

Climate change and the urban water system of Rotterdam, an inventory

Sandra Junier

Delft University of Technology

on behalf of:

Jaap Nederlof, Gemeentewerken Rotterdam,

Marleen Maarleveld, Arcadis,

Martine Rutten, Hogeschool Rotterdam,

Erik Mostert, Delft University of Technology

Eric van Nieuwkerk, Deltares,

Robert Trouwborst, Deltares,

Hans Geerse, Waterschap Reest en Wieden, formerly Wittenveen+Bos

Frans van de Ven, Delft University of Technology

With the cooperation of many others!

Kennis voor Klimaat
Knowledge for Climate



Research partners:

- Public Works Rotterdam
- Hogeschool Rotterdam
- Deltares
- Delft University of Technology
- Wittenveen+Bos
- Arcadis



Kennis voor Klimaat
Knowledge for Climate



Climate change and the urban water system of Rotterdam

- General inventory research
 - consequences
 - people
 - measures
 - approaches
 - monitoring

Kennis voor Klimaat
Knowledge for Climate



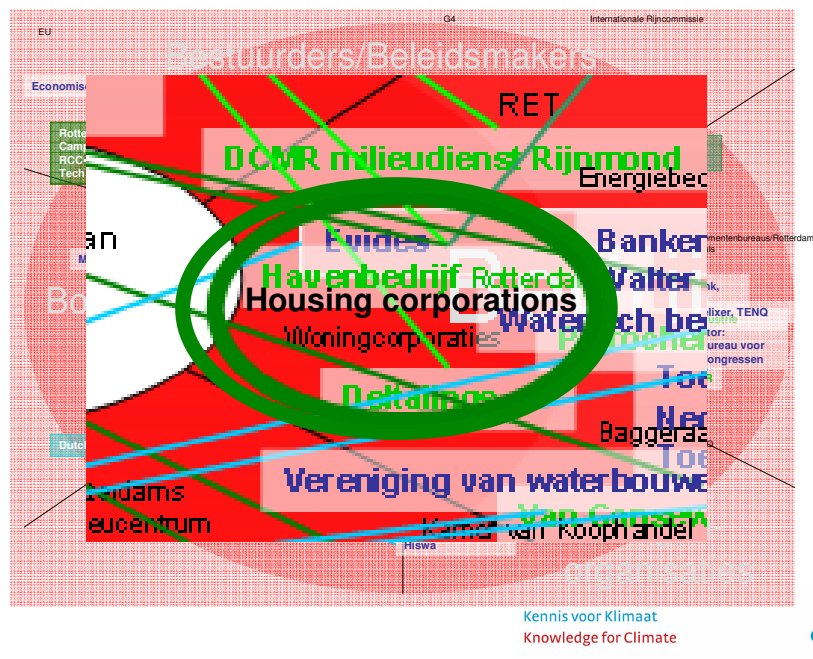
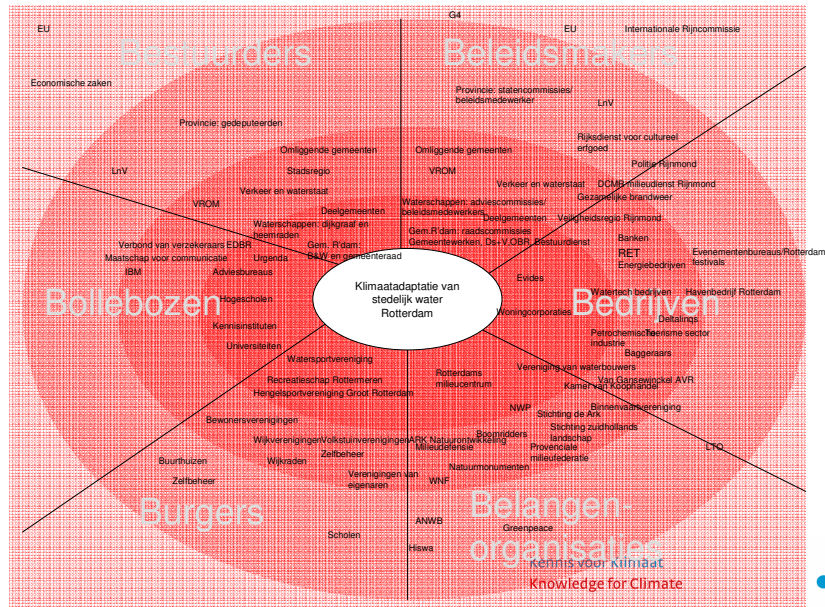
Modeling consequences of climate change

- Testing modeling methods and first impressions
- Examples results:
 - High surface water levels would occur more often in Rotterdam Zuid.
 - Spangen: 1,5 times the rain would mean 3 times as long water on the streets
 - more often groundwater levels too high and too low

Kennis voor Klimaat
Knowledge for Climate



People



(Street) interviews

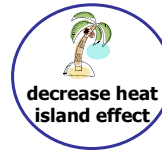
Citizens:

- are mostly un-aware of climate change consequences for urban area
- want water to enhance city life and no bother
- mostly do not see an active part for themselves

Kennis voor Klimaat
Knowledge for Climate



measures



Inventory of measures:

- for existing or new urban areas
- costs, effects
- stakeholders involved
- conditions for implementation



Approaches

- Private, corporate, public action
- Anchoring plans
- Legal instruments
- Financial instruments
- Communication instruments



Inspiration from other cities

- Number of Dutch cities
- Hammerby Sjöstad, Stockholm, Sweden
- Hafencity, Hamburg, Duitsland
- Tokyo
- London
- Melbourne
- New York

Kennis voor Klimaat
Knowledge for Climate



Example

Hammerby Sjöstad (Stockholm), Zweden

- Largely closed and connected circles: water, energy, waste
- Ecological principles leading
- strict building requirements
- partnership between council civil servants, architects and developers
- Re-use of rain water and sewage water



Kennis voor Klimaat
Knowledge for Climate



Monitoring

- Not enough data available
- Different parameters need to be monitored
- Different time scale of monitoring
- Different locations
- Monitoring of effects of measures



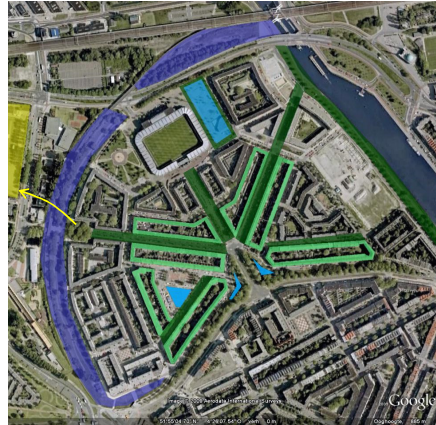
Stakeholder workshop

- Overview research results
- Test check list for analysis
- Design challenge
- Discussion



Kasteeltuin Spangen, Castle garden in Spangen

1. What role does climate change play in this area? Who will suffer the consequences?
2. What other aspects of urban development are at stake? How can they be connected or integrated?
3. Imagine an image that describes the area in 30 years?
4. What measures can support a development in that direction?
5. What are the dilemmas when executing these measures?
6. How can success be measured?



Kennis voor Klimaat
Knowledge for Climate



Conclusions workshop

- Climate adaptation for water management should be integrated in urban development
- Tailor made solutions necessary for each area
- Public support required
- Tools needed to support climate change adaptation

Kennis voor Klimaat
Knowledge for Climate



More general conclusions

- Insufficient data for modelling
- Modelling results from one part of the city cannot be generalised
- Various lists of measures and approaches useful reference, or tool
- Examples were inspiring
- Encompassing image was useful concept

Kennis voor Klimaat
Knowledge for Climate



Further research

- Further modeling of consequences
- Elaboration of implementation approaches, development of tools
- Pilot projects, action research

Kennis voor Klimaat
Knowledge for Climate



Thank you for your attention!

Kennis voor Klimaat
Knowledge for Climate

