Participatory modelling for water planning and risk management at the urban fringe

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Presentation Plan

- **Introduction**: water planning and risk management + participatory modelling theory
- **Method**: intervention research
- **Australian and Bulgarian case study examples**
- **Participatory modelling process outcomes and key insights**
- **Lessons**: discussion, conclusions and perspectives
Presentation Plan

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Water planning and risk management at the urban fringe

A range of challenges...

→ need for stakeholder involvement
Why seek to involve stakeholders in water planning and risk management?

- High levels of conflict, uncertainty, complexity
- Legitimacy of expert models and risk assessments questioned
- Ecological degradation vs. other social and economic interests
- Power and resources for decision-making and action increasingly dispersed

→ Challenging negotiations over risks and management responses based on differing stakeholder values, beliefs, relations & practices
Understanding participatory modelling

Shared representations, “models”, policies or plans

INTERACTION SPACE

Analysts / coordinators

Stakeholders / institutional representatives

DECISIONS & SIGN-OFFS
Who to engage in participatory modelling processes?

A story from one of my first research projects...

- Need for ‘multi-level’ participatory modelling processes for sustainable water management + early and in-depth engagement with decision-makers
Politics & Management

Who to engage in participatory modelling processes

Who will champion the implementation?
- Efficient decision making based on sound scientific knowledge
  - possibility for public backlash

Who specifically will make the decisions?
- Construction of socially acceptable decisions
  - possible lack of scientific bases & other associated problems

Who has the required knowledge?
- Co-sharing of knowledge and construction of scientifically valid and socially acceptable solutions
  - possible lack of power required for implementation

Who has the analytical skills?
Presentation Plan

- Introduction: water planning and risk management + participatory modelling theory

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Method: development of participatory modelling approaches to water planning

- Development & analysis of approaches through intervention research and case study comparison (cf. Hatchuel, David, Midgley)
- Using a decision-aiding process model and evaluation protocol (cf. Tsoukiás, 2005; Daniell and Ferrand, 2006)
- Pilot development and testing in Montpellier, France
Method: development of participatory modelling approaches to water planning

- Development & analysis of approaches through **intervention research** and case study comparison (cf. Hatchuel, David, Midgley)
  - Using a decision-aiding process model and **evaluation protocol** (cf. Tsoukiás, 2005; Daniell and Ferrand, 2006)
  - Pilot development and testing in Montpellier, France
  - Australian and Bulgarian regional examples

- **Focus on multi-level processes used for planning**
  - Politicians and government officials to local residents

Different “shapes” of participation are possible

- International
- Nation state
- State
- Regional
- Community
- Individuals

NGOs, businesses, scientific experts act at many levels
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Participatory modelling approaches to regional peri-urban water planning

- **Management-driven process**
  - AUSTRALIA: Lower Hawkesbury

- **Research-driven process**
  - BULGARIA: Sofia Region

- **Multiple issues**
  - Perception of climate change impacts
  - High population growth / urbanisation
  - Water conflicts: quality and quantity
  - Economic / environmental viability of industries
Example 1: Australian management-driven process

Creation of a “risk response” plan for estuary management

Lower Hawkesbury River

Use of Risk Management Standard AS/NZS 4360:2004
**Lower Hawkesbury Estuary Management Plan (LHEMP) Process**

- **Workshop 1**
- **Document Review**
  - Estuarine Processes
  - Management / Legislation
- **Estuary Report**
- **Workshop 2 (agency only)**
- **Workshop 3**
- **Written Plan**
- **Implementation**
LHEMP Workshop 1: Establishing the context

Individual values and issues cards

Card classification

Issues/values matrix

Spatial mapping

Collective discussion on estuary visions & values
LHEMP Workshops 2 & 3: Risk Assessment and Treatment

Risk assessment

Definition of risks, consequences, likelihoods, uncertainties, management

Risk prioritisation

Strategy mapping

Strategy prioritisation
Example 2: Bulgarian research-driven process

“Living with floods and droughts in the Upper Iskar Basin”

Key risk:

Example 2: Bulgarian research-driven process

“Living with floods and droughts in the Upper Iskar Basin”

Transnational
National
Regional
Community
Individuals

Key risk:

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Australian National University
Bulgarian Process Outline (1 year program)

- Individual interviews
- Workshops 1, 2 & 3
- Individual and group interviews
- Workshops 4a
- Workshops 4b & 5

(Ferrand, Hare and Rougier 2006)
Iskar phase 1 & 2 (individual groups): Situation models, visions and strategy creation
Iskar Phase 3: vertical integration, fusion & analysis of strategies, action planning

Robustness analysis of new strategies

Strategy fusion

Evaluation jury

Vertical integration

Project construction

Action plan

Spatialising of projects

Google Earth

Voting on projects
Aimed to understand three aspects of the decision-aiding process

- Organisational decision-making processes
- Participatory stakeholder processes for planning/policy-making
- Overall intervention outcomes

<table>
<thead>
<tr>
<th>Phase</th>
<th>Objects of interest</th>
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| **Context** | • Objectives, feasibility, existing situation (Bellamy et al., Mazri, Ostenello and Tsoukiàs)  
              • Roles and relations (Creighton, Katzenbach and Smith) |
| *ex ante*   |                                                                                      |
| **Process** | • Changes (i.e. “ENCORE” - Ferrand)  
              • Planned vs. implemented process (Argyris and Schön) |
| *monitoring*|                                                                                      |
| **Results** | • Final impacts: effectiveness, efficacy, efficiency (Marsh et al., Checkland)  
              • Innovation (Hatchuel) |
| *ex post*   |                                                                                      |
Bulgarian process: participant evaluation

- **Systematic**: ex-ante, after each workshop, ex-post
- **Example Results**: Perceived depth of learning

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<td>WS5</td>
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- I have learnt more about floods and droughts
- I have learnt more about other stakeholders' points of view and relations
- I have learnt more about the impacts of certain flood and drought management options
Introduction: water planning and risk management + participatory modelling theory

Method: intervention research

Australian and Bulgarian case study examples

Participatory modelling process outcomes and key insights

Lessons: discussion, conclusions and perspectives
Common process outcomes

- Action plan creation (with the aid of computer processing)

- Evaluation results very similar in both processes
  - Increased open sharing of visions and opinions
  - Individual and collective learning (greater depth in Bulgaria)
  - Capacity to successfully manage conflicts
  - Some impacts of the processes on governance and water system sustainability starting to be observed (greater depth in Australia)
Australia (estuarine risk management)
- Difference in key values for sustainability of the estuary (triple bottom line vs. ecologically based sustainability)
- Participating stakeholder acceptance of risk evaluation model and results – despite some results not matching intuition
- Key conflicts over treated waste water releases managed successfully

Bulgaria (flood and drought risk management)
- Integration of technical and non-technical options (infrastructure, community organisations, education, insurance)
- All levels of management still face other perceived issues: finances, institutional coordination, corruption, social capacity, pollution
Procedural insights from example processes

- **Successful multi-level dialogue**
  - Local residents ↔ ministers (Bulgaria) on complex issues
  - Harnessed advantages of procedural equity & inequity

- **Multi-institutional groups for organisation**
  - Researchers, private consultants, government officials, NGOs
  - Participatory process design negotiated and “co-engineered” for contextual constraints

→ need to appreciate and manage divergent objectives of organisers and analysts

→ There are two participatory processes to organise!
Situating the co-engineering process

Co-engineering process

- ORGANISATIONAL DECISIONS

Participatory modelling process

- WATER MANAGEMENT PLANS AND POLICIES

EVALUATION

Feedback

SOCIAL-ECOLOGICAL SYSTEM PROCESSES AND WATER MANAGEMENT ACTIONS
Content of the co-engineering process

Co-engineering process

- Sponsors / funders
- Managers
- Supporters
- Designers
- Evaluators
- Promoters
- Facilitators / moderators
- Analysts / modellers
- Translators

Co-initiation
Defining:
- Problem scope
- Methodology proposition
- Resource needs
- Contracts

Co-design
Choosing:
- Problem focus
- Processes
- Methods
- Participants
- Evaluation program

Co-implementation
Realising:
- Participant invitation
- Logistics organisation
- Facilitation
- Modelling
- Analysis / synthesis
- Evaluation
- Promotion

Participatory modelling process
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Discussion – understanding the subjective nature of risk management

- Risk management is highly subjective
  - Many parts of risk management are values-based
  - Individual stakeholder assessments vary
  - Knowledge is dispersed and commonly contested
  - Participatory multi-level assessments
    \(\rightarrow\) Need to seek inter-subjective agreements for action

- Participatory modelling approaches can save time and money
  - If well co-engineered and monitored
  - If they have leaders and finance to support them
Discussion – roles and limits of models in participatory planning processes

- Some models are interesting and some are useful
  - They change our perspective on the world
  - They can help us to make specific decisions
  - Complexity is a major challenge
  - Specificity of questions to be investigated is important

- Sometimes the participatory modelling process is more important than the model content
  - It can help decision-makers gain legitimation for action
  - Model validity is not always a key concern of stakeholders
  - Simple analytics that support collaboration

- Sometimes engaging stakeholders in modelling is not necessary or a good idea – learn when it is appropriate
Growing need to accommodate new residents and development

Scarcity of resources (e.g. land, water, energy, air) and numerous potential risks likely to lead to growing conflict

Growing environmental footprint of cities problematic – long term planning important for maintaining quality of life

Challenges include

- Who ought to be involved in decision-aiding and how?
- Who has the power to organise how decision-aiding processes take place?
- How to effectively include relevant expertise and models in these processes
Conclusions and perspectives: lessons for successful participatory modelling

- Developing a strong common purpose for the exercise
- Remember there are two participatory processes to organise!
- Having key implementation (and decision-making) champions involved in the core co-engineering team
  - This helps appropriation of the process, models and results
- Spend time understanding the (multi-level) decision-making environment, culture and politics
Conclusions and perspectives: lessons for successful participatory modelling

- Remain flexible, adaptive and responsive to learning
- Seek advice and use engagement expertise for high-risk processes (research informed practice)
  - There is a large literature on and research community that specialises in participatory process design and implementation
  - Include participatory process specialists in the co-engineering team
  - Develop communities of practice that can support co-engineering and participatory water planning and risk management processes
Acknowledgments

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Thank you for your attention
Questions or comments?

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Or see the following 2012 book / 2010 paper references: