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Bridging science and policy oriented conceptual models for integrated vulnerability assessment

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ChangeS
Global Change Science and Policy



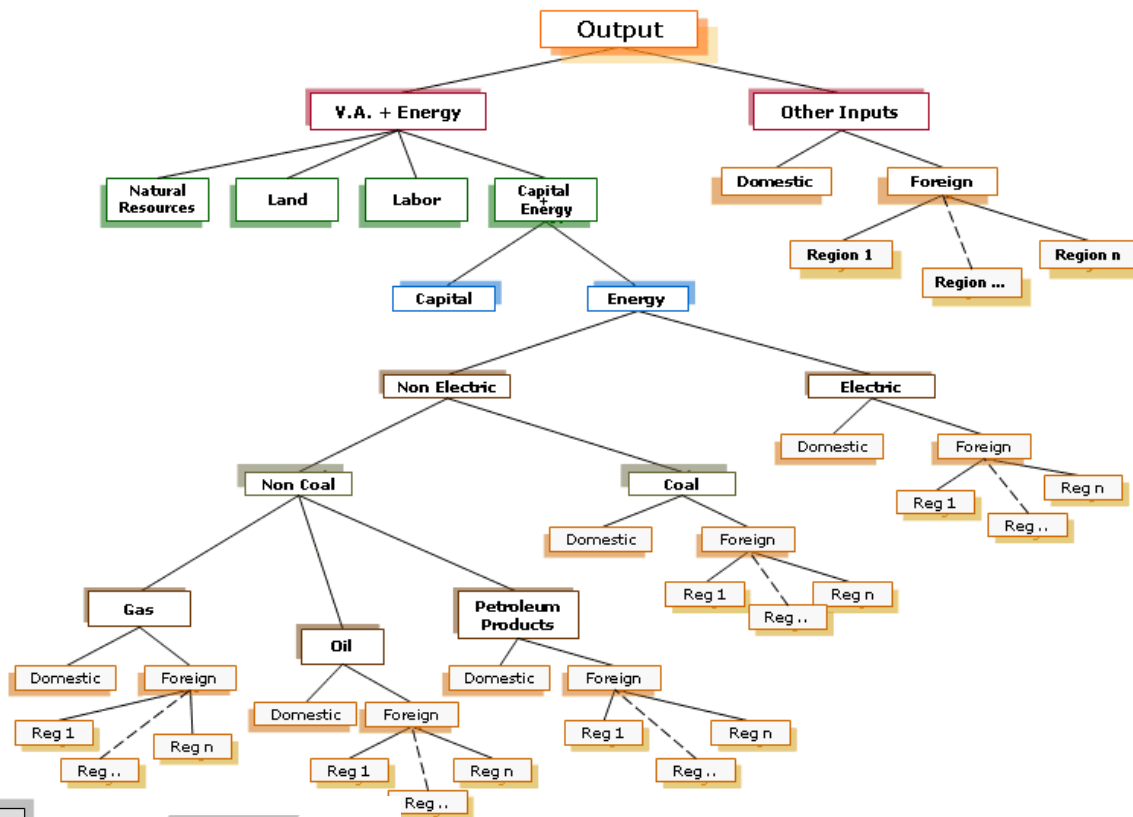
Preamble

- **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

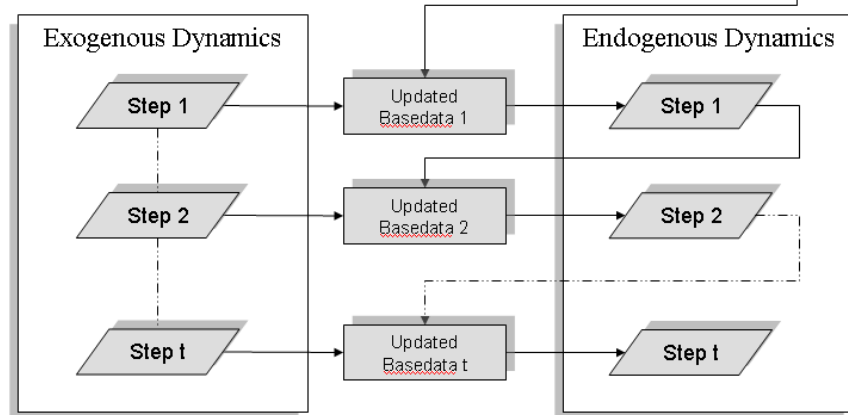
Research: e.g. CGE model



Preliminary Step



Recursive Simulation

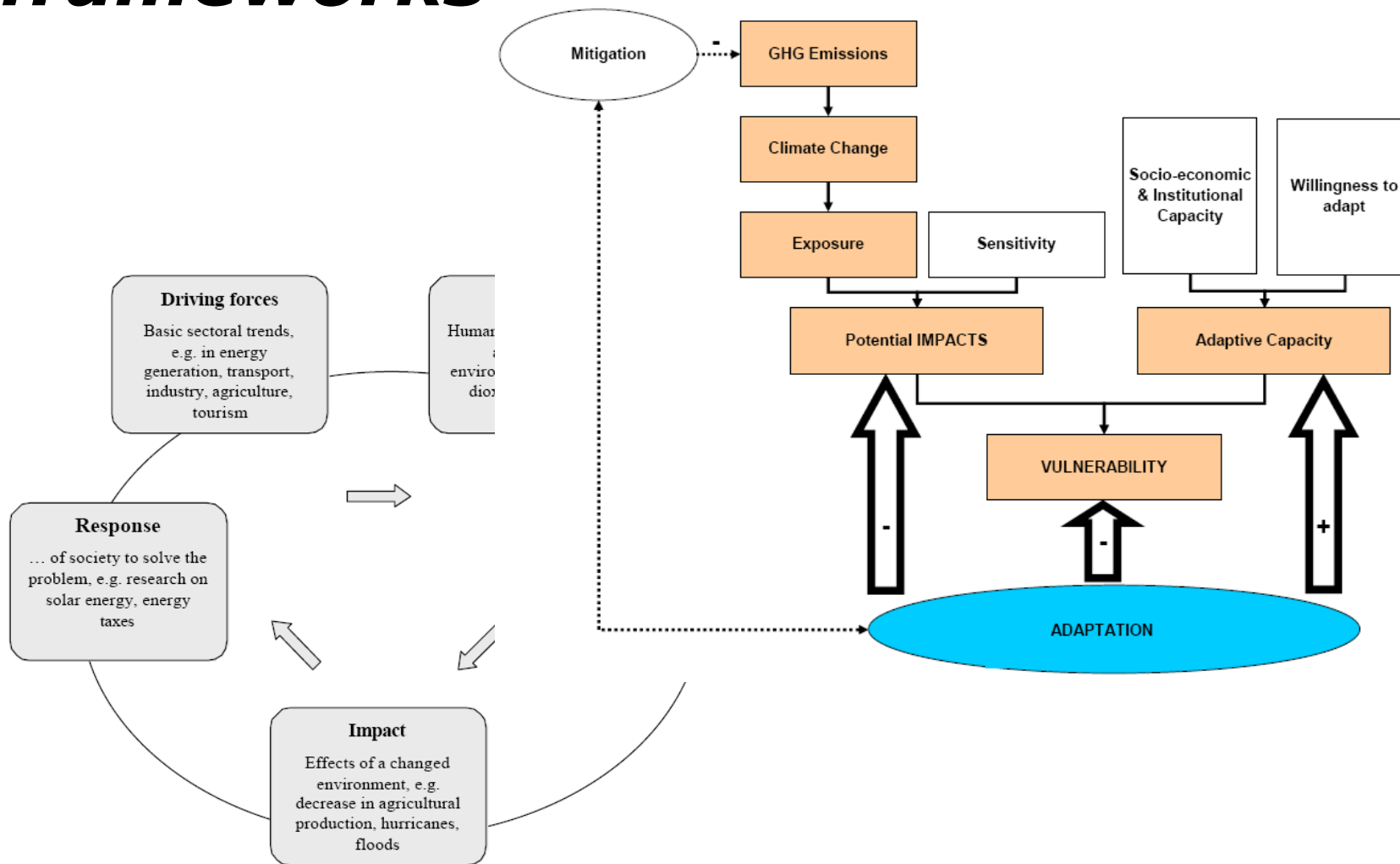


Policy making: conceptual frameworks

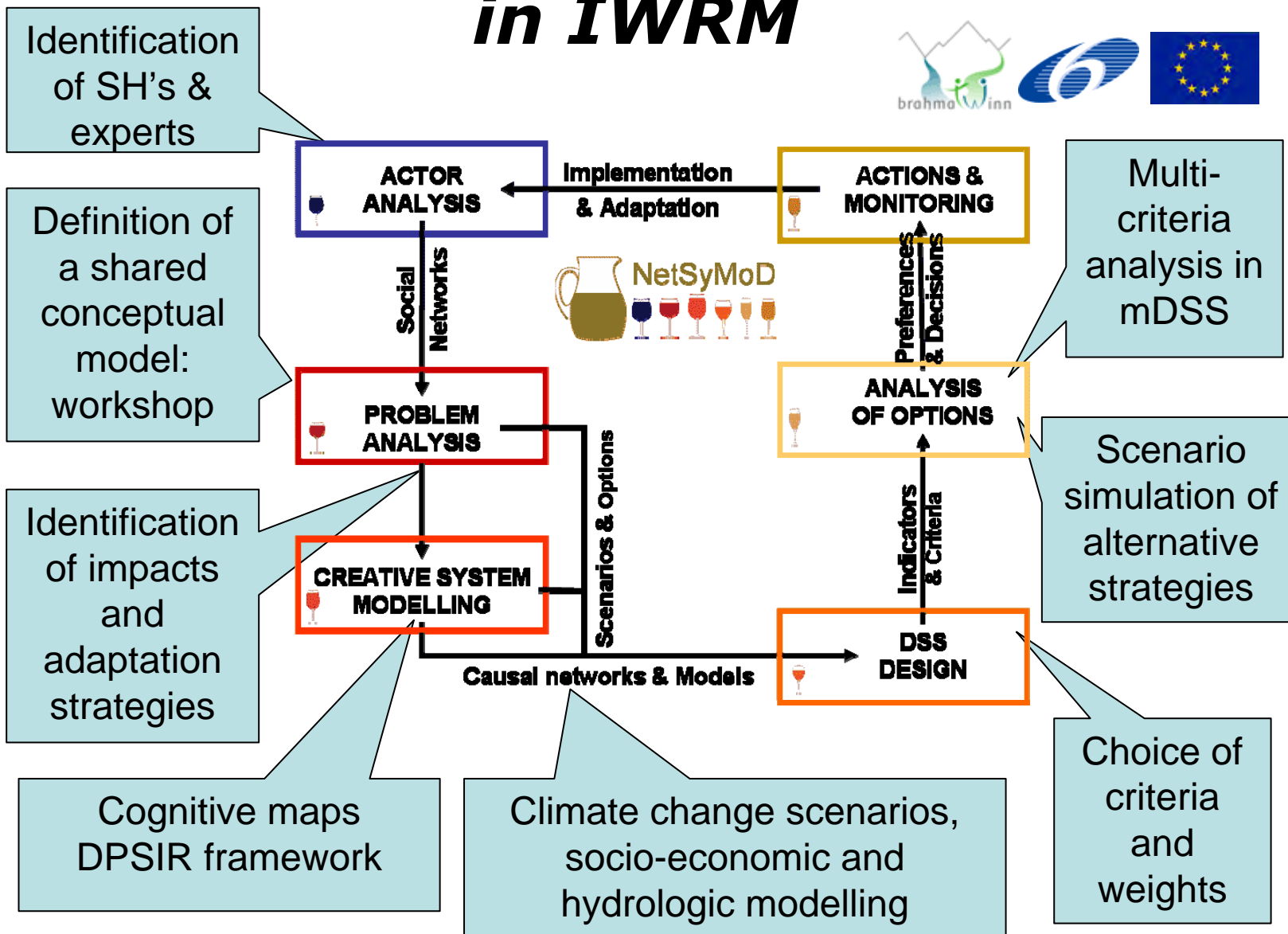


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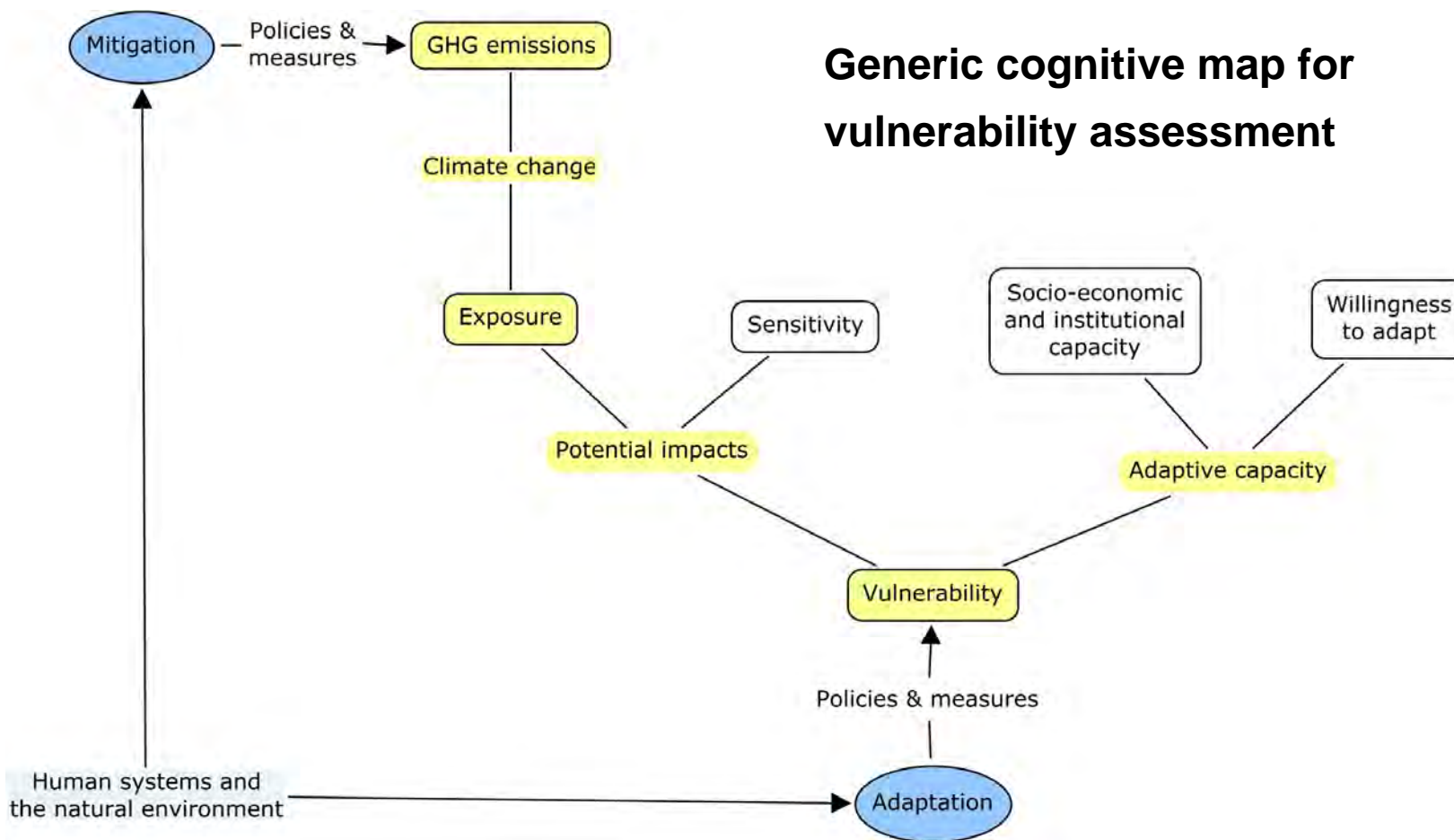


Participatory modelling and decision support for CC adaptation in IWRM



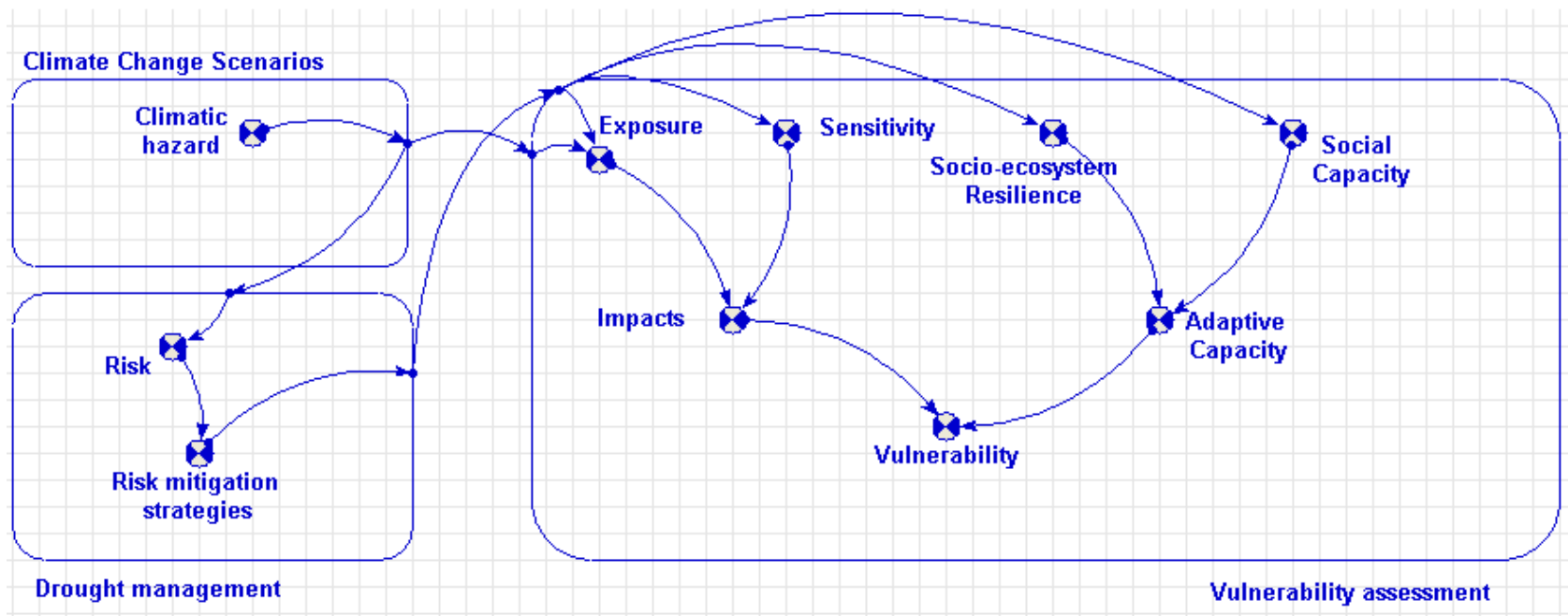
From policy models to operational scientific models 1/4

Participatory modelling



From policy models to operational scientific models 2/4

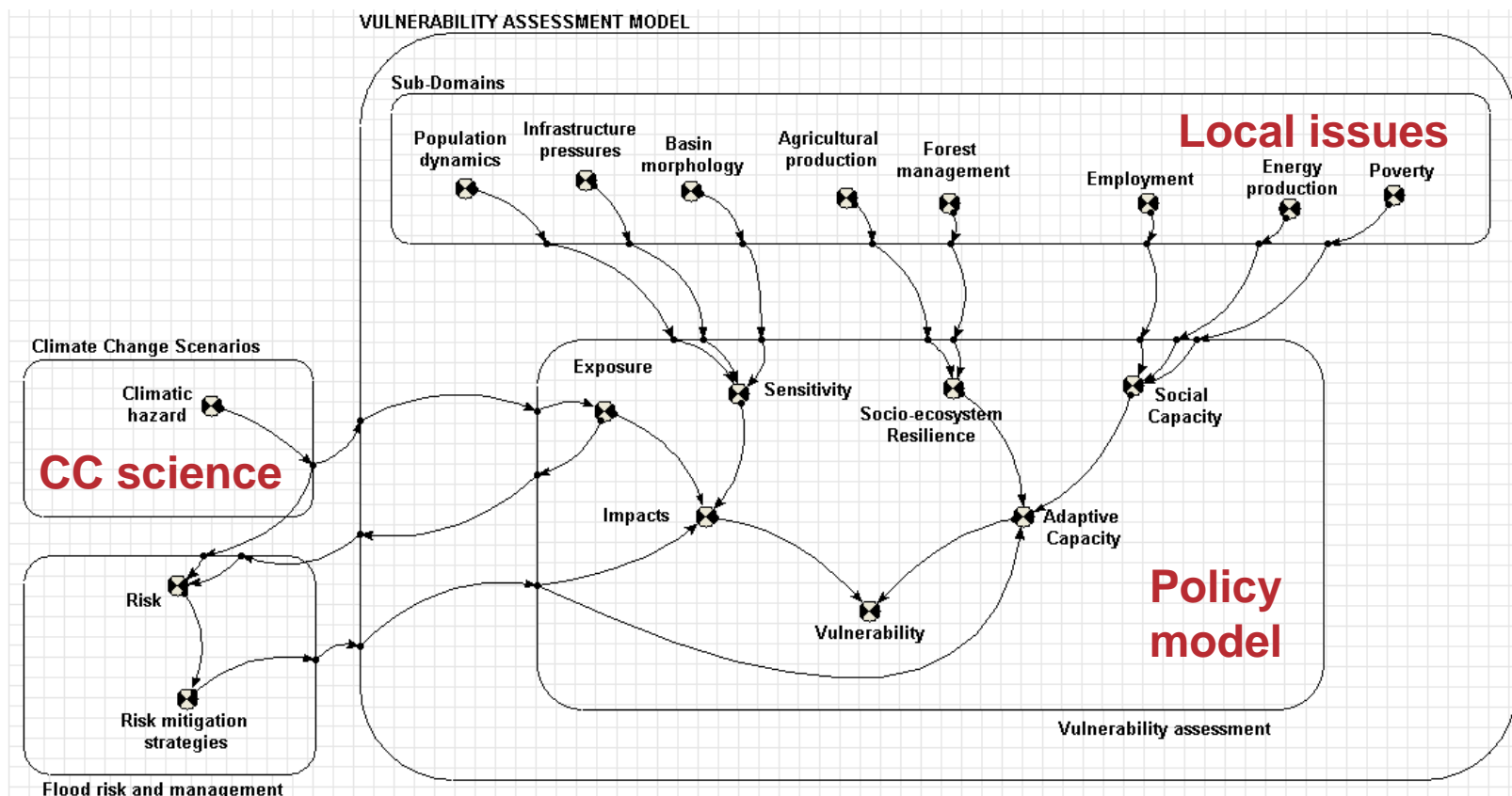
Generic dynamic model for vulnerability assessment



Participatory modelling

From policy models to operational scientific models 3/4

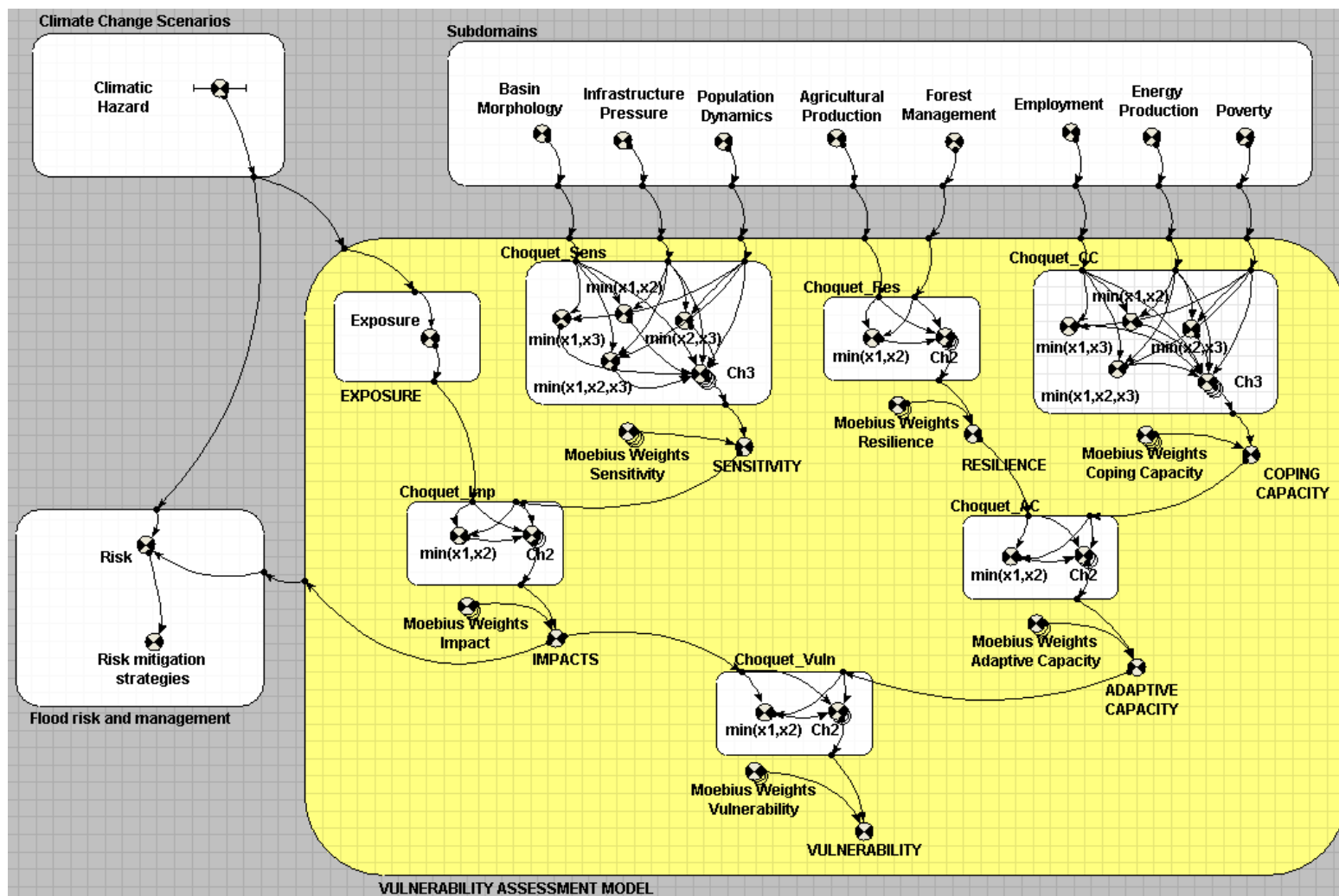
Local implementation of the generic model through an integration framework for participatory modelling



Participatory modelling

Risk management options

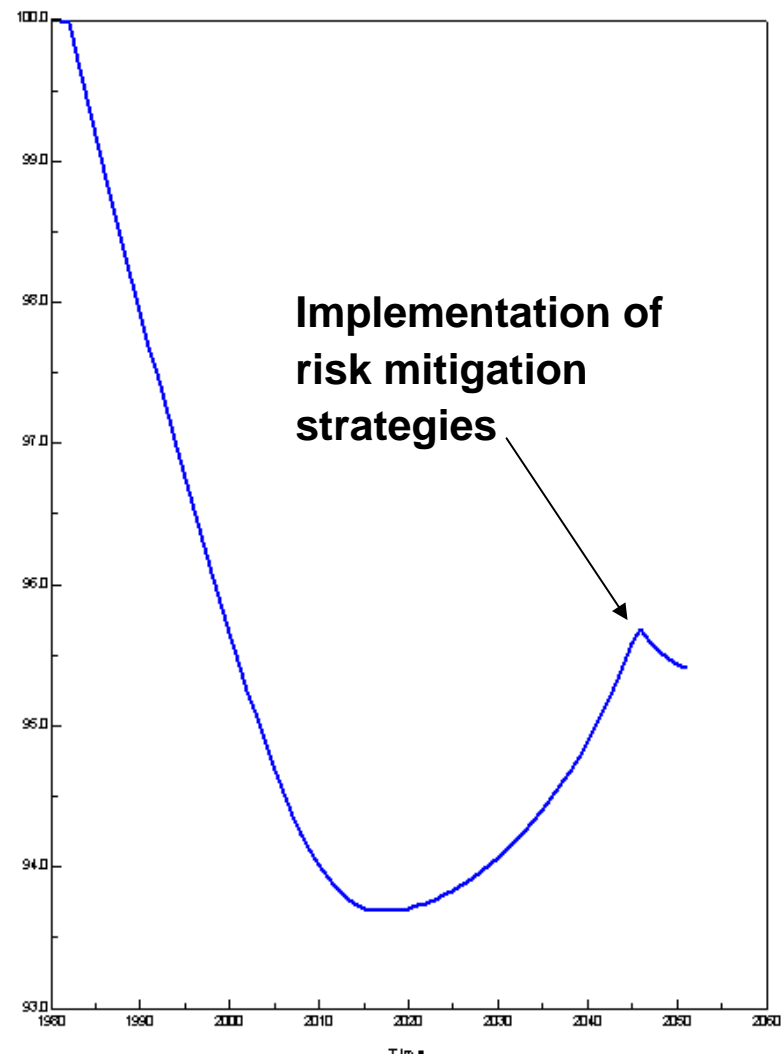
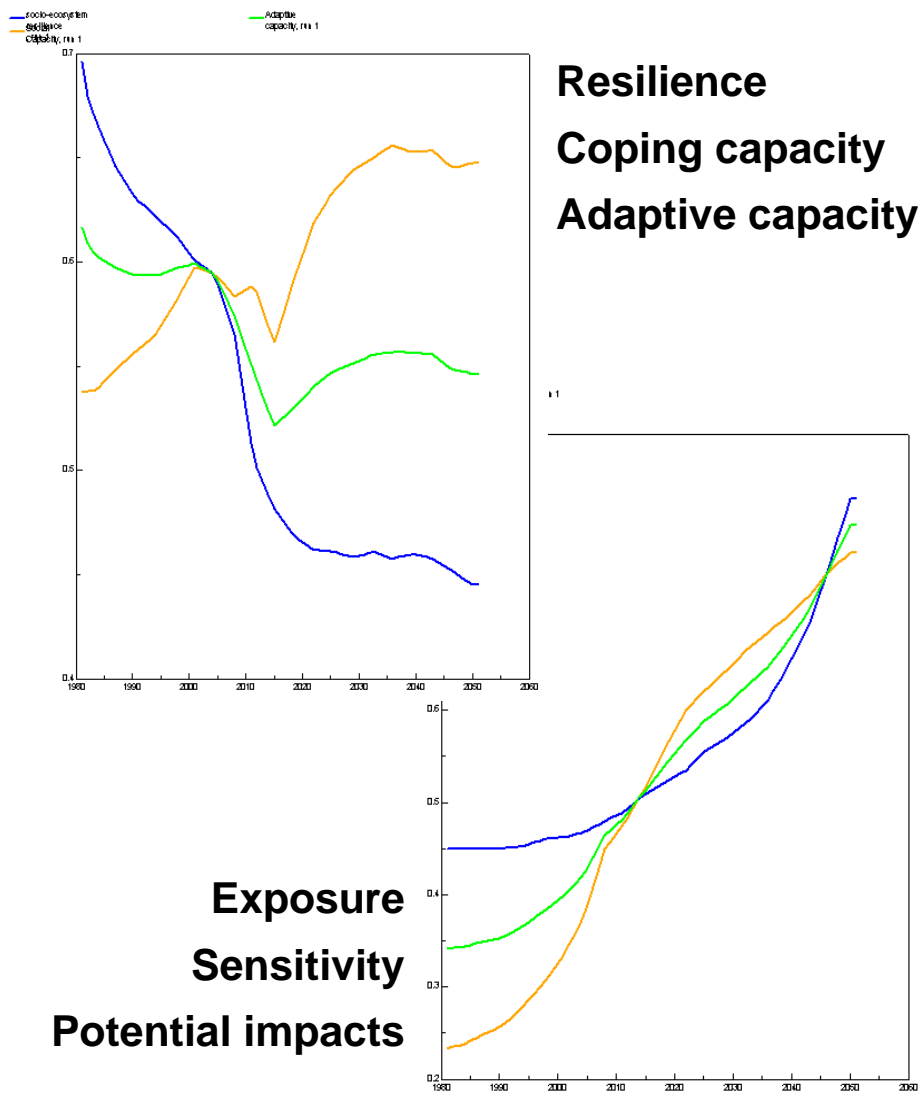
From policy models to operational scientific models 4/4



Participatory modelling

Model outputs

Participatory modelling



Vulnerability

Model outputs → inputs to the DSS

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

Driving Force → **Response**

Press (List of criteria):
 age distribution, education / information, employment, energy production, gender issues, industrial production, population dynamics, poverty, road infrastructure, service sector, water availability, water infrastructure, access to info, agricultural pr, construction s, energy consu, energy produ, healthcare de, housing settle, infrastructure, sanitation sys, urban settle, waste manag, water resourc

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:
 poverty (red), population dynamics (green), infrastructure pressures (blue), vulnerability (yellow), basin morphology (cyan), forest management (magenta), agricultural production (dark red), energy production (orange), employment (dark green)

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*