LINKING WATER MANAGEMENT AND URBAN RENEWAL

THE CASE STUDY OF ROTTERDAM

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Acknowledgements

leven met water
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About DeltaSync

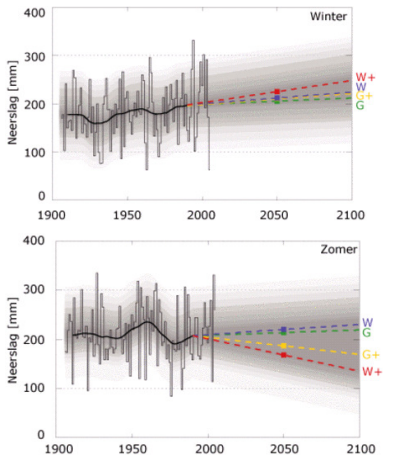
- **Innovative TU Delft spin-off company**
- **Researchers, designers and engineers**
- **Building on water specialist**
- **Mission: realize first self-supporting floating city in the world**

Introduction: Climate change

Rainfall predictions

- Uncertainty
- Variation increases
- Water storage capacity is important for all scenario's

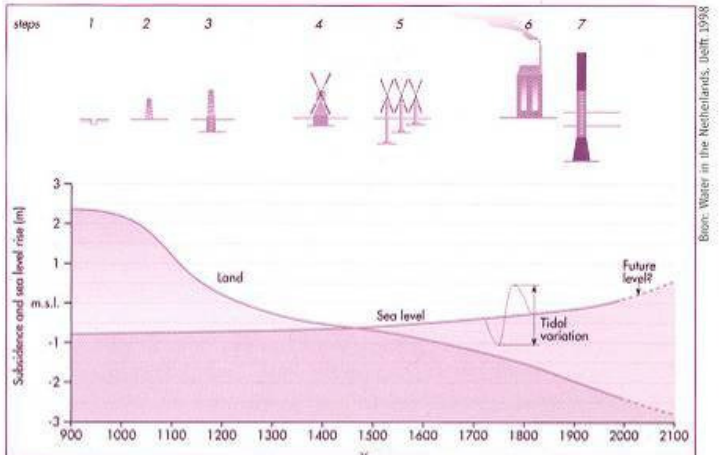
Source: KNMI, 2006



Introduction: Urbanization

1900 1970 2005

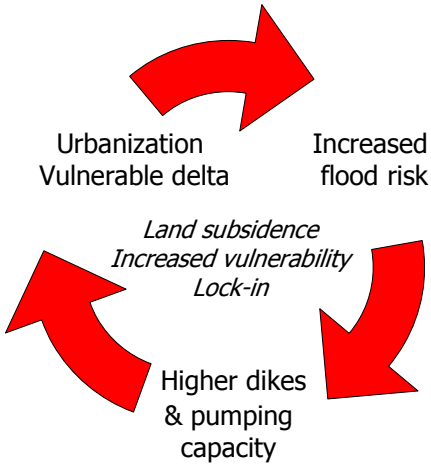
Introduction: Relative terrain level

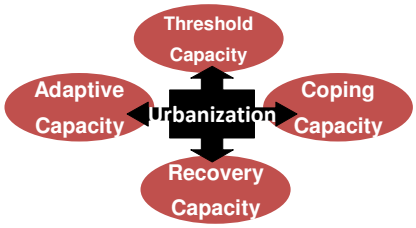


Why change?

- Trends combined with traditional urbanization and traditional water management will lead to a delta that is:
  - Increasingly urbanized
  - Increasingly under sea level
  - Increasingly dependent on large scale, globalizing networks of energy, water and food supply
  - Increasingly **vulnerable** to floods and droughts

Dutch water vulnerability transition





Source: De Graaf, et al. (2007), Water Science and Technology, Vol 56 No 4, pp 165-173; Natural Hazards (2008)

Rotterdam: Facts and Figures

1) the largest port of Europe
2) the second city of the Netherlands
3) three waterboards

- 30 km port
- 600.000 residents
- 2500 km sewer system
- 400 km canals, 600 pumping stations

Source: Municipality of Rotterdam, 2006

Rotterdam: Impression

Source: Municipality of Rotterdam, 2006

Research questions

1. Which major changes have occurred in Rotterdam urban water management over the last 20 years?
2. How did Rotterdam develop an urban water management climate adaptation strategy, in which urban development became sensitive to water management?
3. What was the role of the envisioning process *Rotterdam Water City 2035* in this process?

Methodology

- 16 oral interviews with key-individuals, affiliated with water boards, social housing corporations, consultancy firms and several departments of the municipality
- Analysis of local water policy documents, urban planning documents, internet resources and project plans
- Participation in two field trips and an interdisciplinary urban water design workshop of municipality

Changes in Rotterdam Water Management

- 3rd national memorandum on water management (1989) responsibility for urban surface water management should be transferred from the municipality to the water boards
- In Rotterdam: First attempt in 1996 failed, Successful transfer in 2001
- Transfer process caused the production of the First Urban Waterplan in 1999 by municipality i.c.w. waterboards
  - Inventory of urban water system
  - Initiation of local projecs e.g. Zuiderpark, Bergse plassen and Urban Canals

National developments

- Pluvial flooding in Zuid Holland (1998) → Questions in parliament
- Committee Tielrooij: Report Water management 21st Century, more space for water (2000). Retention strategy rather than drainage strategy
- Water Assessment (2003), water authorities' involvement in urban development becomes obligatory
- National Agreement on Water Management (2004) → allowable pluvial flooding return interval urban areas=100Y
  - First Estimate required additional water retention capacity in Rotterdam: 600,000 m^3 in 2015

Changes in stakeholder perceptions

Causes:

1. **Transfer of responsibility urban water management**
2. **Waterboards and municipality make inventory in First Waterplan**

Water boards discover that there are conflicting spatial interests in city; water has low priority

Water managers realize they need to cooperate with other stakeholders to achieve their objectives

Water managers learn that scarcity of space in cities requires multi-functional land-use

Changes in stakeholder perceptions

Water managers anticipate on city planning and the importance of utilizing 'windows of opportunity' in urban renewal processes

Water managers and urban designers discover that surface water can contribute to solving urban problems.

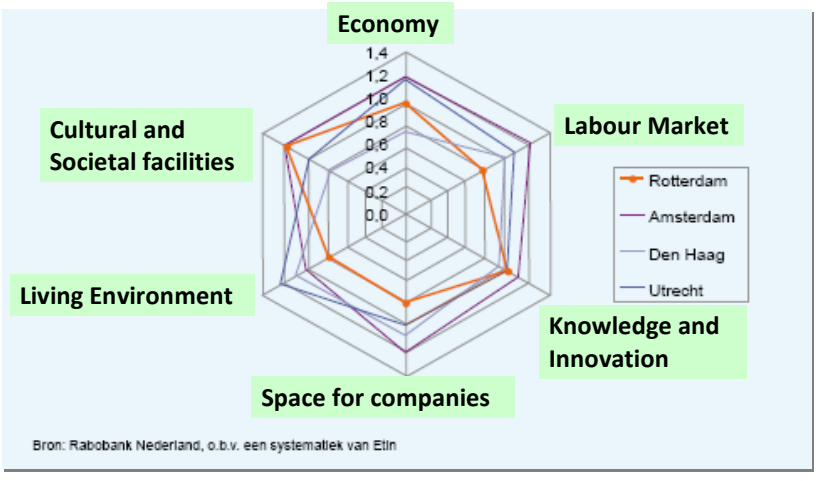
Result:
- Water boards and municipality co-develop plans for water infrastructure innovations in cooperation with other stakeholders
- Strongly connected with city planning

What was the role of the envisioning process Rotterdam Water City 2035 in this process?

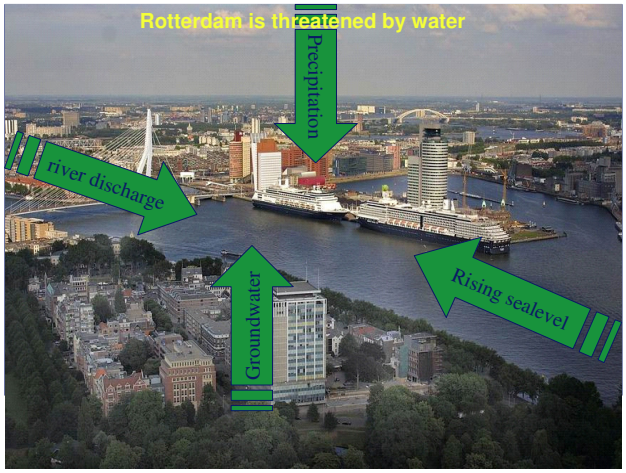
Rotterdam Watercity 2035

- Long term envisioning process
- Rotterdam's submission for the 2nd International Architecture Biennale Rotterdam
- 2005 theme was ' The Flood'
- Develop joint vision on the combined water challenge and urban challenge
- How can the water threat become an opportunity?

Urban Challenge

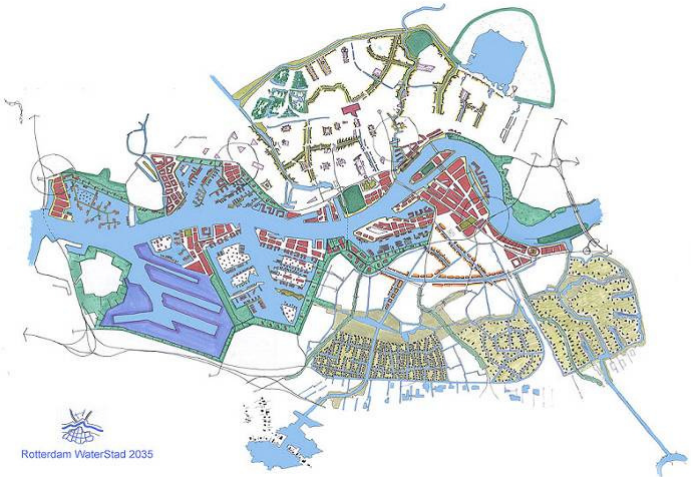


Water Challenge



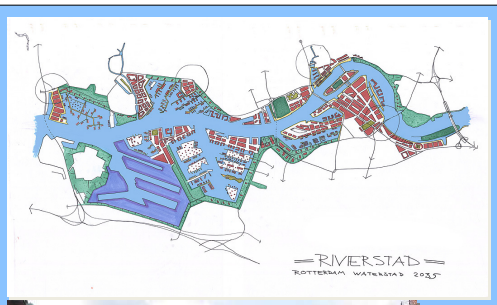
Source: Municipality of Rotterdam, 2006

Rotterdam Watercity 2035



Source: Municipality of Rotterdam, 2006

Rotterdam Watercity 2035



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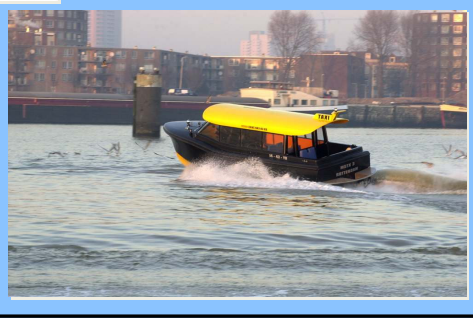
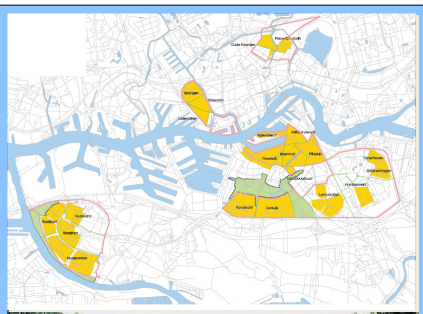


Rotterdam Watercity 2035

Source: Municipality of Rotterdam, 2006

Rotterdam Watercity 2035



Source: Municipality of Rotterdam, 2006

Rotterdam Watercity 2035

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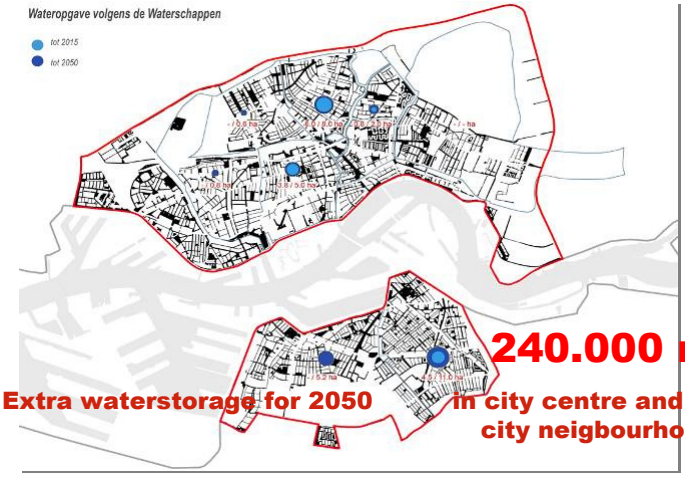
Rotterdam Watercity 2035

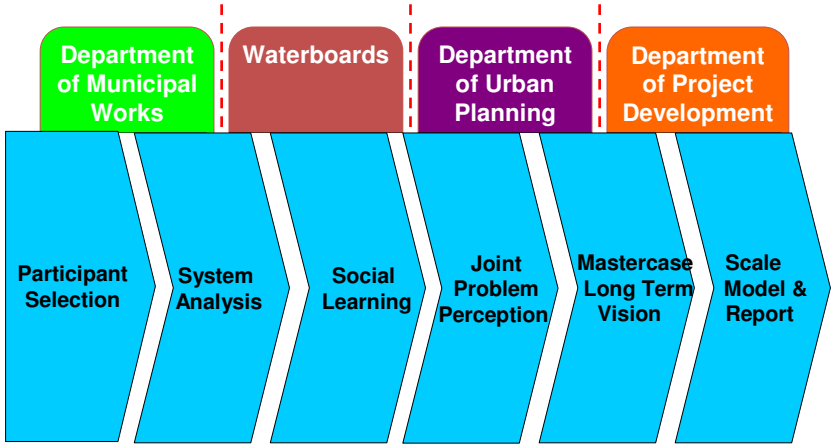


Source: Municipality of Rotterdam, 2006

Role of WaterCity 2035

- Shared vision that generated attention of public and politicians, prize winner → water higher on the agenda
- Alignment objectives and mutual understanding between municipality departments and between waterboards and municipality
- Created a network for further cooperation

Role of WaterCity 2035



Success factors of WaterCity 2035

- Successful connection between water management and spatial planning
- 2 moderators: a water expert and an urban designer
- Time pressure and high status of the project have been crucial
  - Selection of only best 16 participants
  - Competition
  - Absence not allowed by directors of department

Success factors of WaterCity 2035

- 3 studies (joint system analysis as starting point):
  - Water, History and Culture
  - Water and facts
  - Experience & Enjoy
- 'Non official' policy process with a huge impact on regular policy process
  - Possibility to generate extreme ideas
  - Possibility to cross boundaries
  - Low risk, if it fails it is just a competition

Mainstreaming of WaterCity 2035

- Many ideas have been adopted by official policy Waterplan 2 and in practice: green roofs, water squares, floating pavilion
- The network of cooperation that emerged during the process is still operating
- A change of thinking among stakeholders has taken place, e.g.:

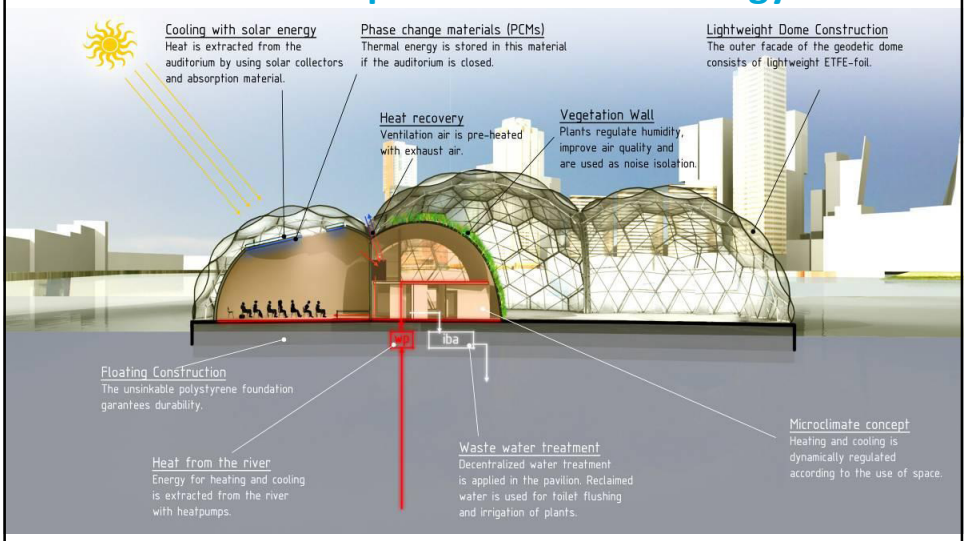
  'In the old approach we said: 'provide us with the square meters and we will dig water in a cost-effective way. In the new approach we say: 'we are open to water infrastructure innovations, such as water retention squares and green roofs'

Mainstreaming of WaterCity 2035: Floating Pavilion

- Initiated by DeltaSync
- Finished june 2010
- Local concepts of water and energy

Ontwerp: DeltaSync/Public Domain Architecten

Local concepts of water and energy



Concluding remarks

- Major changes have occurred in Rotterdam water management in terms of thinking, institutional arrangements and planning process
- Integration of spatial planning and urban water planning.
- The role of the future envisioning process WaterCity 2035 has been crucial
- *What are the next steps in the transition to more sustainable urban water management?*

Further integration: Stakeholders

	Mainstream water infrastructure regime	Transformative water infrastructure regime
Role of citizens	Client	Source context specific knowledge, co-producer
Role of expert	Decisive	Source reliable science

De Graaf, R.E and R. van der Brugge(2010). Transforming water infrastructure by linking water management and urban renewal in Rotterdam, Technol. Forecast. Soc. Change (2010), Vol77, 8, pp 1282-1291

Further integration: Process management

	Mainstream water infrastructure regime	Transformative water infrastructure regime
Planning process	Public sector driven Deadline driven Fragmented	Public-Private Partnerships Flexible Integrated
Planning timeframe	5 years horizon `	30-70 years horizon

De Graaf, R.E and R. van der Brugge(2010). Transforming water infrastructure by linking water management and urban renewal in Rotterdam, Technol. Forecast. Soc. Change (2010), Vol77, 8, pp 1282-1291

Further integration: Process management

	Mainstream water infrastructure regime	Transformative water infrastructure regime
Infrastructure typology	Centralized, generic solution, low flexibility	Context specific, flexible, reversible and decomposable
Evaluation and monitoring of implemented measures	Absent	Monitoring, improvement and replication

De Graaf, R.E and R. van der Brugge(2010). Transforming water infrastructure by linking water management and urban renewal in Rotterdam, Technol. Forecast. Soc. Change (2010), Vol77, 8, pp 1282-1291

Further integration: Accountability

	Mainstream water infrastructure regime	Transformative water infrastructure regime
Accountability Frameworks	Effective execution of fragmented statutory tasks, costs minimization	Co-responsibility of multiple organizations
Management style	Authority driven Responsibility driven Functional silos	Leadership driven System performance driven Cross sectoral cooperation

De Graaf, R.E and R. van der Brugge(2010). Transforming water infrastructure by linking water management and urban renewal in Rotterdam, Technol. Forecast. Soc. Change (2010), Vol77, 8, pp 1282-1291

More information

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Download thesis:
http://www.deltasync.nl/reports/De_Graaf_thesis.pdf

Visit the floating pavilion!!
Friday's fieldtrip nr. 10 **DP UP 2.5**
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