



# Interactive problem structuring with ICZM stakeholders

## The *Quasta* approach





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  - To myself
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# Introduction (1)

- To myself
  - Background in Computer Science and Environmental Sciences
    - MSc research on Qualitative Probabilistic Networks (QPNs) at RIVM
  - PhD student at Utrecht University since november 2003





# Introduction (2)

- To my research
  - Project about *Integrated Coastal Zone Management* (ICZM), together with colleague Sara Steyn
  - Personal focus on knowledge management
  - Started with investigating the applicability of *decision support systems* for ICZM
  - Since september 2005 focus on developing new approach





# ICZM

- ICZM is complicated, because:
  - knowledge from social and natural disciplinary fields needs to be combined
  - The management has to deal with stakeholders from different sectors, who have different problem perceptions





# ICZM (2)

- Lack of *science-management integration*
- Need for an *integrated* approach, aimed at *unstructured* problems
- Most existing tools for decision support are designed for structured problems
  - Decision Support Systems
  - Planning Support Systems
  - Multi-criteria analysis (MCA) tools





# Cognitive mapping

- Cognitive Mapping (CM): representation of *perceived* problem structure
- CM uses a graphical representation of *causalities* with maps:



Positive relationship:



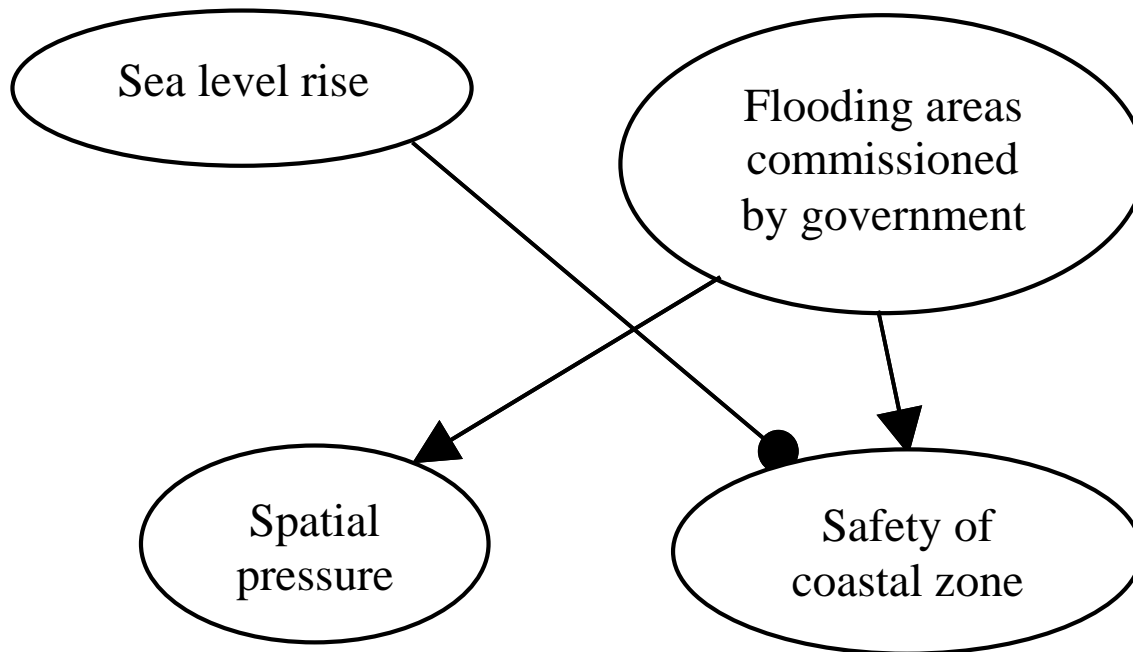
Negative relationship:





# Cognitive mapping (2)

- Example CM:





# The *Quasta* approach (1)

- Quasta: Qualitative start
- Qualitative: intentionally no quantification
- Central philosophy:
  - First step: analysis and determination of key factors and their relationships
  - In this stage, weights and strengths of these factors are disregarded





# The *Quasta* approach (2)

- Computer-supported CM
- Based on techniques from theoretical computer sciences (probability theory)
- Allows to give *directions* for concepts of the map
- Computer determines the logical consequences of these directions





# The *Quasta* approach (3)

Resulting effects on concepts:

Increase

Indifferent

Decrease

*Ambiguous*

A fixed direction is depicted with a thicker edge and bold text:

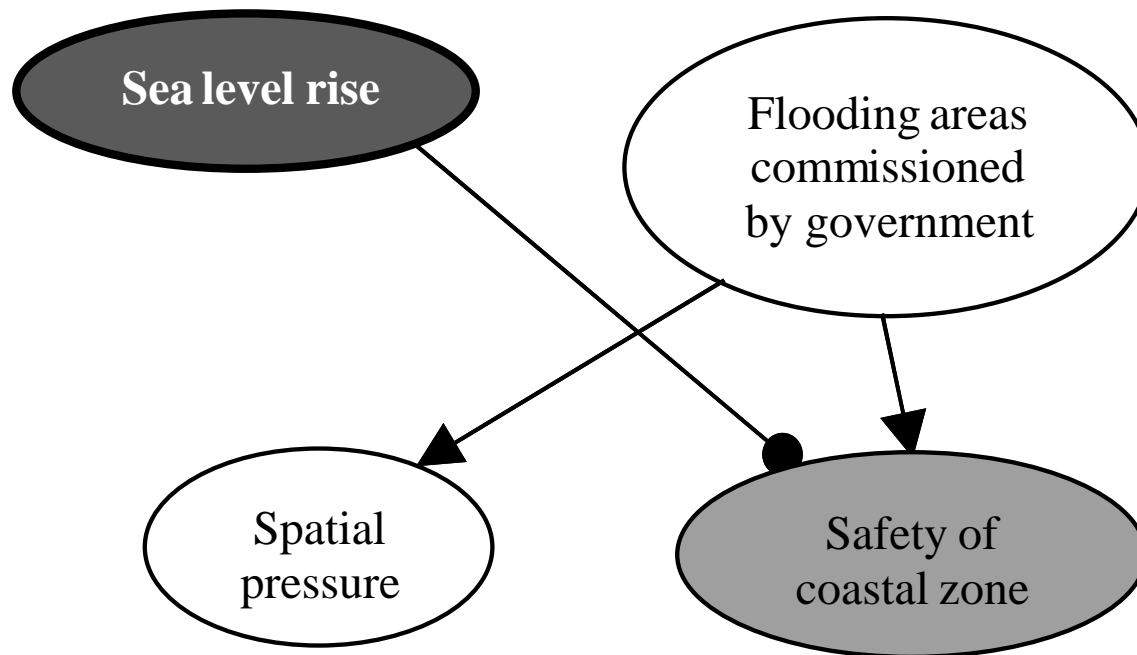
**Fixed increase**





# The *Quasta* approach (4)

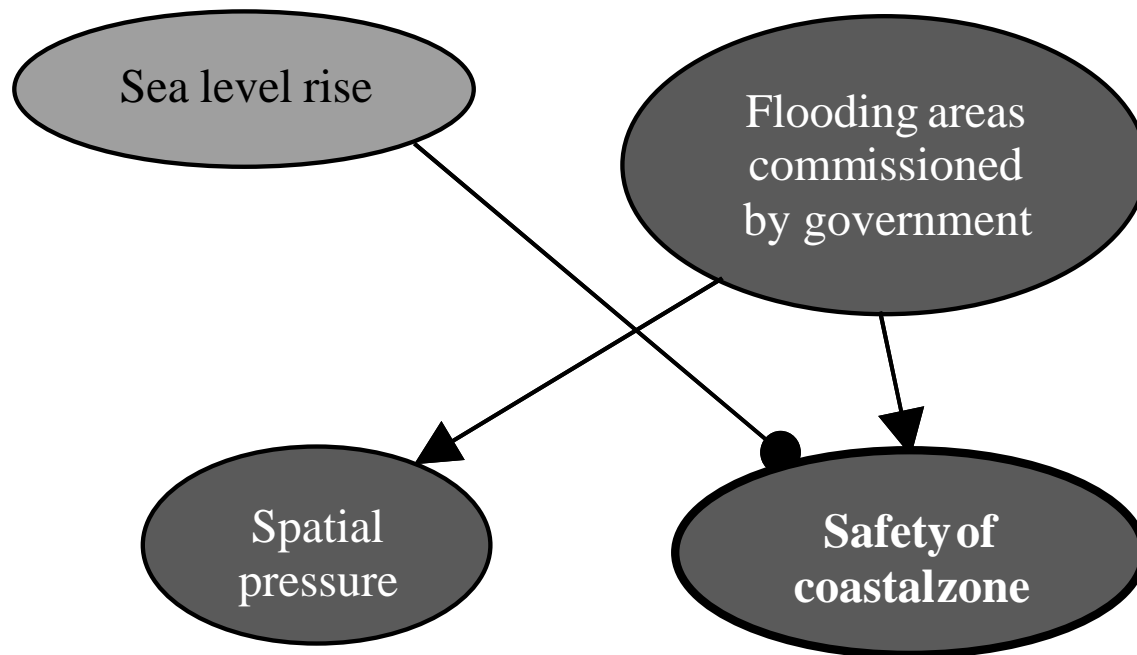
Example:





# The *Quasta* approach (5)

Example (2):





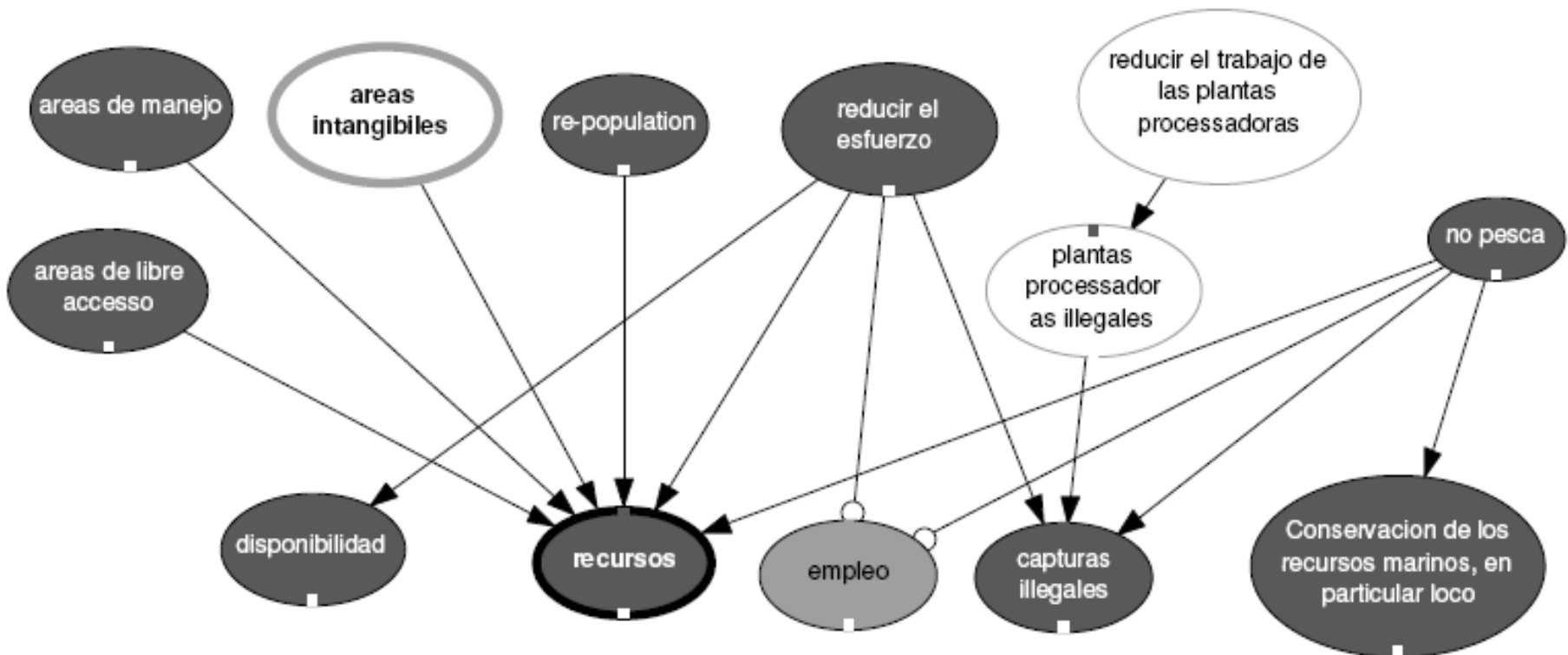
# Practical experiments

- Interactive workshops were organised to test the tool in practice:
  - In Chile we facilitated a discussion about restricted management areas for fisheries
  - In the Netherlands a discussion about sustainable living in the Dutch coastal zone was facilitated



# Practical experiments (2)

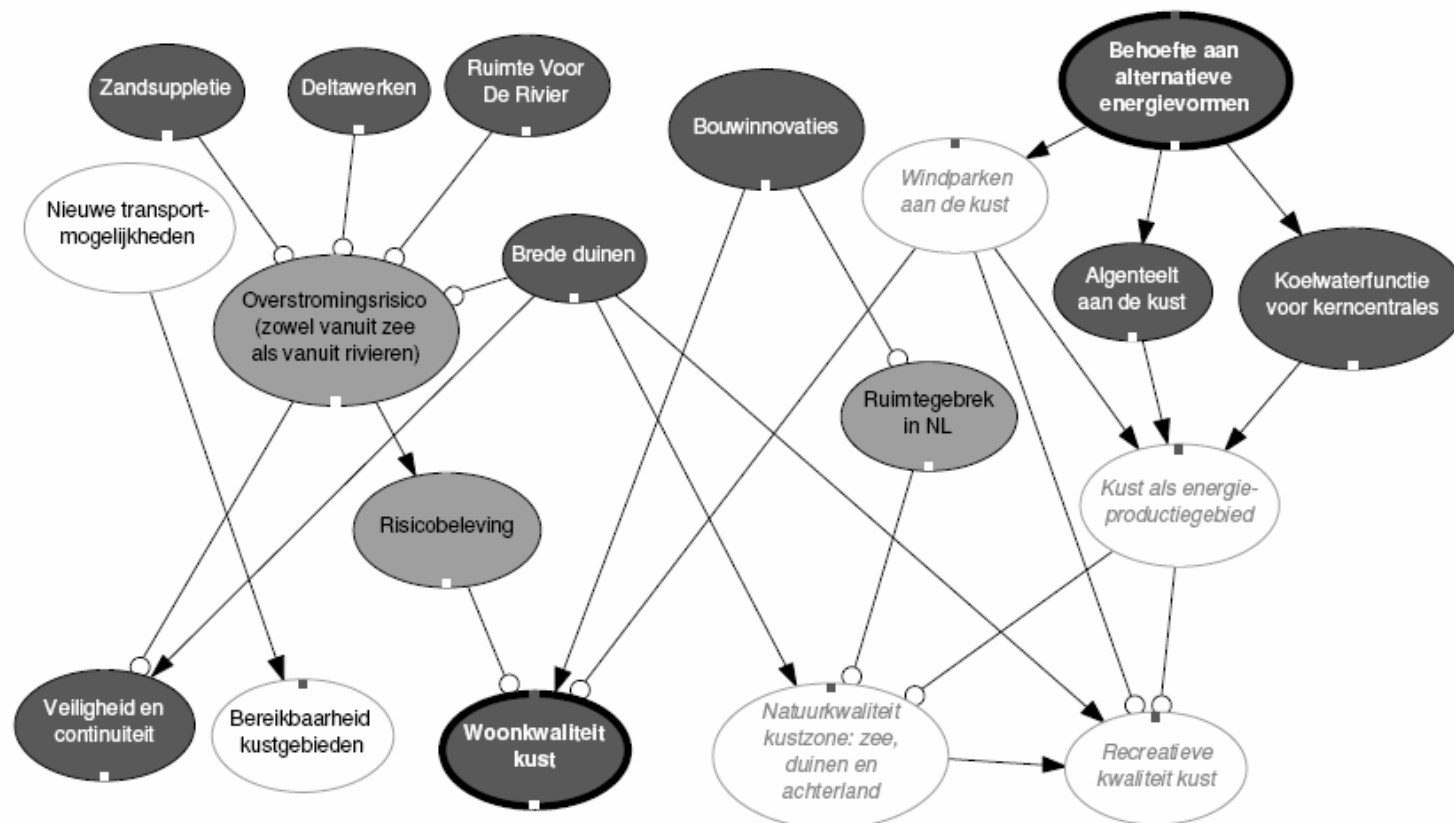
Quasta diagram from Chile:



Frank van Kouwen, March 13, 2007

# Practical experiments (3)

Diagram from Dutch workshop:



Frank van Kouwen, March 13, 2007



# Practical experiments (4)

- The duration of the workshops was 1½ – 2½ hours.
- Apart from the chairman, there was a facilitator who entered the diagrams and directions into the computer
- Workshops were evaluated by means of:
  - Questionnaires
  - Additional interviews





# Practical experiments (5)

- The evaluations confirm that:
  - Quasta helps participants to make them more aware of causal relations
  - It is useful for a qualitative exploration of scenarios
  - It identifies the need for further (quantitative) knowledge
  - There is no threshold for non-technicians





# Discussion

- Quasta allows any conceptual model to be analysed
- Problem structuring with stakeholders
- Determination of *what* is relevant
- It may support in preparing for MCA
  - it may identify variables, indicators, measures and goals

