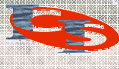


Using water system and society interaction to prepare for an uncertain future

M. Haasnoot, A. Offermans, M. van Lieshout, H. Middelkoop, P. Valkering, R. van der Brugge, W.P.A. van Deursen, E. van Beek, J. Kwadijk, J.J. Beersma

Deltares, Universiteit Maastricht, Universiteit Utrecht, Universiteit Twente, Carthago, KNMI, Pantopicon



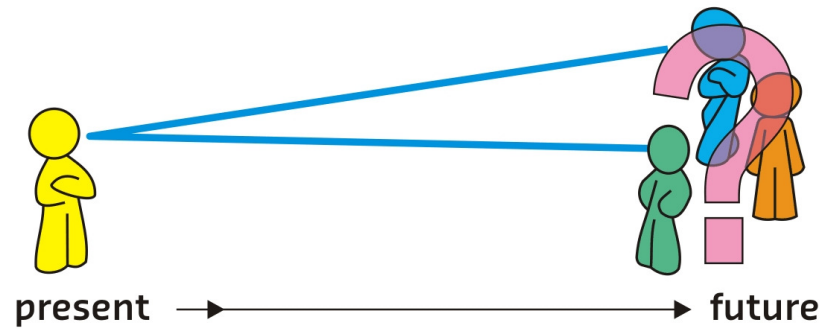
Given the uncertainties about the future,

what is the most sustainable water management strategy?

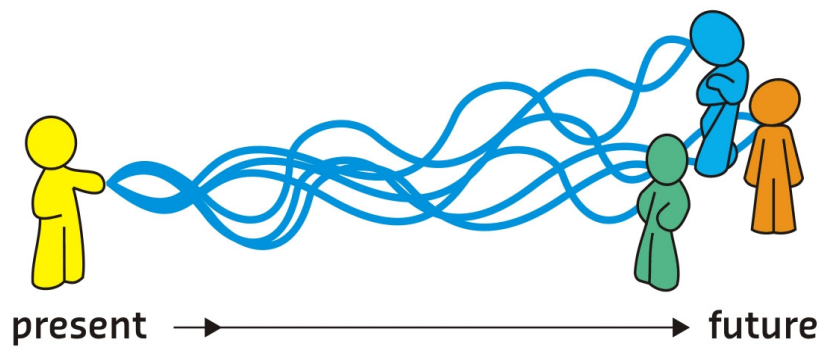


The future is uncertain & there are different possible futures

E090625b



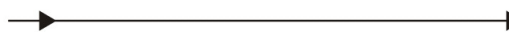
There are many ways to get there



Suppose your dream is ...



present



future



live with water

This may be a way to get there



present



future



live with water

reserve
space

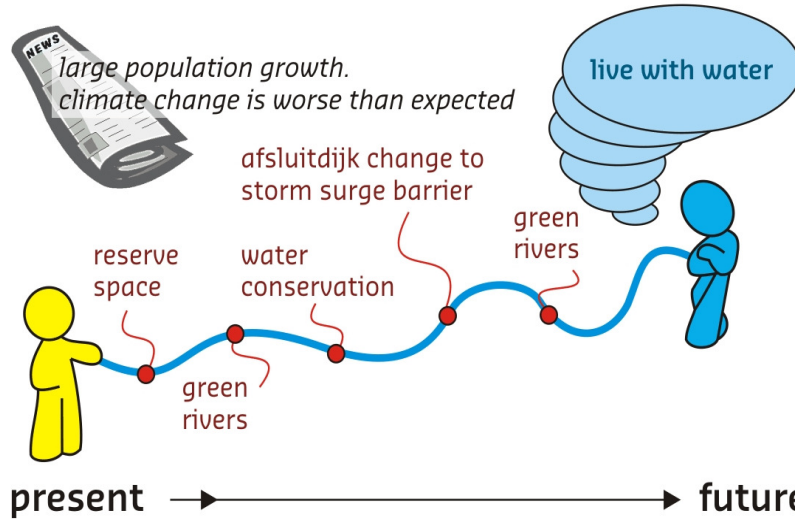
green
rivers

afsluitdijk change to
storm surge barrier

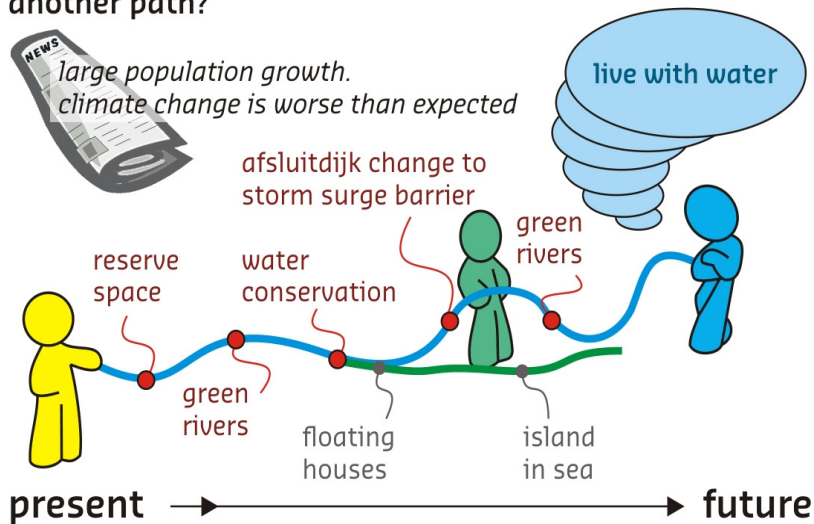
water
conservation

green
rivers

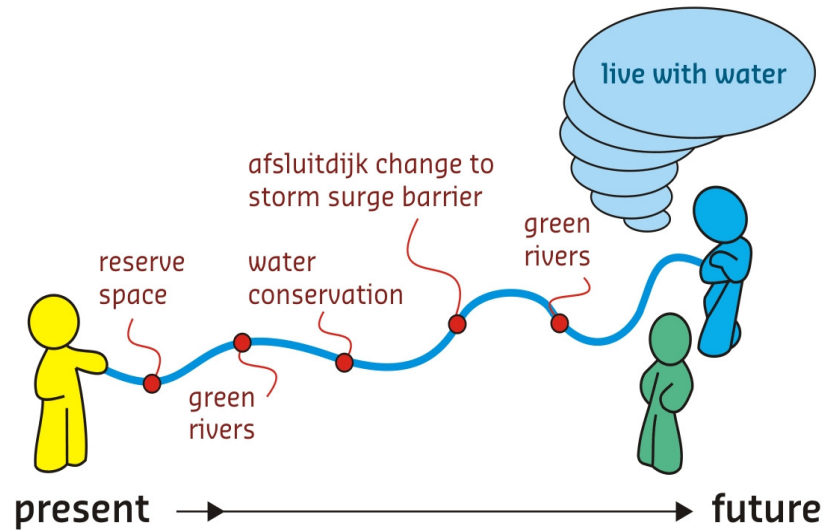
What if your dream is threatened?



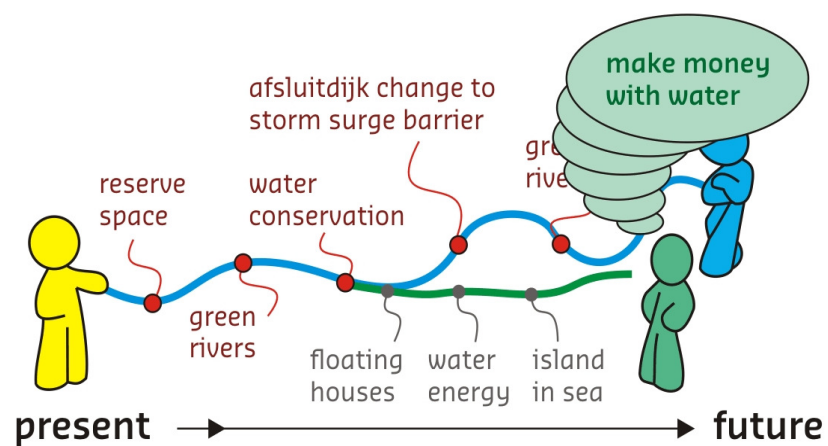
Can your strategy cope or do you need to choose another path?

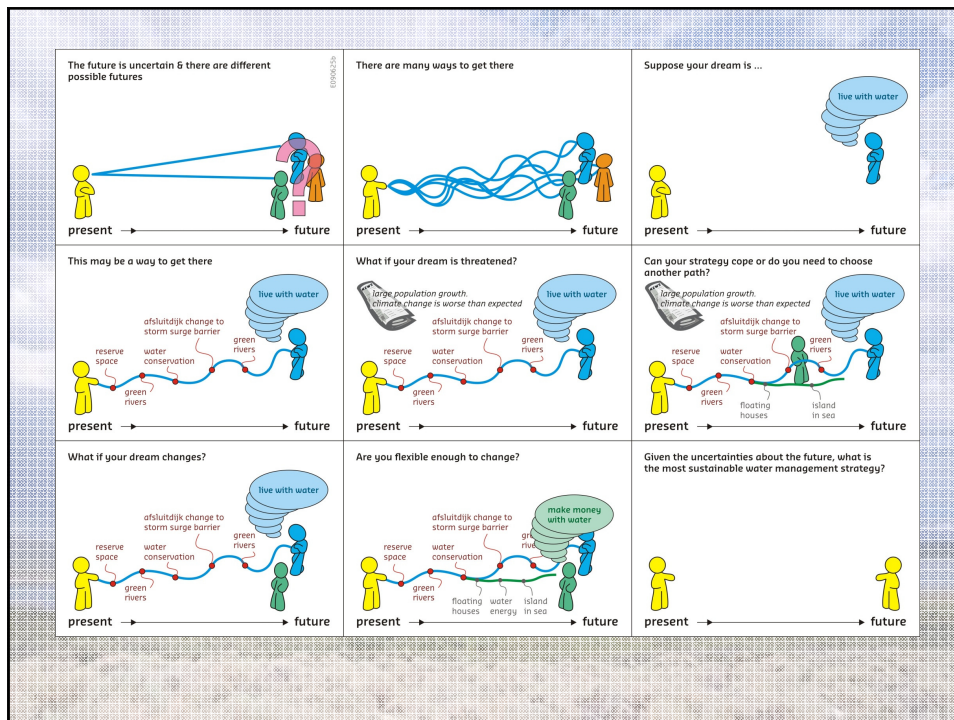


What if your dream changes?



Are you flexible enough to change?





Sustainable measures are able to cope with uncertainties in physical and social environment (robust and/or flexible)

*Our hypothesis is that in order to develop sustainable adaptation pathways into an uncertain future the **interaction** between the **water system and society** needs to be taken into account.*

Method

We use a simulation tool:

- with transient scenarios of climate and socio-economic developments
- to simulate pressure-impact-response relations and
- analyse the response in terms of water management and perspective



Haasnoot et al. (2009) [Sustainable Development](#) DOI: 10.1002/sd.438
Offermans et al. (2009) [Sustainable Development](#) DOI: 10.1002/sd.439

Method

We use the simulation tool:

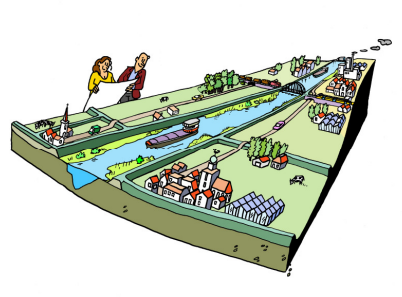
- with individuals
- automatically with computer
- in a Game setting

to analyse response and adaptation pathways

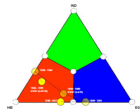


Simulation in game setting

- Participants are water managers of the Waas Delta.
- The future unfolds.
- Each year there is an opportunity to implement measures.



Perspective analysis



Analyse impacts & events in the Waas



**Steps
in the
Simulation**



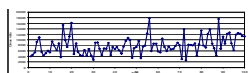
The Waas area

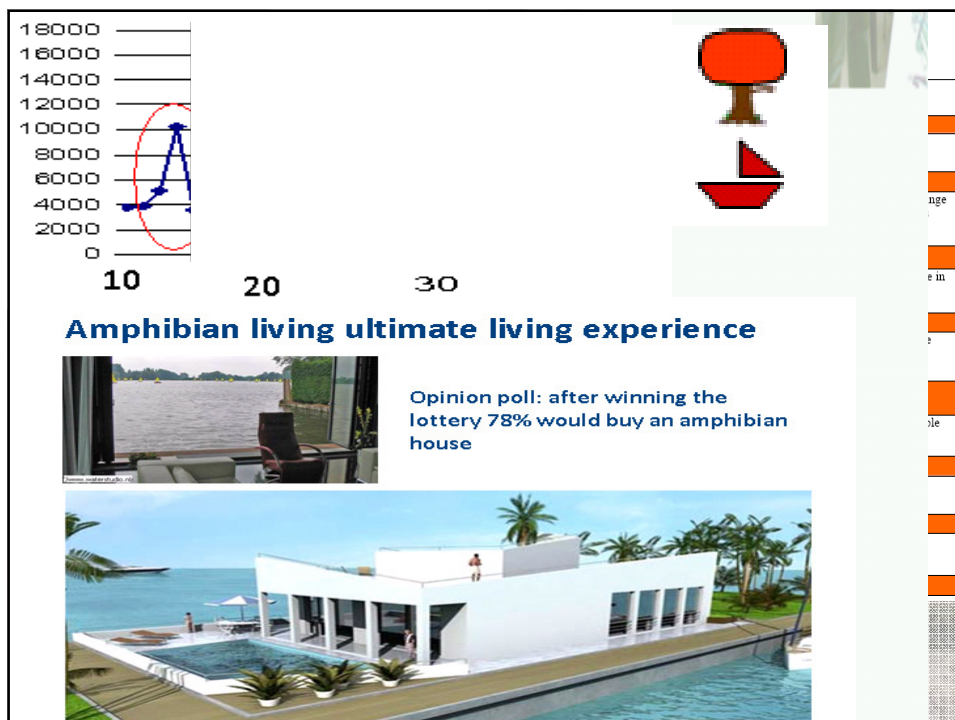
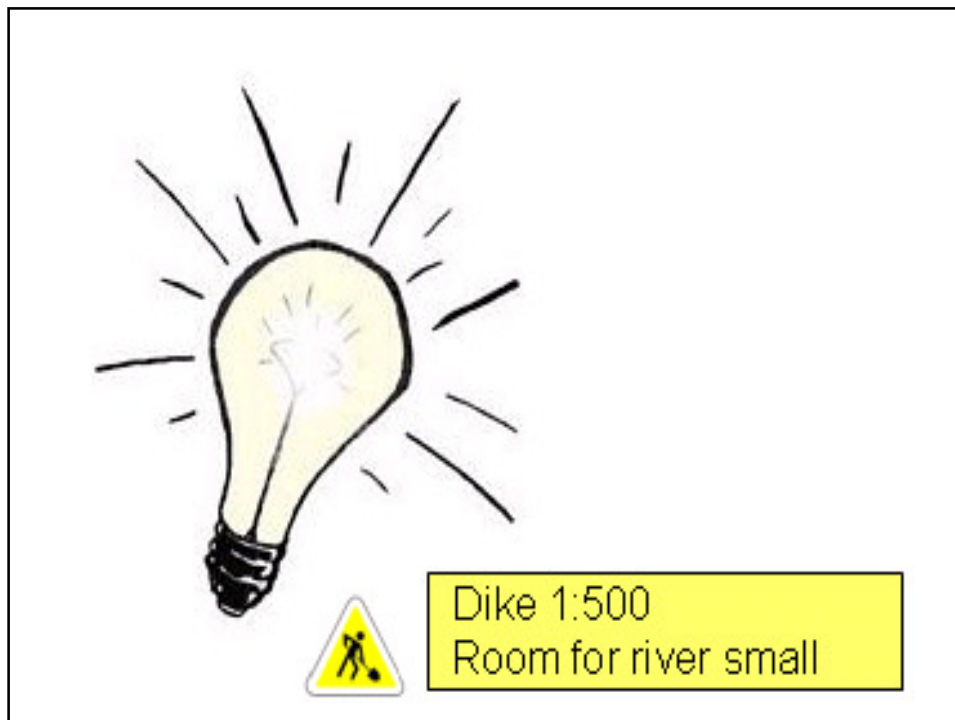


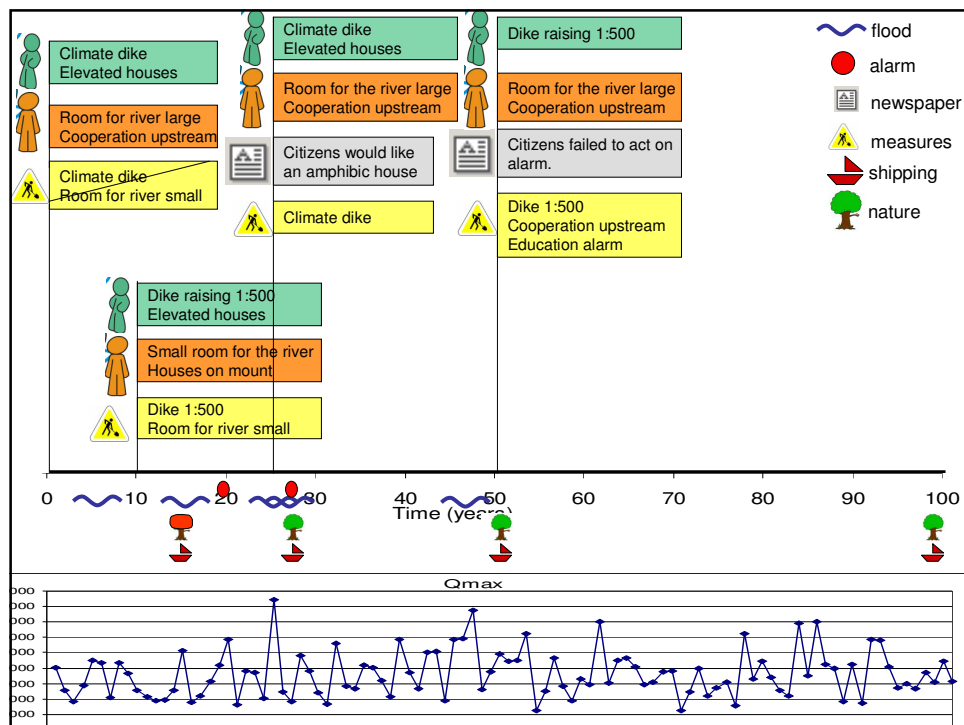
Select measures



The future unfolds..







Lessons from a simulation for policy makers

- Experience the interaction between the water system and society.
- Realize the presence of different perspectives on water (beliefs and values).
- Realize that your beliefs can change
- Get an example of an adaptation pathway.
- Learn about the system through many what-if situations.

Lessons many simulations for sustainable water management

- Events in social (incl. external) and physical system are important for decisions on water management strategies.
- Climate variability is important.
 - Participants react to events instead of anticipation
 - Extreme events result in adverse impacts
- Analyzing many possible futures may support the development of sustainable pathways.*
 - No-regret and regret options (dead-end)
 - Near future is important for our long-term situation
- Middle of the road decisions are less effective.

*Haasnoot et al. (submitted to climatic change). Exploring pathways for sustainable water management in river deltas in a changing environment

Lessons many simulations for sustainable water management (2)

- Events function as surprise or reproduction *
- Patterns in response of participants:
 - Two groups seem to grow to each other
 - Groups stand for a measure: if we X than you are allowed to Y; learning effect seems limited
 - High urgency: something is better than nothing
 - Choosing for an extreme measure seems difficult
- Risk of ineffective measures
 - Middle of the road decisions (win-win becomes loss-loss) and
 - Inconsistent decisions

*Offermans, A.G.E. (2010) Learning from the past; the interaction of the social system and the water system in the Netherlands. <http://www.berlinconference.org/2010/>

The simulation outcomes give insight into the *threats and opportunities* of water management strategies, hence allowing for a *pro-active approach* with enough *time* to prepare for future developments.

Besides it provides information about the extend to which strategies are *sustainable*.



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<http://perspectivesiniwrm.deltares.nl>

Experience yourself:

at the session
Preparing for an uncertain future
Friday 10.15-12.00 in the
van der Veeken room

Please sign up