

# Rotterdam Climate Proof

Connecting water with opportunities



June 17 2013

John Jacobs

Office for Sustainability and Climate Change



**ROTTERDAM REGION**

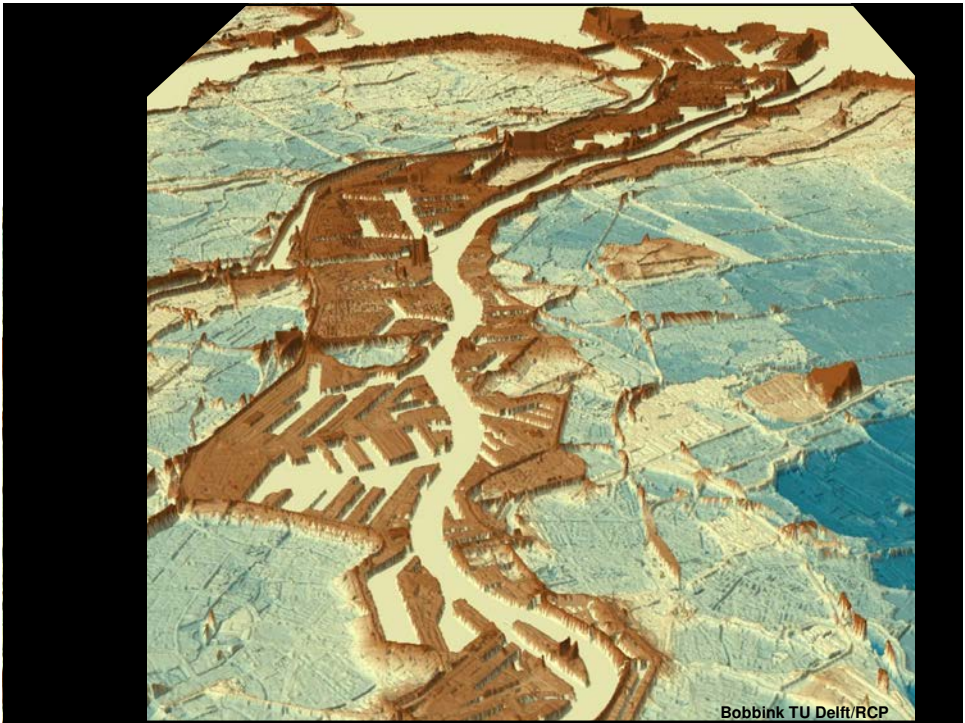
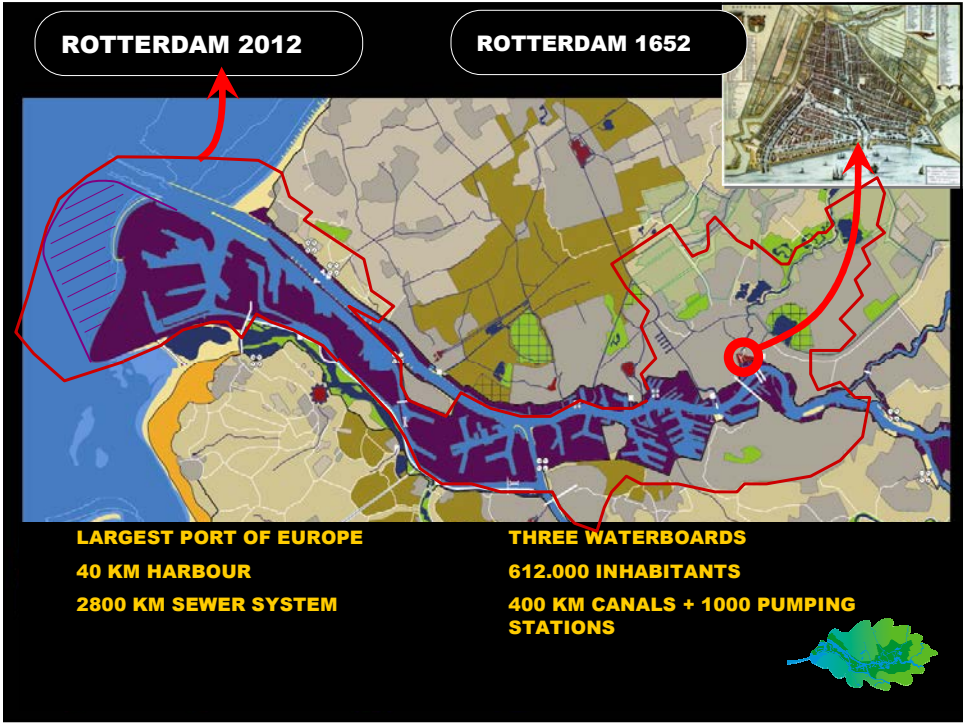


**THE NETHERLANDS**



**ROTTERDAM, DELTA CITY**

**MAESLANTKERING:  
STORM SURGE BARRIER**



## WATER CHALLENGES ROTTERDAM



## SEA LEVEL RISE AND CHANGING RIVER DISCHARGES







**ROTTERDAM CLIMATE PROOF**  
ADAPTATION PROGRAMME 2018

THE ROTTERDAM STRATEGY FOR WATER ADAPTATION SOLUTIONS



**ROTTERDAM APPROACH**

**100% climate proof in 2025**  
+  
**attractive and economically strong city**  
+  
**holistic approach**  
+  
**LT Vision => ST Actionplan**

**ROTTERDAM APPROACH**




**THEME 1. FLOOD MANAGEMENT**  
**THEME 2. ACCESSIBILITY**  
**THEME 3. ADAPTIVE BUILDING**  
**THEME 4. URBAN WATER SYSTEM**  
**THEME 5. URBAN CLIMATE**

**ROTTERDAMSE CLIMATE ADAPTATION STRATEGY (RAS)**

**ADAPTATION BAROMETER 1.**  
**CLIMATE ATLAS 2.**  
**ADAPTATION TOOLKIT 3.**  
**ADAPTATION PATHWAYS 4.**  
**MONITORING 5.**

**KNOWLEDGE**  
**EXPOSURE**  
**ACTIONS**

**Knowledge**



**Action**

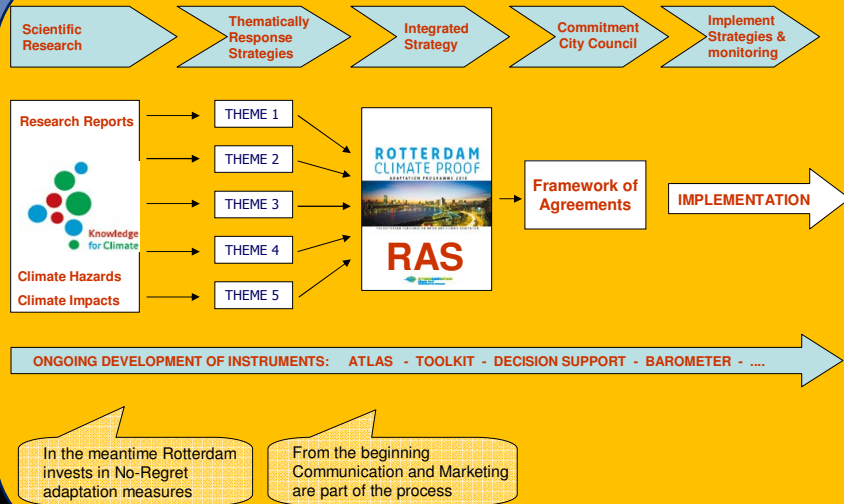


**Marketing**

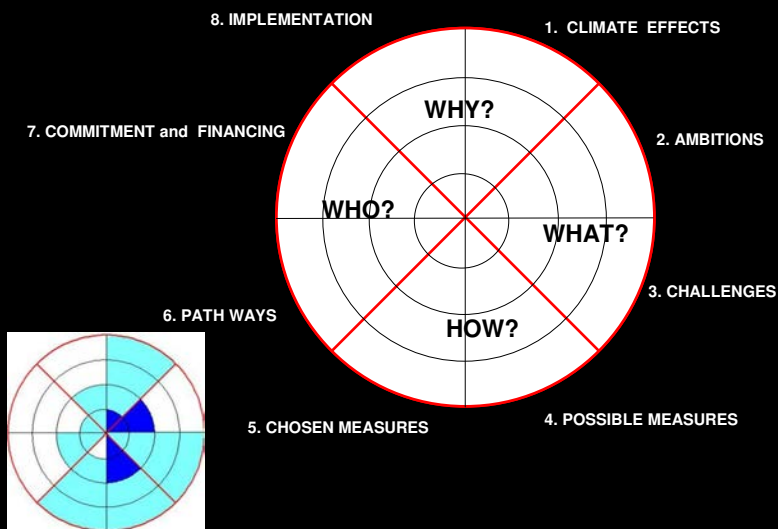


Floating Pavilion

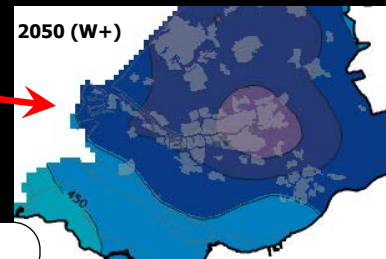
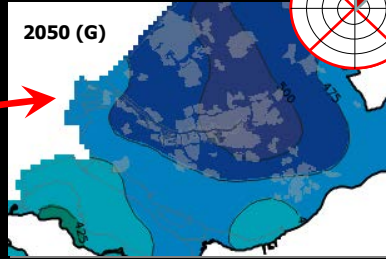
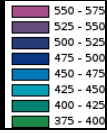
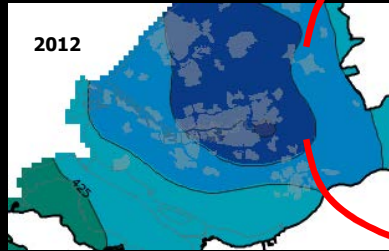
## ROTTERDAM ADAPTATION STRATEGY: THE PROCESS



## CLIMATE ADAPTATION BAROMETER

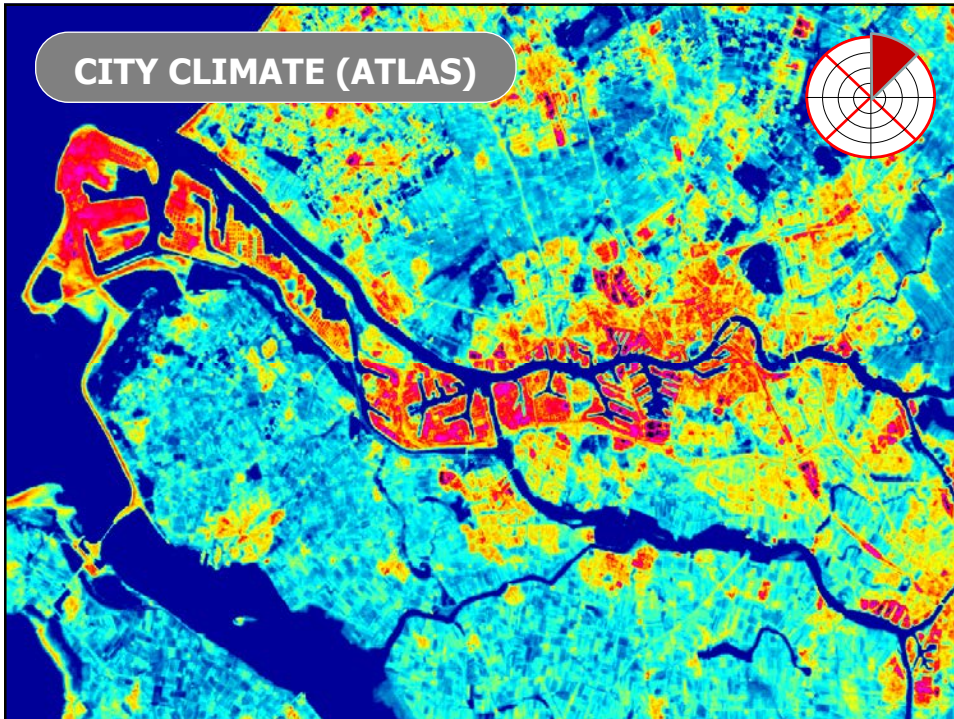


# CLIMATE ATLAS

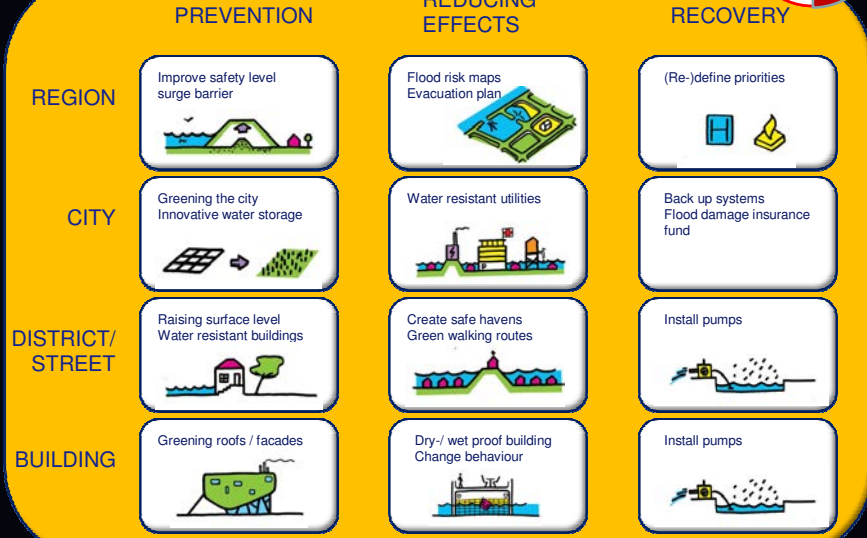


Precipitation during winter

# CITY CLIMATE (ATLAS)



# ADAPTATION TOOLKIT



# SOCIAL COST BENEFIT ANALYSES



AABEL

**COCKPIT**  
social cost-benefit analysis  
Rotterdam Climate Proof

**ROTTERDAM**  
CLIMATE PROOF  
THE ECONOMIC CHALLENGES ON WATER AND CLIMATE ADAPTATION

INPUT

ENDOGENOUS / PROJECT CHOICES

<b>Strategy</b> <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	<b>Time/Flexibility</b> <div style="display: flex; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">2015</div> <div style="margin: 0 5px;">→</div> <div style="border: 1px solid gray; padding: 2px;">2015</div> </div>
<b>District</b> <input checked="" type="checkbox"/> Downtown <input type="checkbox"/> Delfshaven <input type="checkbox"/> Overschie <input checked="" type="checkbox"/> North <input checked="" type="checkbox"/> Hillegersberg-Schiebroek <input checked="" type="checkbox"/> Kralingen-Grooswijk <input checked="" type="checkbox"/> Feijenoord <input type="checkbox"/> IJsselmonde <input type="checkbox"/> Pernis <input checked="" type="checkbox"/> Prins Alexander <input type="checkbox"/> Charlois <input type="checkbox"/> Hoogvliet <input checked="" type="checkbox"/> Hoek van Holland	<b>Scale</b> <div style="display: flex; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">City</div> <div style="margin: 0 5px;">↓</div> <div style="border: 1px solid gray; padding: 2px;">District</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">Object</div> </div>

EXOGENOUS

<b>Climate scenarios</b> <input type="checkbox"/> A <input checked="" type="checkbox"/> B	<b>Socio-economic scenarios</b> <input type="checkbox"/> Divided Europe <input checked="" type="checkbox"/> European Coordination <input type="checkbox"/> Global Competition
<b>Demographic development</b> <div style="display: flex; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">Low</div> <div style="margin: 0 5px;">→</div> <div style="border: 1px solid gray; padding: 2px;">High</div> </div>	

OUTPUT

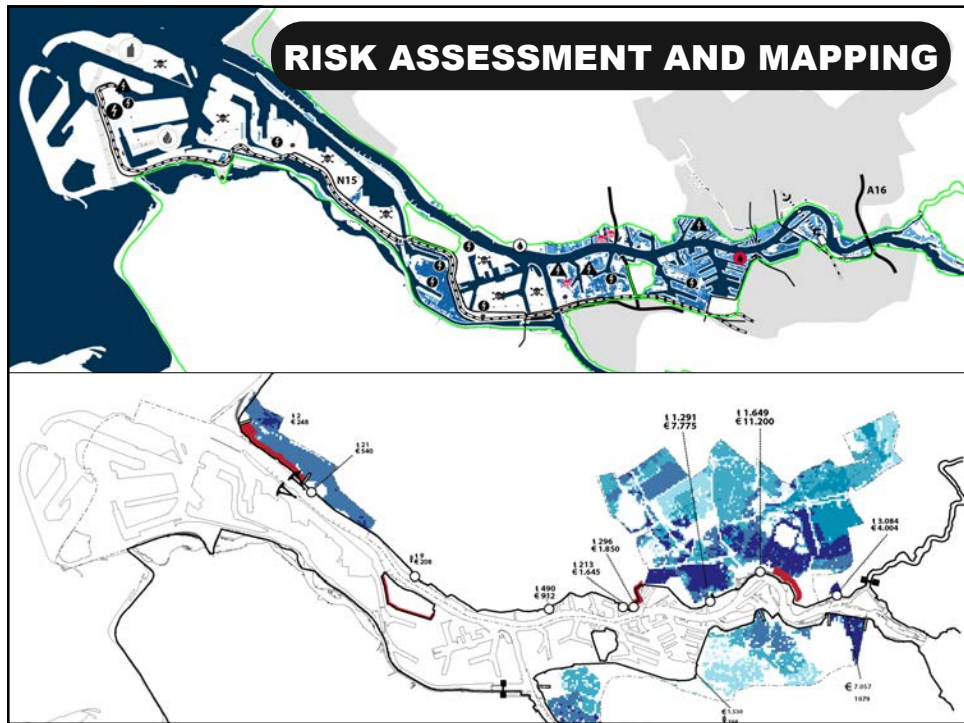
RESULTS

NCW		
Costs	7	min €
Investments	6	min €
Overhead	1	min €
Financial revenues	3	min €
Benefits / Impacts	7	min €
Victims	3	min €
Labor	1	min €
CO2	1	min €
Liveability	1	min €
<b>Total</b>	<b>3</b>	<b>min €</b>
<b>Profitability</b>	<b>20%</b>	<b>%</b>

Actors	Costs	Benefits	Net
Municipality	-6	1	-5
Realm	-2	-	-2
Citizens	-1	7	6
Companies	-2	2	0

GRAPH





## GUIDING PRINCIPLES ADAPTATION STRATEGY

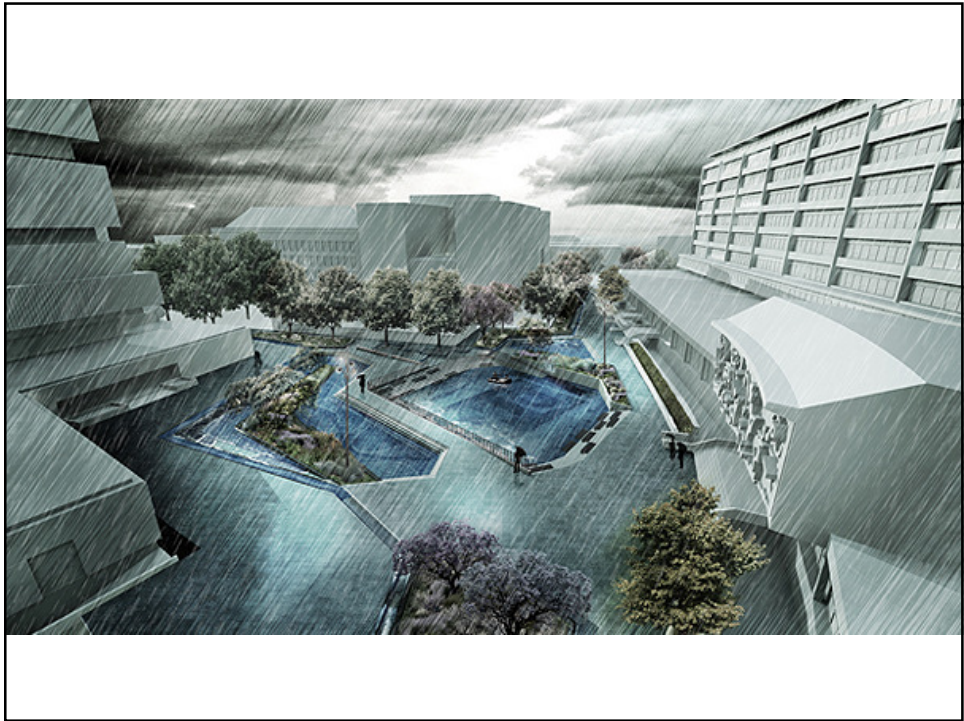


## BLUE SOLUTIONS



# URBAN FLOODPLAIN





## GREEN ROOFS FOR AN ATTRACTIVE CITY

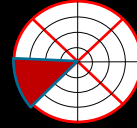


## ECOLOGICAL SOLUTIONS IN THE URBAN DELTA

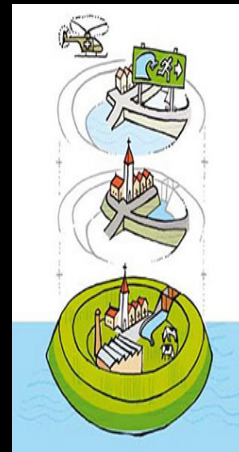
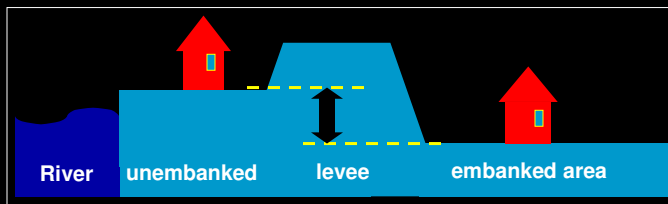


THE NETHERLANDS

## FLOOD MANAGEMENT



- Link to Spatial Planning Projects + processes
- Spatial differentiation
- New financial arrangements
- New governance
- Multi layer approach water safety (embanked and unembanked)

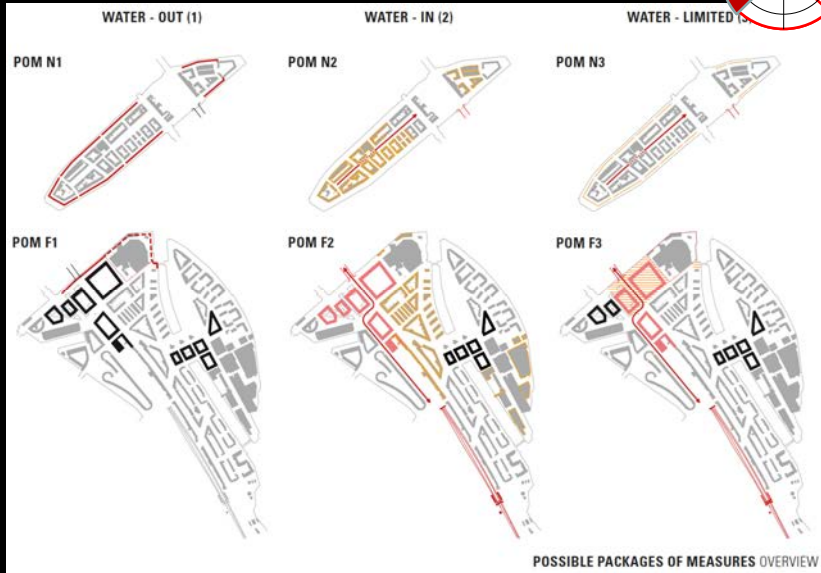


## FLOOD MANAGEMENT





# ADAPTIVE DEVELOPMENT



# ADAPTIVE BUILDING





## NATIONAL & GLOBAL NETWORK

### LOCAL

- City Departments
- Port Authority
- Knowledge Inst.
- Private Partners

### REGIONAL

- Waterboards
- Neighbour Cities

### NATIONAL

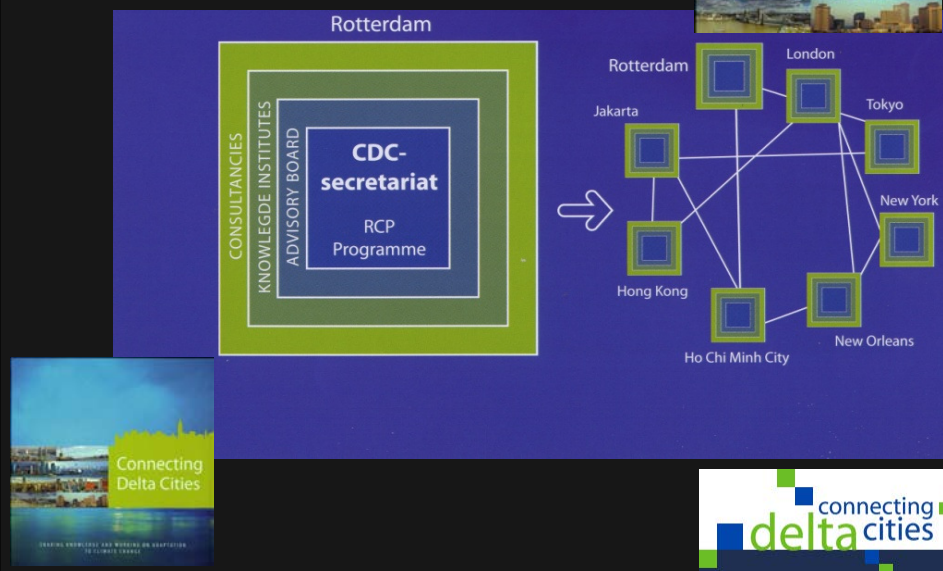
- Min. Departments
- National Delta programme
- Knowledge for Climate

### INTERNATIONAL

- C40
- CDC Partners
- ICLEI



## CONNECTING DELTA CITIES



## TOGETHER WITH PARTNERS



**ABEL**



**DURAVERMEER**

**C40**  
CITIES  
CLIMATE LEADERSHIP GROUP



**TU Delft** Delft University of Technology



**NMP** Netherlands Water Partnership



**DE URBANISTEN**

**VU** UNIVERSITY AMSTERDAM



**NWC** Netherlands Water Centre

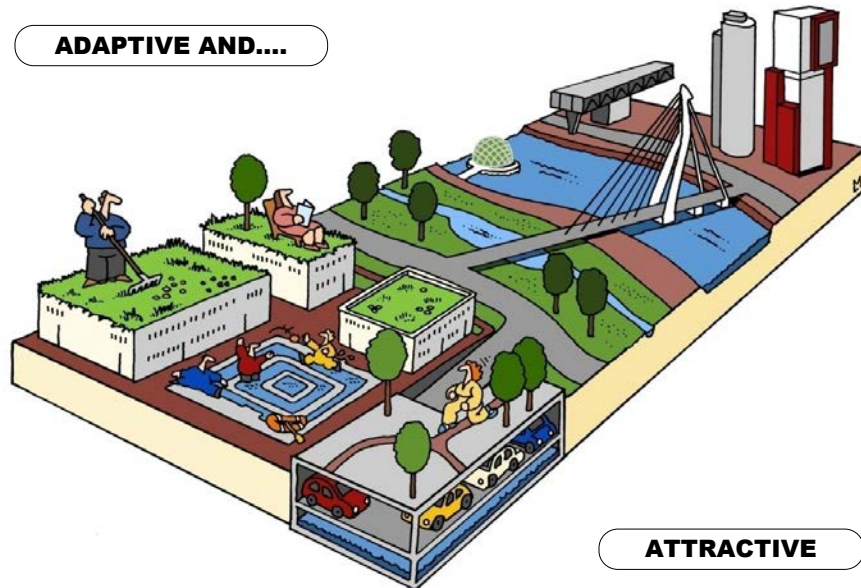


**Deltares**  
Enabling Delta Life

**Grontmij**

**delta sync**  
WATERBASED URBAN DEVELOPMENT

**ADAPTIVE AND....**



**ATTRACTIVE**

[www.rotterdamclimateinitiative.nl](http://www.rotterdamclimateinitiative.nl)

