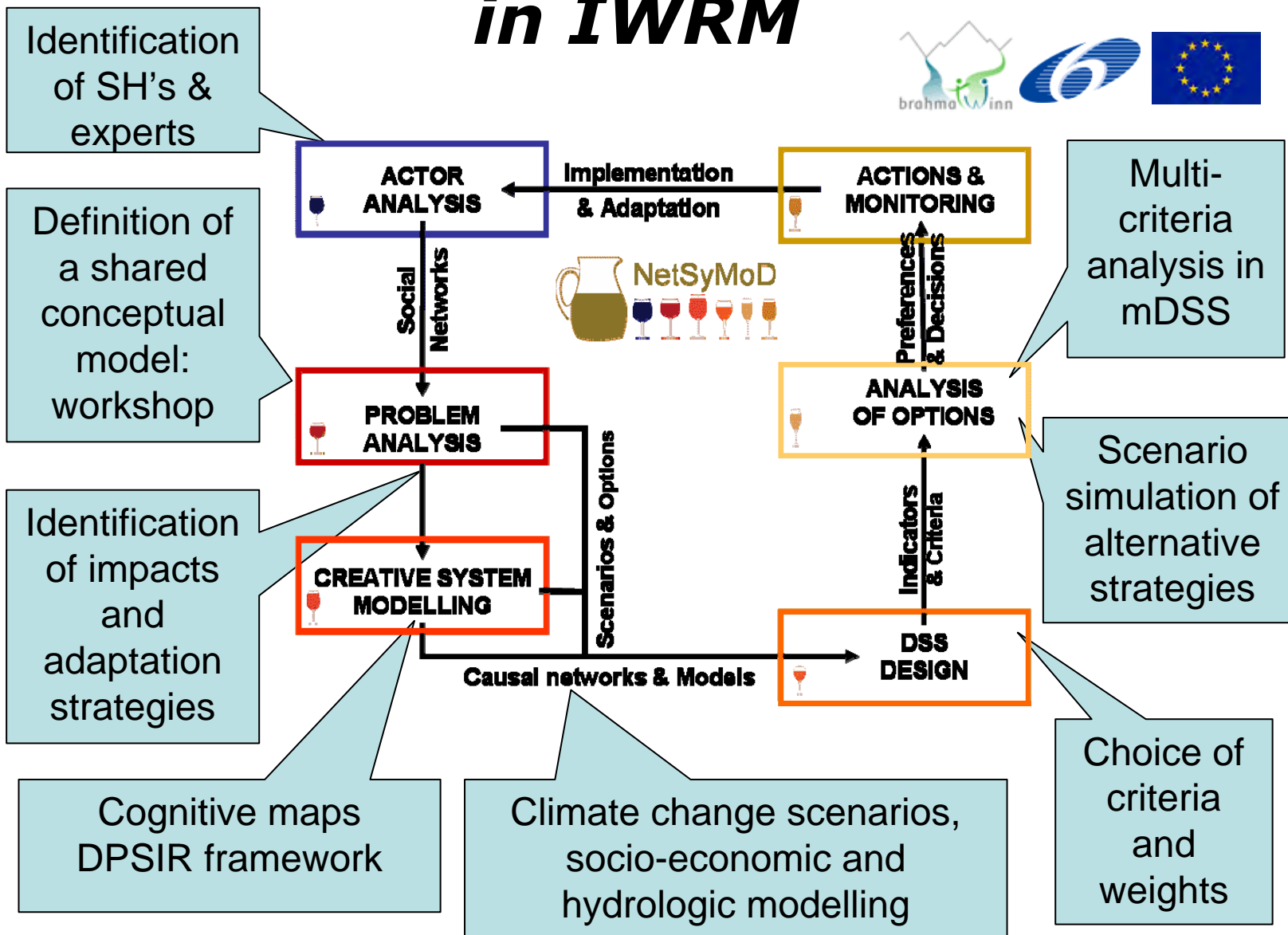
Brussels, 1.4.2009  
 SEC(2009) 387



Introduction

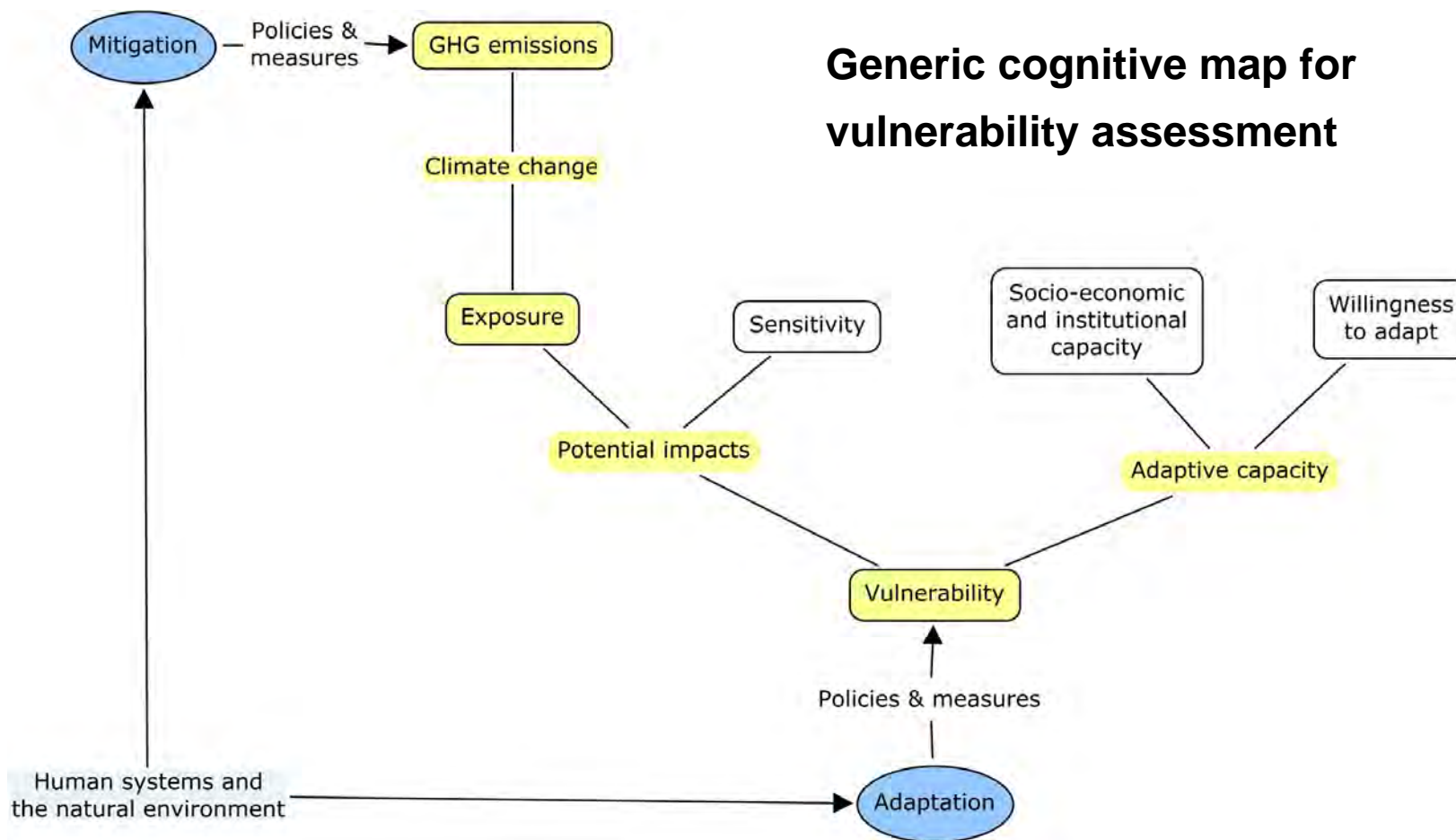


# Participatory modelling and decision support for CC adaptation in IWRM



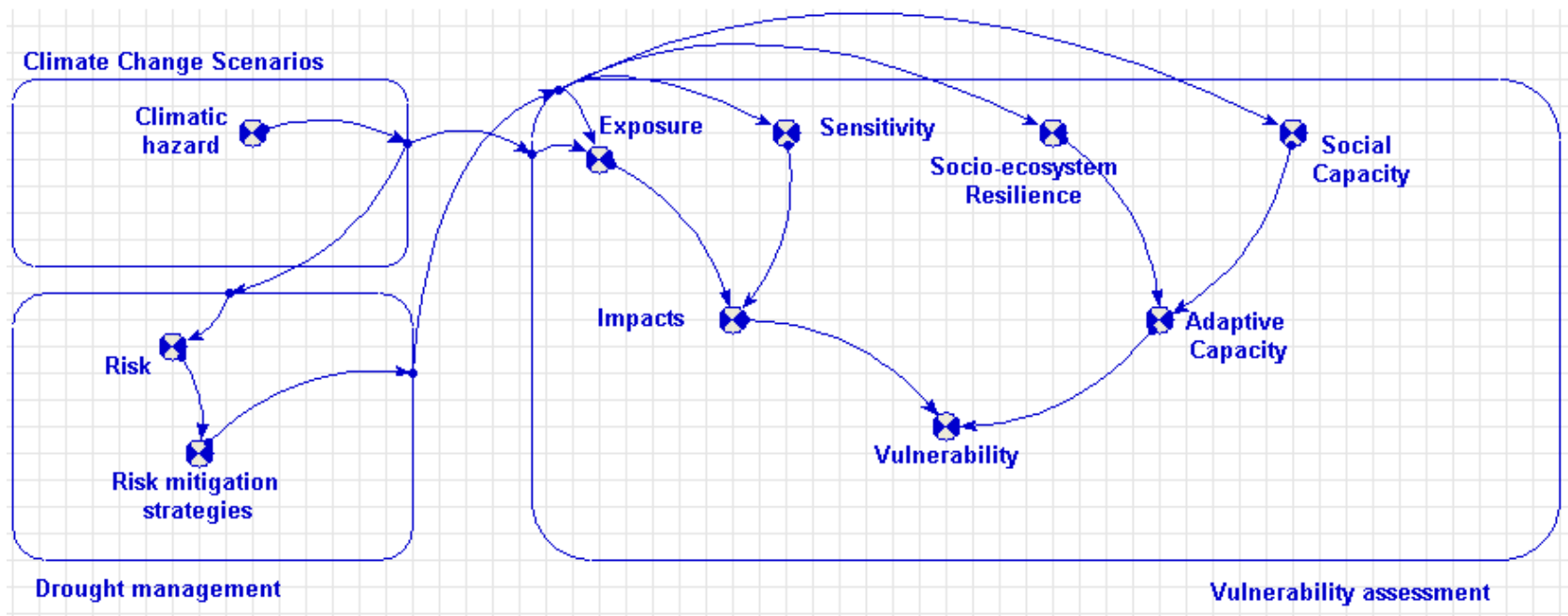
# From policy models to operational scientific models 1/4

Participatory modelling



# From policy models to operational scientific models 2/4

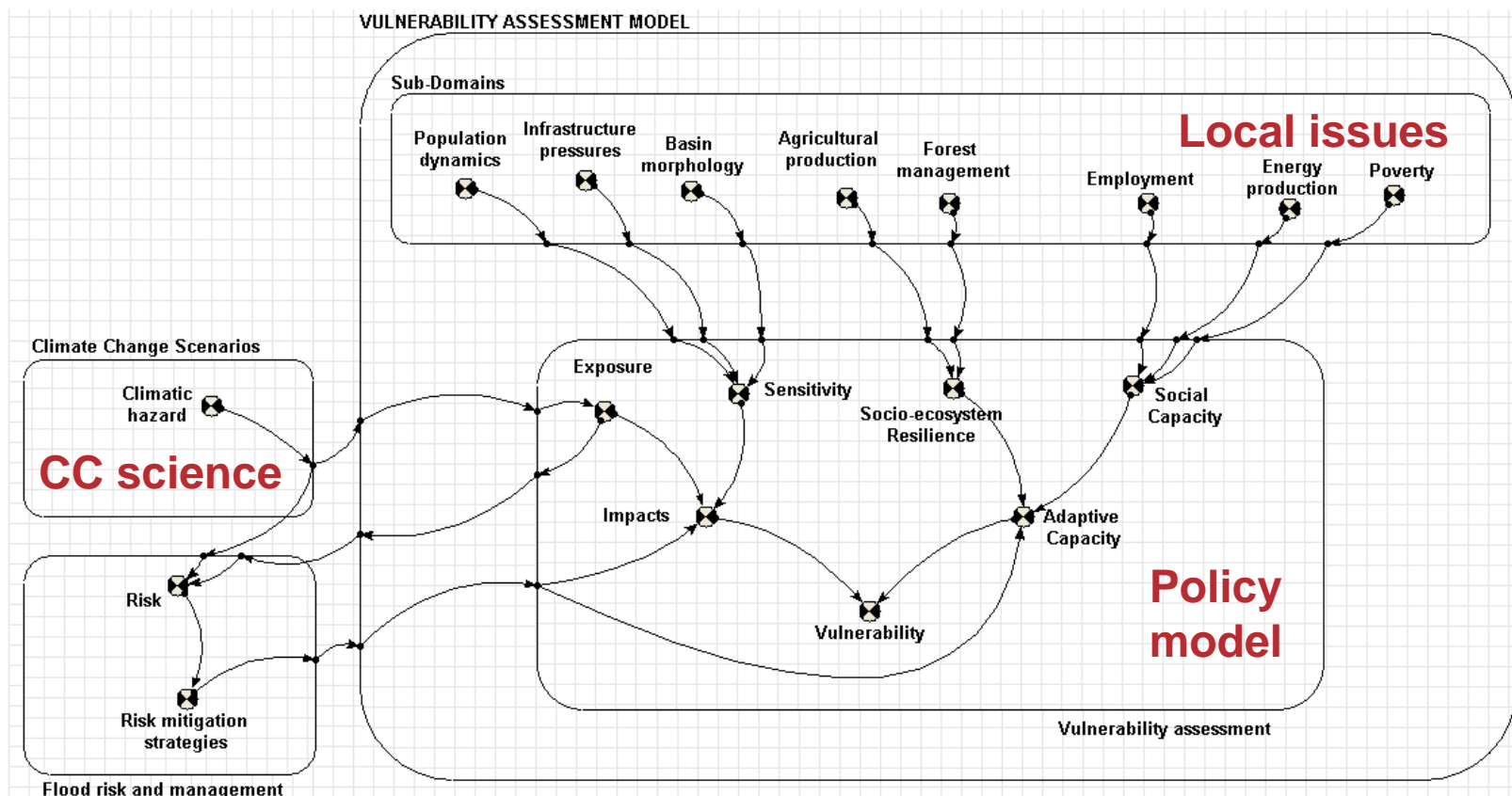
Generic dynamic model for vulnerability assessment



Participatory modelling

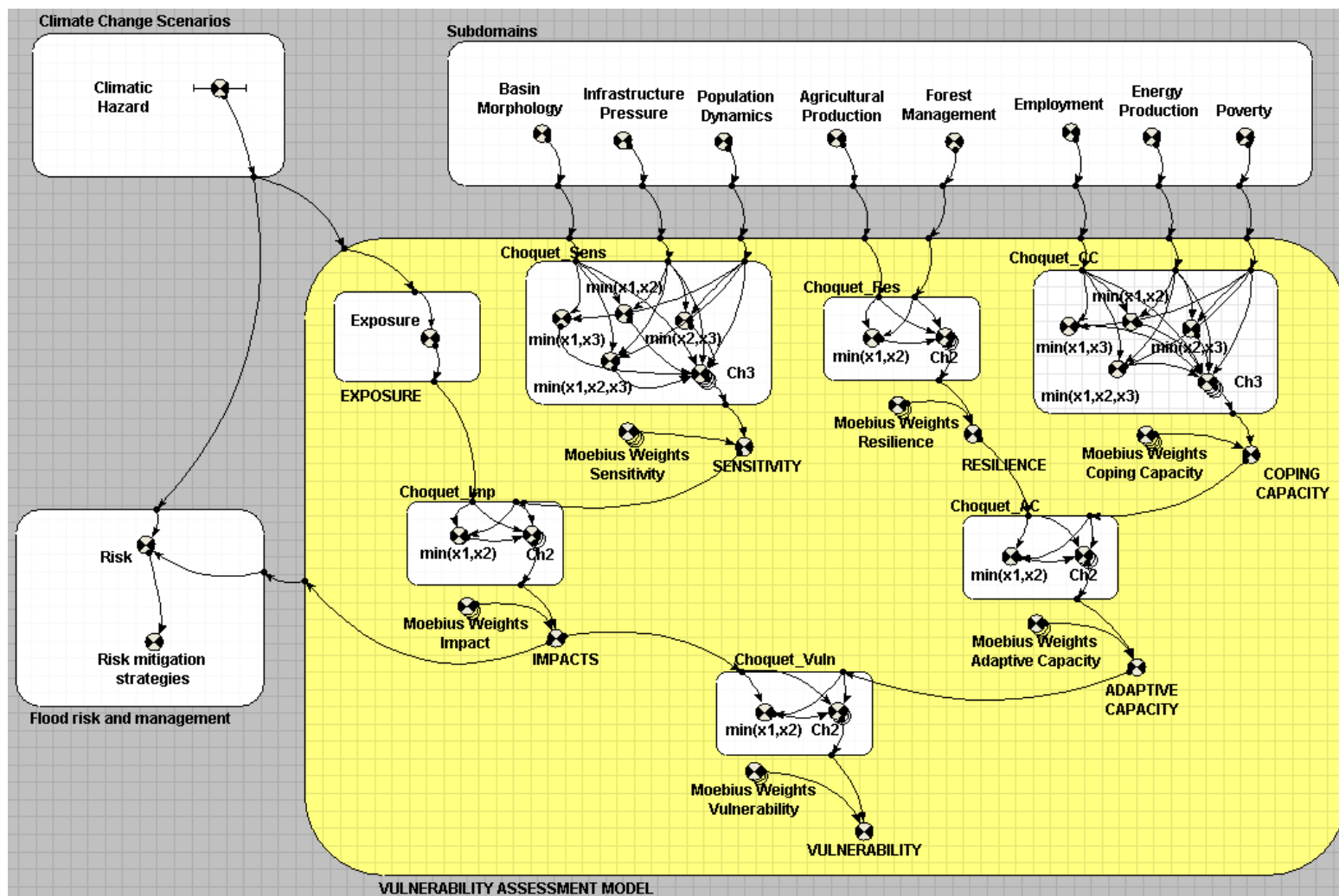
# From policy models to operational scientific models 3/4

Local implementation of the generic model through an integration framework for participatory modelling



Participatory modelling

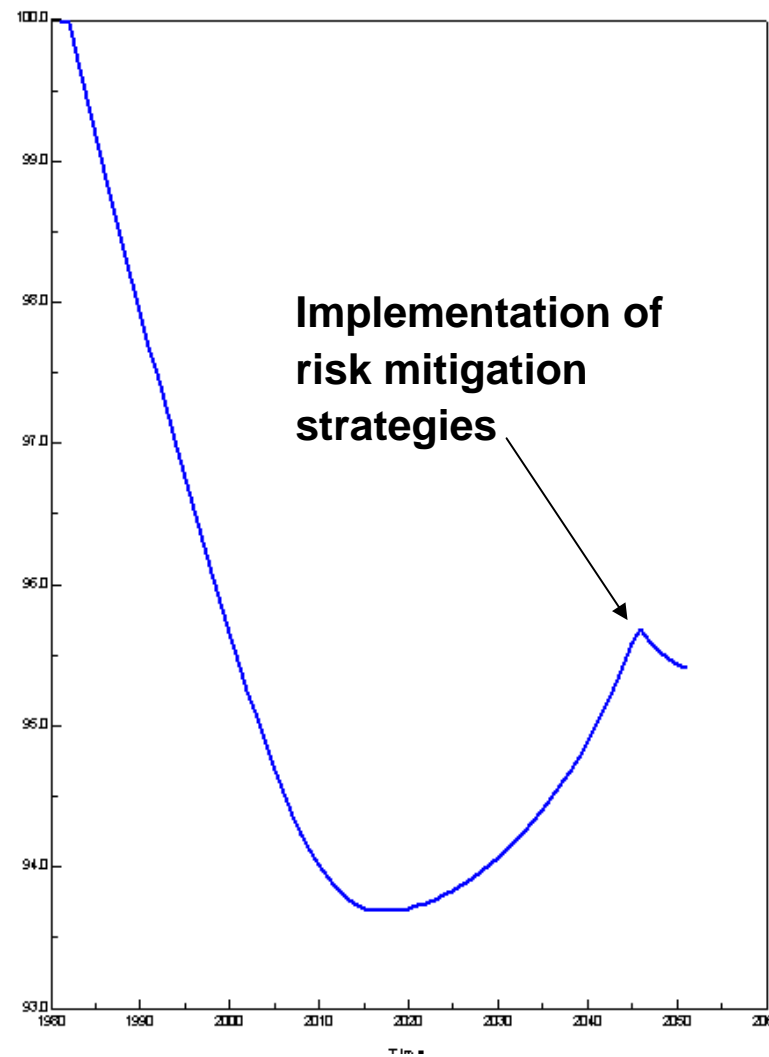
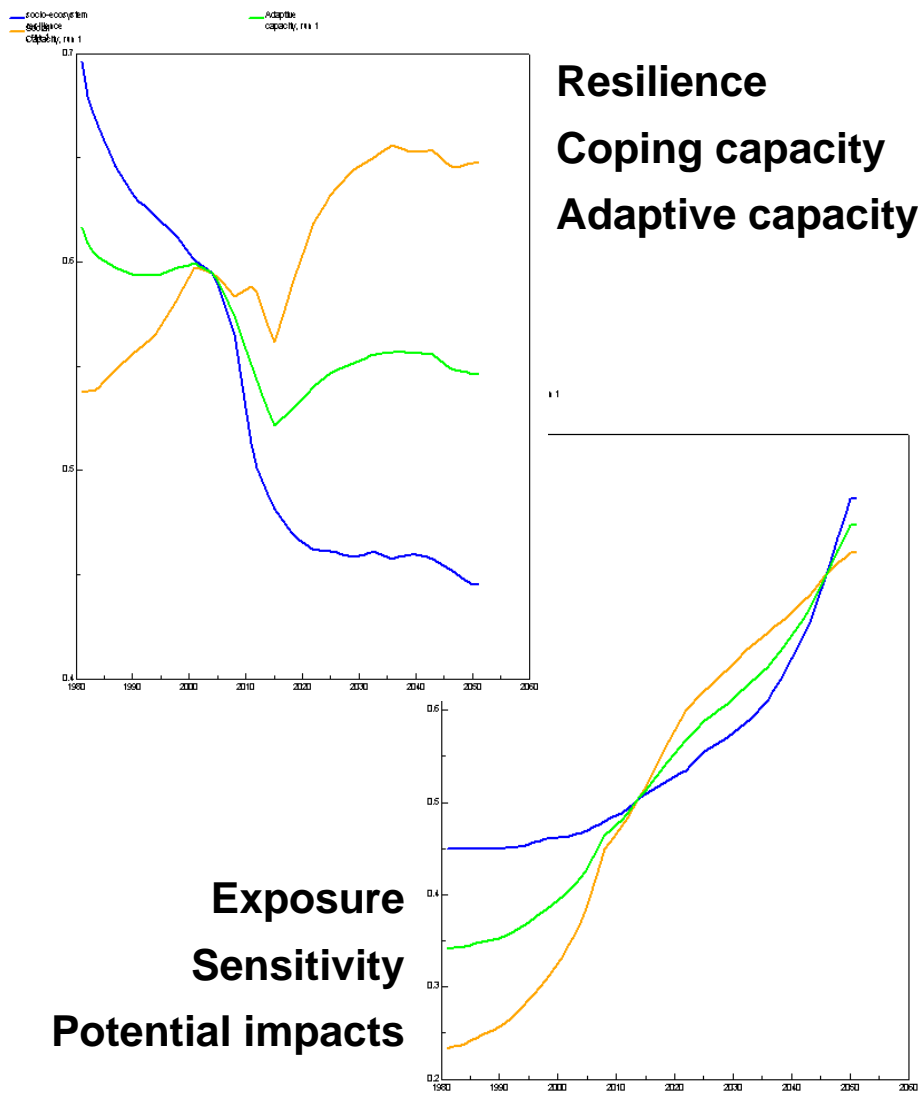
# From policy models to operational scientific models 4/4



Participatory modelling

# Model outputs

Participatory modelling



**Vulnerability**

**Exposure**  
**Sensitivity**  
**Potential impacts**

# Model outputs → inputs to the DSS

**Base DPSIR**  
 Project description: UBRB Kathmandu Workshop 24-28/11/2008

**Driving Force** → **Response**

**Press** → **Driving Force**

**Weights:**

- poverty: 0.125
- population dynamics: 0.132
- infrastructure pressures: 0.100
- vulnerability: 0.145
- basin morphology: 0.125
- forest management: 0.113
- agricultural production: 0.103

**Responses for SAW**

OPTIONS:	Score:	% (relative to 1st position)
PLANNING	0.7408	100%
GOV-INST	0.6559	88%
ENG-LAND	0.6298	85%
KNOW-CAP	0.6087	82%

**Ranking Histogram**

Legend for Ranking Histogram:

- poverty
- population dynamics
- infrastructure pressures
- vulnerability
- basin morphology
- forest management
- agricultural production
- energy production
- employment

Decision Support

**Integration of multiple dimensions:  
 e.g. cost-effectiveness analysis**

# Lessons learned 1/2

- The implementation of **simulation capabilities** and **DSS tools** within widely accepted **conceptual and policy frameworks** can significantly contribute to the uptake of research products and thus to the **quality of decision/policy making process**;
- **Integration** of disciplinary [modelling] approaches (e.g. hydrology and social science) and of sectoral policies (e.g. drought management and climate change adaptation) is an ever growing need;
- Only rarely **fully integrated assessment models** are available; more frequently different sources of knowledge must be loosely coupled, thus requiring a robust and transparent **integration framework (IF)**;

# Lessons learned 2/2

- **Uncertainty** is a major issue with many different features: e.g. u. of policy frameworks, u. about complex socio-ecosystem behaviour, u. about the future, etc.)
- Many **different application contexts** exist: **(re)use of research products** (models and DSS's) is remarkably improved by the availability of IF;
- The **feasibility** of deriving scientifically robust support to policy making from Ifs must be assessed on a case by case basis (normalisation effects, non-linearity, aggregation algorithm, etc.).

***Thank you for your  
attention!***



XEROCHORE

*An exercise to assess research needs  
and policy choices in areas of drought*