

Perspectives in Integrated Water Resources Management in River Deltas

M. Haasnoot (Deltares, Utrecht University), A. Offermans (ICIS-Maastricht University), E. van Beek (Deltares/ Twente University), H. Middelkoop (Utrecht University), P. Martens & P. Valkering (ICIS-Maastricht University), W. van Deursen (Carthago), R. van der Brugge (DRIFT), M. van Lieshout & N. Rijkens (Pantopicon), J. Kwadijk (Deltares), J. Beersma (KNMI)

Introduction

Water management faces major challenges to cope with potential global change impacts, and the inherent uncertainties surrounding future developments. Apart from uncertainties in the physical environment (e.g. climate change, increased discharges), and socio-economical context (e.g. demography, economic growth) there are also uncertainties in the societal response.

Deltas are areas which are most at risk. Without robust management strategies and adaptation paths, humans and nature may suffer severe damage and we may be forced into sudden unplanned actions which are more costly and less appreciated than taking actions right now. Therefore, it is valuable to assess the consequences of different water management strategies under different future developments

The project has three main objectives:

1. To assess the vulnerability of river deltas for global change;
2. To develop a method to identify robust and flexible adaptation strategies in river deltas under uncertainty, taking into account different possible and integrated scenarios for the physical, socio-economic and social system; and
3. To support long-term robust and flexible water management policies by giving methodological recommendations.

Robust strategy: Strategy which is effective under different future developments in physical and social environment.

Flexible strategy: Strategy which can be adapted to changes in the physical and social environment, e.g. reversibility and relative easy to change.

Timeline

In 2007 the project passed through an inception phase, following on the NOP project. In the next 4 years (2008- 2012) the method will be further developed by refining theories, elaborating the method for an imaginary case and experimenting with the method in different river deltas.

Methods

We use a transdisciplinary approach in which social and physical sciences are integrated. The underlying conceptual approach is the model of Pressure, State, Impact, and Response (PSIR). A central concept in this study is the concept of 'Perspectives'.

For the assessment and understanding of social perspectives and their dynamics, a combination of qualitative and quantitative methods will be used including, desk research, questionnaires/ perspective table, open interviews, participatory stakeholder workshops, transition approach, scenario analysis.

Societal responses: (changes in) how a society thinks about water management, which goals and values they aim at and their (non) support towards policy strategies.

Perspectives table

The perspectives table will be used to assess and visualize perspectives and perspective changes. The shaded cells indicate an imaginary perspective. A real life perspective usually exists of a combination between two or more stereotypical perspectives.

Water value	Diverse functions	Restfulness & Space	Prosperity and self-development
Perception water problem	Serious but controllable	Big problem	No problem
Climate change	Average trend	Extreme trend	Minimal trend
Socio-economic context	Average trend	Minimal growth - shrinkage	Extreme growth
Priorities water functions	Preservation and win-win	Compensation and ecology	Innovation and economy
Managing safety	Flood prevention	Avoid certain areas	Adaptation-utilize opportunities
Water supply	Demand guided	Supply guided	Market driven
Trust in technology	Positive but reserved	Suspicious	Great trust
Design water system	Dams, dikes & regulation	Natural restoration	Opportunistic
Spatial planning	Water follows	Water guides	Water offers opportunities
Responsibility	Government NL and EU	Regional governments and NGOs	Market players and individuals
Process design	Norms and expert knowledge	Participatory decision making	Free market and privatisation
Identity and knowledge	Water authority NL	Basin and locally	International companies
Integrality water management	Sectorial	Integral	Competition

- INDIVIDUALIST**
- nature is robust
 - economic growth
 - anti-regulation
 - market-oriented
 - adaptation
 - risk = challenge

HIERARCHIST

- nature is tolerant within limits
- top-down regulation
- hierarchy and standards
- risk avoiding
- authority through expertise and experience

E081007b

Perspectives method

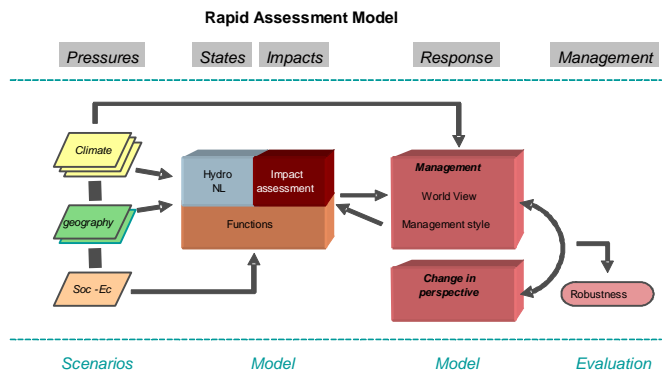
A perspective is "the perceptual screen through which people interpret the world [...] and which guides them in acting" (van Asselt et al., 2000). Within a society or group, a multitude of perspectives can be distinguished. Therefore we need a framework to classify and interpret this plurality of perspectives. For this, the Cultural Theory is used and elaborated.

EGALITARIAN

- nature is fragile
- equity
- economy as means
- conscious consumption
- collective interest
- risk averse

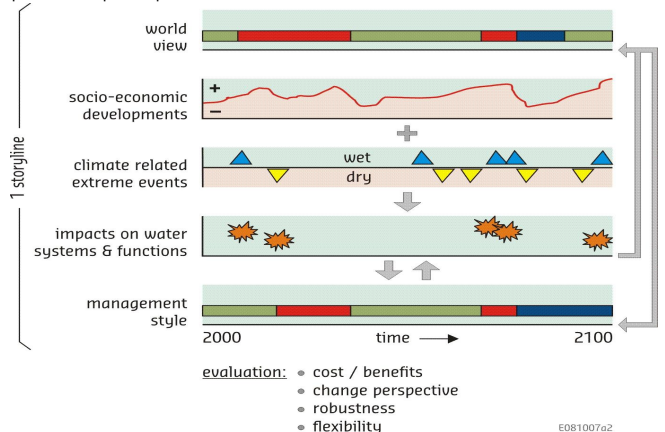
The assessment of the perspective method will result in narratives (storylines) in which various future developments including climate change, societal responses, external developments and the consequences for the water system are interrelated in a consistent way.

PSIR-model: describes the cause effect chain from pressures like climate change or social-economic developments to effects on the water system (state) and related functions (impact) and the response of society and policy to these effects



A vulnerability analysis will be used to define possible adaptation strategies as input for the RAM, which describes the PSIR chain with physical cause-effect relations for the PSI-part and management and perspective response curves for the R-part. The effect relations and response curves will be based on the vulnerability analysis, the understanding of the perspectives dynamics and results of complex hydrological models.

In the next step the RAM will be used to analyze the PSIR-chain with ensemble transient runs to assess the robustness and flexibility of adaptation strategies. In this way the study will include the timing aspect of a strategy and deal with the uncertain future of global change and changing perspectives, which is not yet been done in other studies. The results of the scenario analysis will be used to evaluate the management strategies and develop possible adaptation paths.



pantopicon



Deltares
Enabling Delta Life