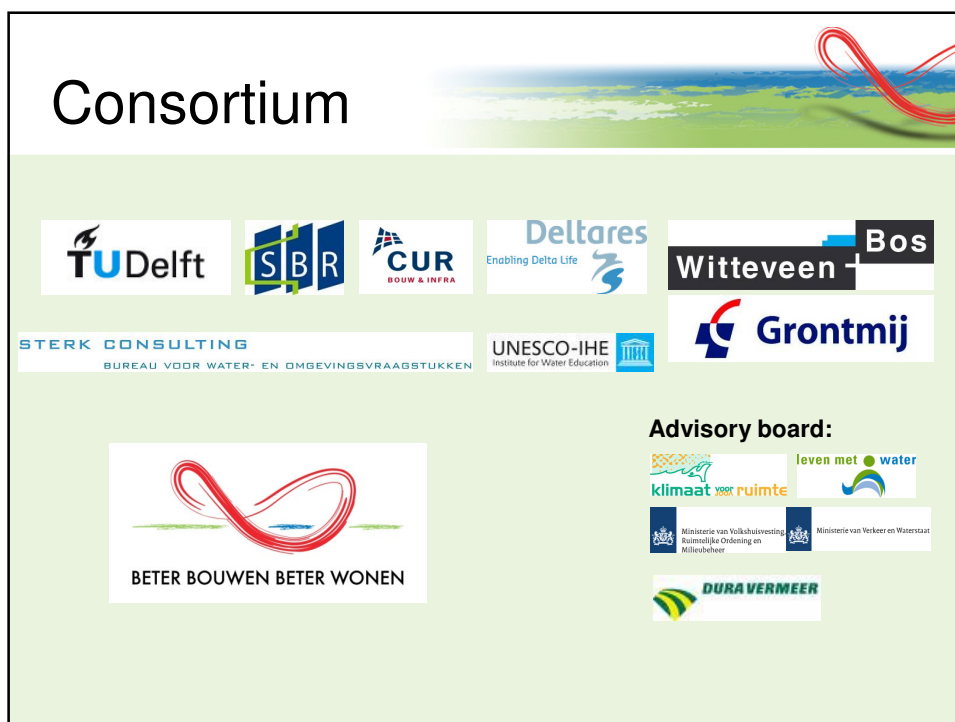










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Grontmij / TU Delft


**Water robust urban environments:
A three-step approach**

Consortium




















Advisory board:



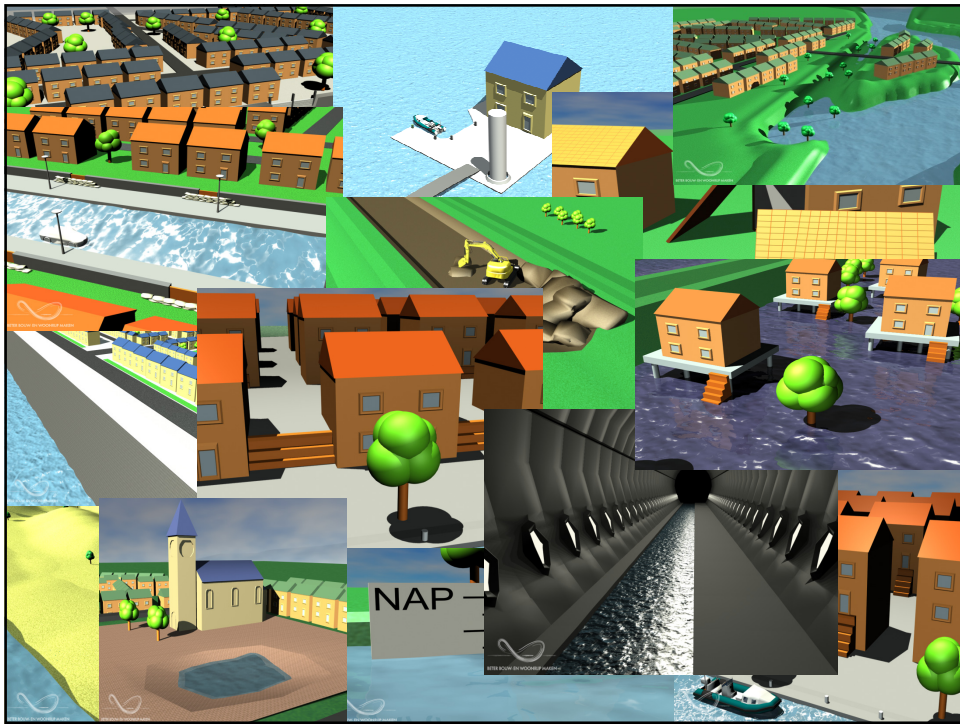
Urbanization

1900

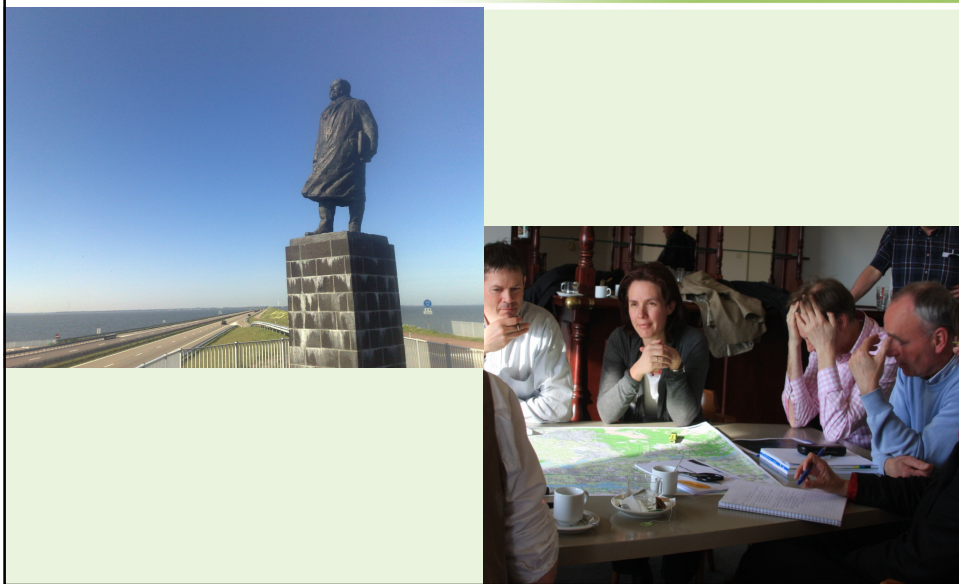
1970

2005

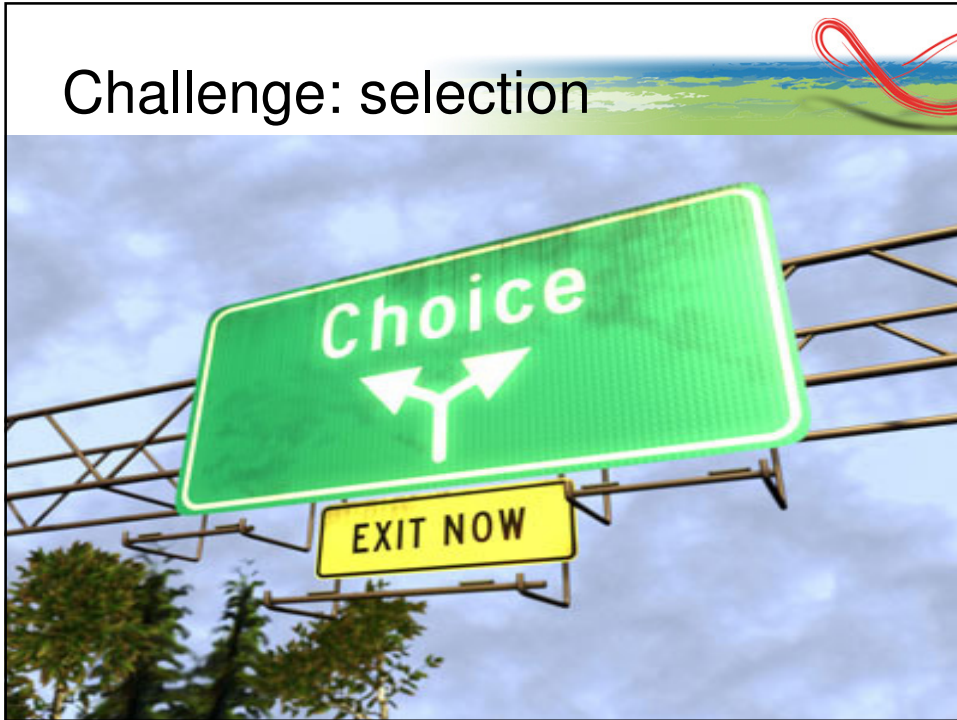




Design process



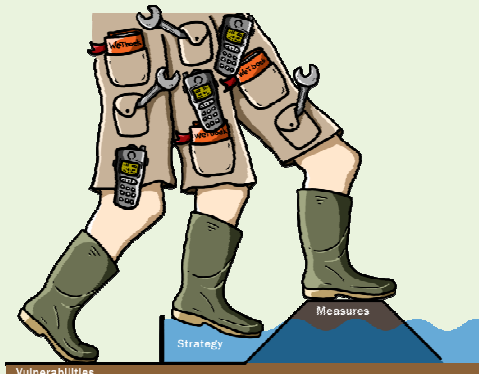
Challenge: selection



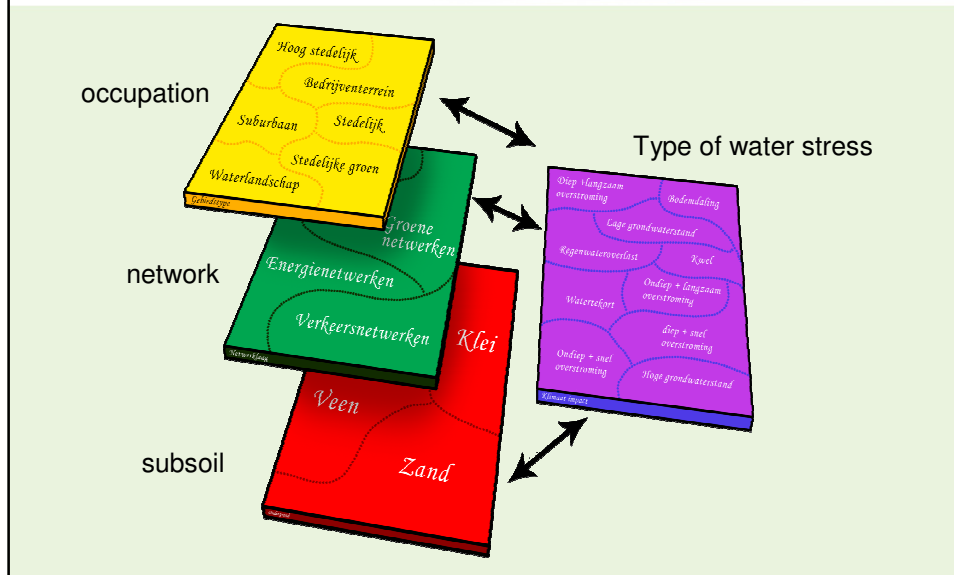
Our solution:

Three-step approach

- Step 1: Vulnerability-analysis
- Step 2: Strategy to reduce vulnerability
- Step 3: Selecting appropriate measures



1. Vulnerability-analysis



2. Strategy to reduce vulnerability

Four capacities to reduce vulnerability¹:

- Damage prevention = threshold capacity
- Damage reduction = coping capacity
- Damage reaction = recovery capacity
- Damage anticipation = adaptive capacity

¹ Graaf, R. de, N. van de Giesen and F. van de Ven, 2007, Alternative water management options to reduce vulnerability for climate change in the Netherlands, Natural Hazards nov.

Threshold capacity



Coping capacity



Recovery capacity



Adaptive capacity



3. Measures selection

Measures to strengthen ...

Threshold capacity

Waterrobust infrastructure
Enlarged seasonal buffer
High floor level vs street level
Floating housing

Et cetera

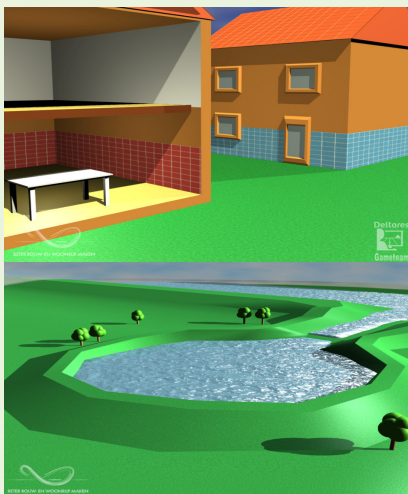


Adaptive capacity

Temporary houses and buildings
Adaptive management
Water-based spatial planning
Regular updates water & space policies



3. WRD measures selection



Coping capacity

Major drainage system; adapted street profile
Wet proofing
Flood risk management

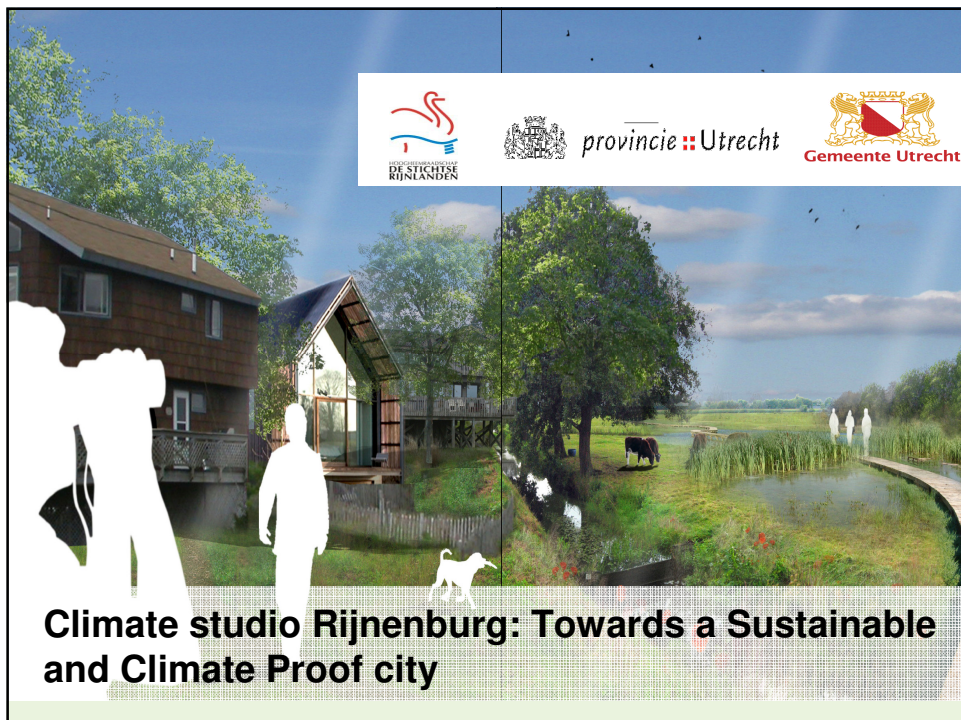
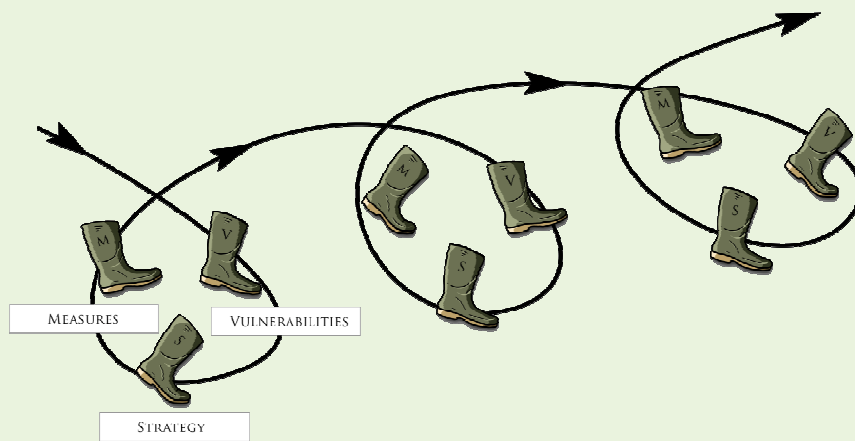
Et cetera

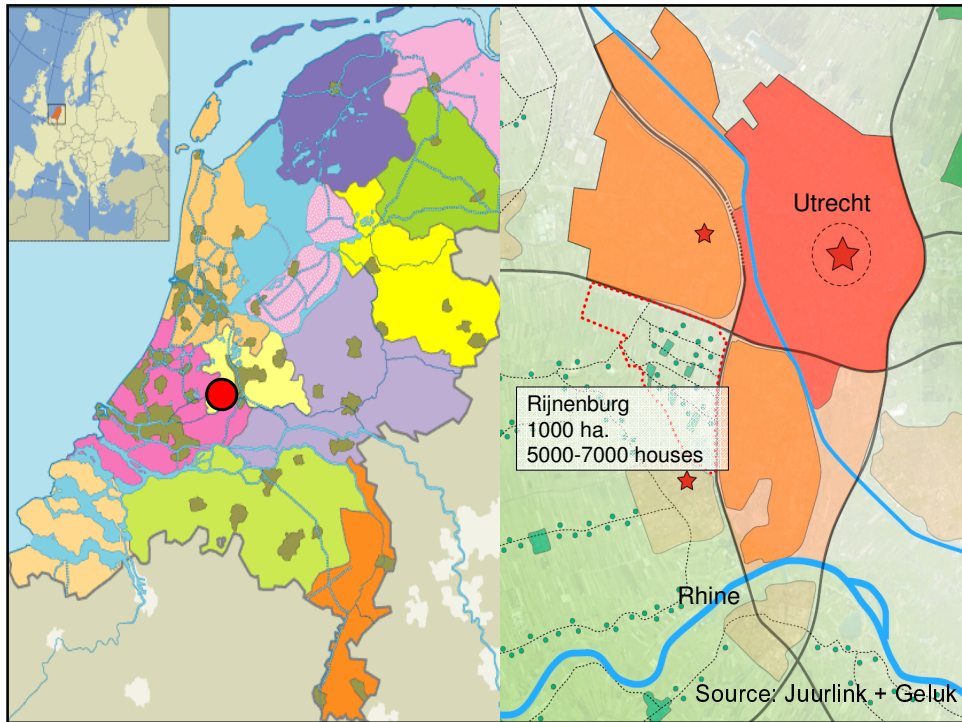
Recovery capacity

Extra pumping capacity
Cleaning & drying capacity
Water supplying capacity in extremely dry periods

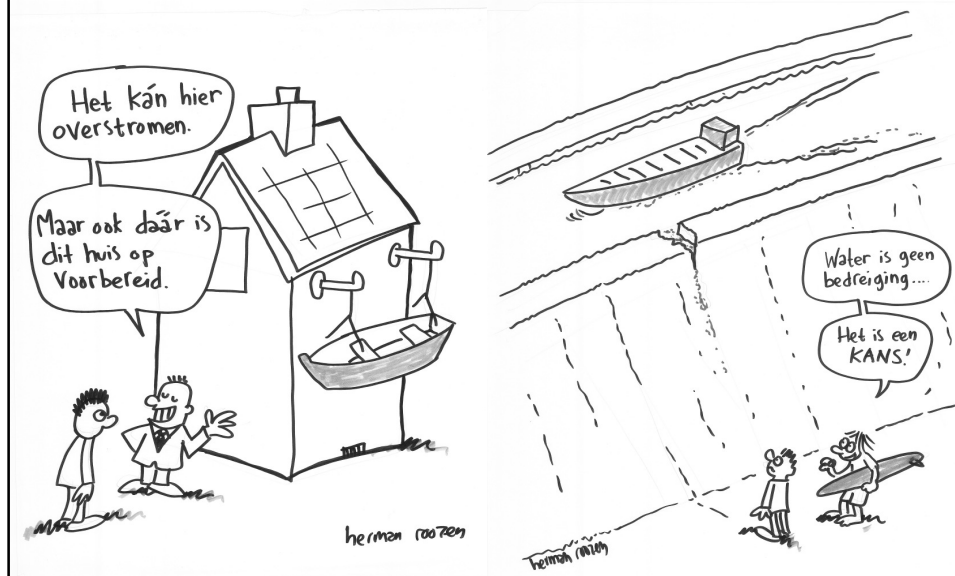
Et cetera

Knowledge transfer





Charrette



Masterplan

