Climate change and urban resilience:

A Rotterdams' experience

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Egypt Pyramids | Canada Niagara falls | Wetskills Taiwan | Borobudur Indonesia

OUTLINE

Part I: Introduction Netherlands and it's challenges
Part II Introduction Rotterdam and climate adaptation strategies
Part III City Resilience Framework

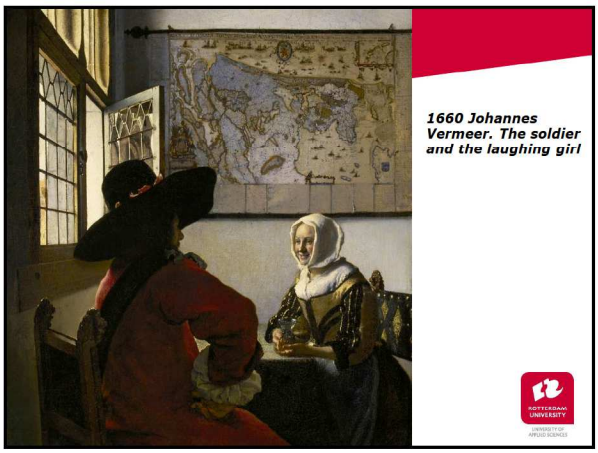
The Difference Between:

Holland & (and a whole lot more) the Netherlands

Fun facts of The Netherlands

- Highest population density in Europe 488 sq/km
  Rotterdam 3.000 sq/km
  (Manila proper 71.263 sq/km)
- 2nd largest exporter of agricultural products
- Schiphol Airport is 4,5 metres below sea level
- **Tallest people in the world**
- There are twice as many bicycles as cars
- There are 1180 windmills
- Netherlands 41.543 sq km (18% water)– Philippines 300.000
- Netherlands 17.0 million – Philippines 100.000
- Highest point 323 meter above sea level – Philippines 2938

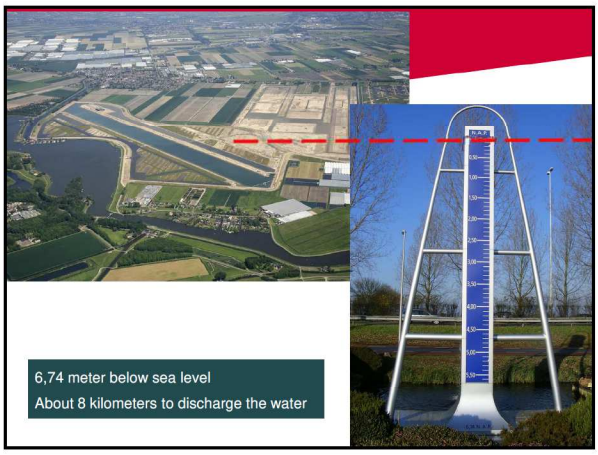
1665 Johannes Vermeer – Girl with a Pearl Earring



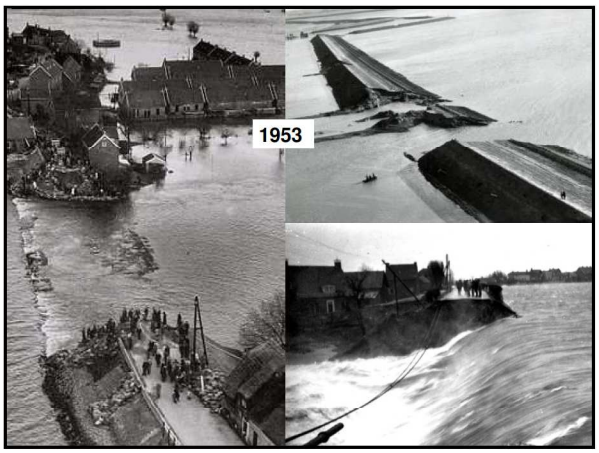
1660 Johannes Vermeer. The soldier and the laughing girl

North- South
300 km

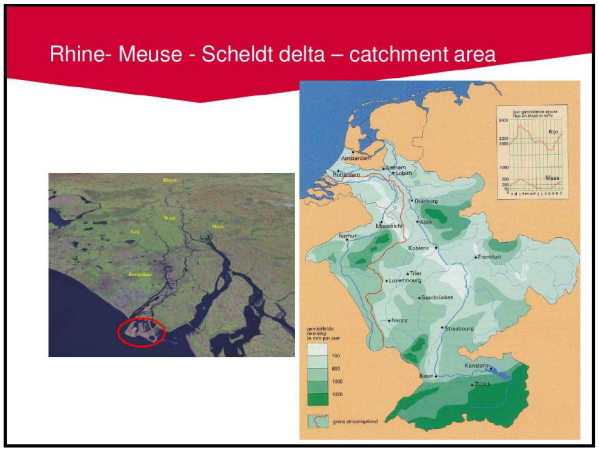
East- West 200 km

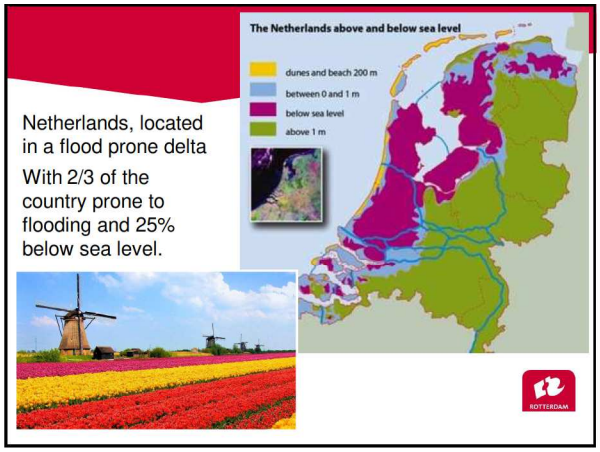


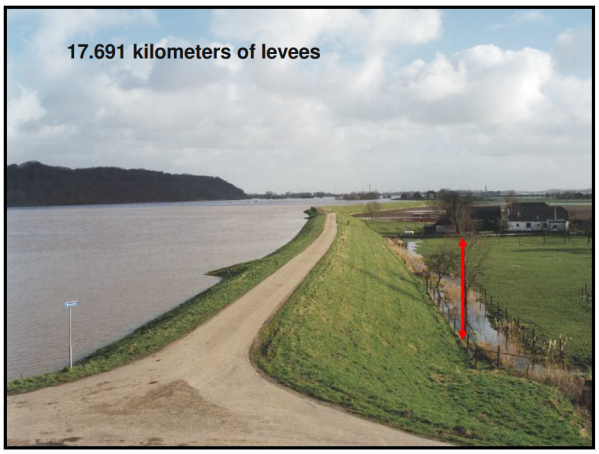
6,74 meter below sea level
About 8 kilometers to discharge the water


1953


Deltaworks
Maeslantkering
Hollandse IJssel Kering
Harinvlietdam
Hartelkering
Brouwersdam
Volkeraksdam
Grevelingendam
Philipsdam
Oosterscheldedam
Veersegatdam
Zeelandbrug
Zandkreekdam
Oesterdam
Bathse Spuisluis
7 WONDERS
of the modern world

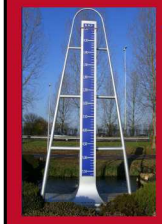

Rhine- Meuse - Scheldt delta – catchment area


The Netherlands above and below sea level
dunes and beach 200 m
between 0 and 1 m
below sea level
above 1 m
Netherlands, located in a flood prone delta
With 2/3 of the country prone to flooding and 25% below sea level.
ROTTERDAM

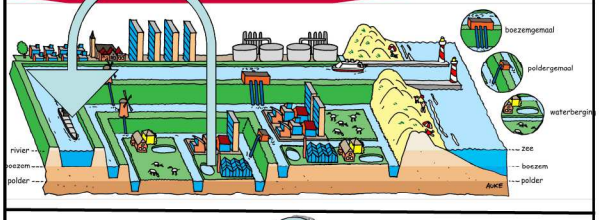

17.691 kilometers of levees

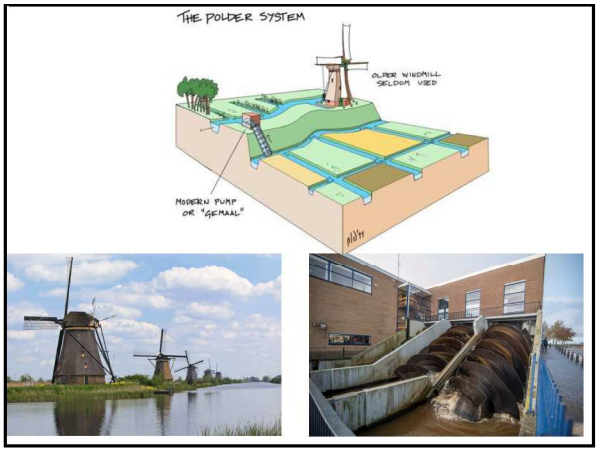

Climate change requires strengthening of the levees and new safety standards

What should you do when your city is located in a bathtub?



Dutch polder system



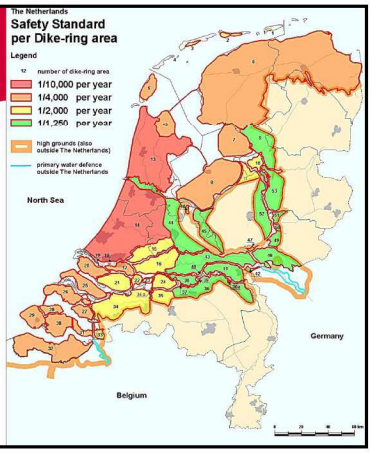


Typical Dutch residence

Ja, je overstroomt maximaal 2.0 meter

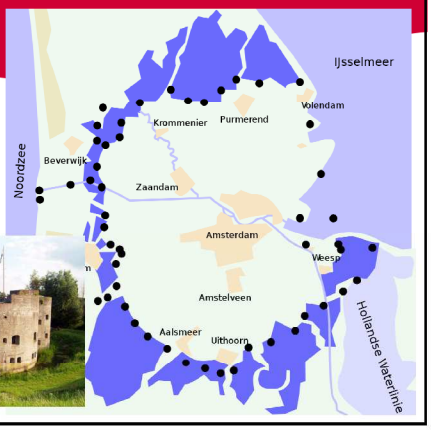
Jij hebt een kans van meer dan 10% dat jij dit in je leven meemaakt. Dat kan ook morgen zijn.

Water safety standards per dike ring (53 bathtubs)

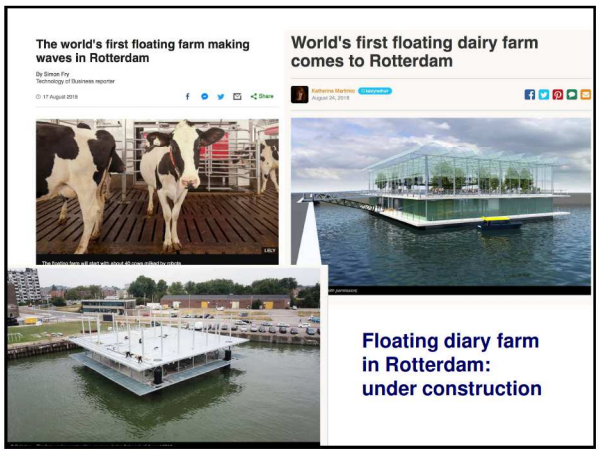


Water as protection:

Dutch waterlinie: Water as a way of protection: Amsterdam: 1880-1920

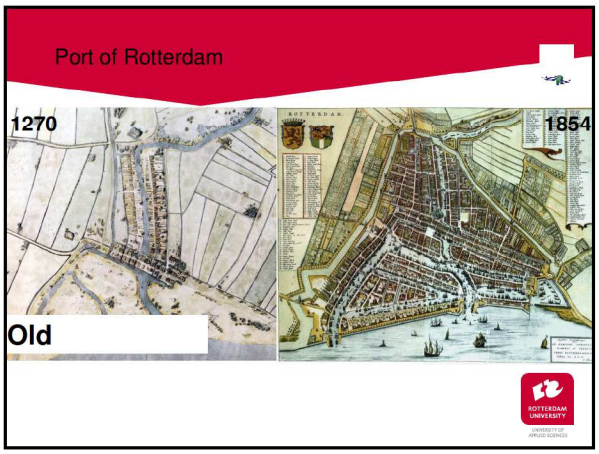



Floating buildings and houses


The world's first floating farm making waves in Rotterdam
World's first floating dairy farm comes to Rotterdam
Floating diary farm in Rotterdam: under construction

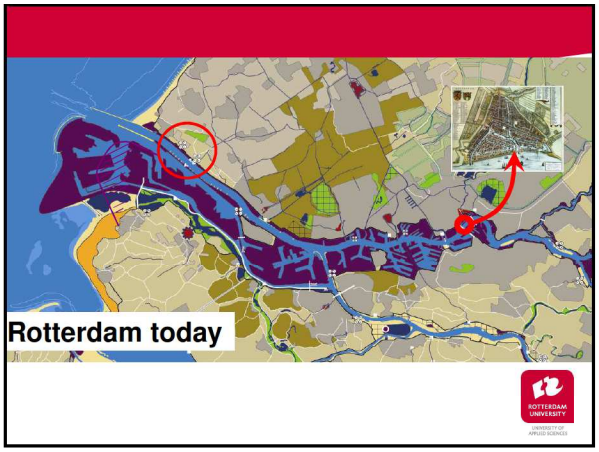

VINTAHANAN
A Floating Village in the South of Manila
VINTAHANAN O FLOATING VILLAGE, SOLUSYON DAW SA HIRAP NG MGA NAKATIRA MALAPIT SA LAGUNA LAKE
FLOATING VILLAGE, ITINATAYO vs. PAGBABAHA

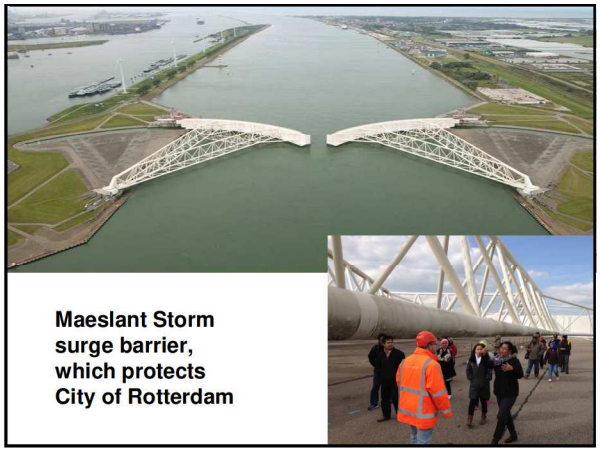

WATER CHALLENGES
in Rotterdam
Credits to Johan Verlinde Water Department City of Rotterdam


Port of Rotterdam
1270
1854
Old


Rotterdam before May 10,1940

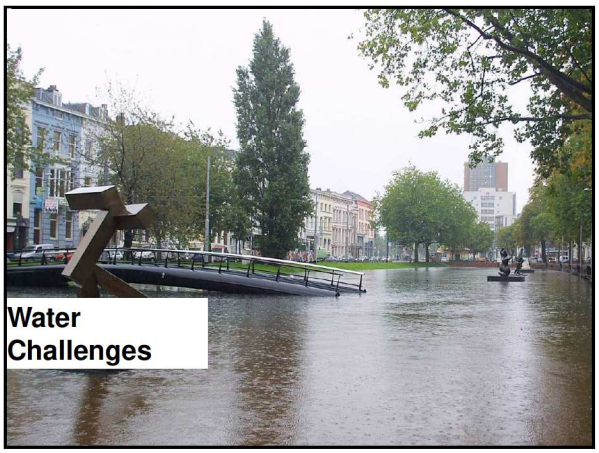

Rotterdam after
May 10, 1940


Rotterdam today


Maeslant Storm
surge barrier,
which protects
City of Rotterdam


Rotterdam &
Water

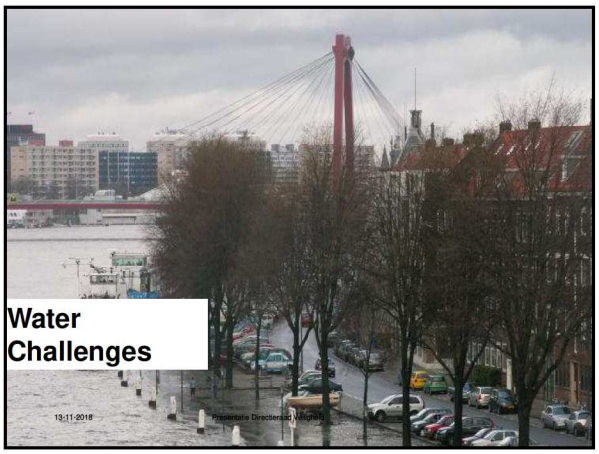

Water in combination with urban quality

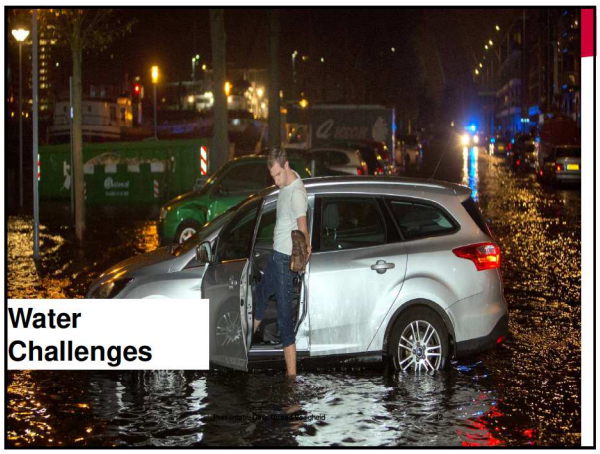

Water
Challenges


Water
Challenges


Water
Challenges
13-11-2018
Presentatie Directeraad Veiligheid
39


Water
Challenges


Water
Challenges
13-11-2018


Water
Challenges

How to define resilience?

According to Merriam Webster dictionairy

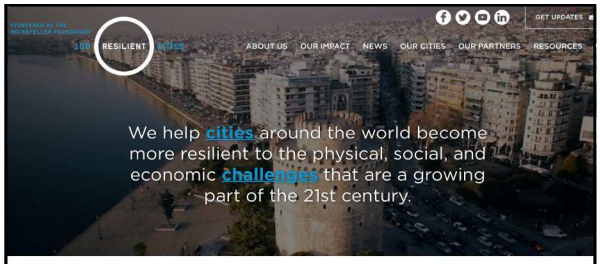
Definition of RESILIENCE

1 : the capability of a strained body to recover its size and shape after deformation caused especially by compressive stress

2 : an ability to recover from or adjust easily to misfortune or change

What is resilience?

- Ability to "bounce back"
- Adapting to hardships and setbacks in life



100 Resilient Cities defines urban resilience as "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience."

City Strategies

The city resilience strategy is one of the core tools that propels 100 Resilient Cities member cities through the process of building resilience. It is a process that helps to come up with new solutions so that cities can act collectively on their resilience challenges. The stratgy is a roadmap.

CHRONIC STRESSES

Chronic stresses are slow moving disasters that weaken the fabric of a city. They include:

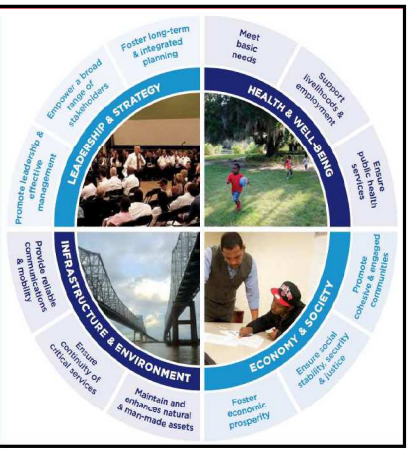
- high unemployment
- overtaxed or inefficient public transportation system
- endemic violence
- chronic food and water shortages

ACUTE SHOCKS

On the other hand, acute shocks are sudden, sharp events that threaten a city, including:

- earthquakes
- floods
- disease outbreaks
- terrorist attacks

City Resilience Framework: 4 dimensions and 3 drivers

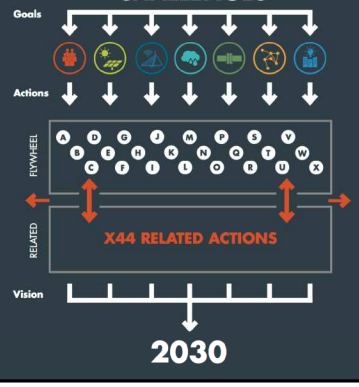


OUR RESILIENCE GOALS.

ROTTERDAM AIMS TO BECOME A CITY IN WHICH RESILIENCE THINKING HAS BEEN ANCHORED IN DAILY LIFE, AS WELL AS IN THE ACTIONS TAKEN BY COMPANIES, INSTITUTIONS, GOVERNMENT AND CITIZENS. SPECIFICALLY WE ARE WORKING TOWARDS THE FOLLOWING GOALS:

1. Rotterdam: A balanced society
2. World port city built on clean and reliable energy
3. Rotterdam Cyber Port City
4. Climate resilient Rotterdam to the next level
5. Infrastructure ready for the 21st century
6. Rotterdam Networkcity – truly our city
7. Anchoring resilience in the city

ROTTERDAM RESILIENCE CHALLENGES



TO IMPROVE AND SECURE OUR CITY'S RESILIENCE WE WANT ALL STAKEHOLDERS TO CONSIDER THE RESILIENCE PERSPECTIVE IN THEIR DAILY LIVES – IN THEIR THOUGHTS AND ACTIONS.

Goal 1: Rotterdam a balanced society

RESILIENCE GOALS.

GOAL 1:
ROTTERDAM: A BALANCED SOCIETY

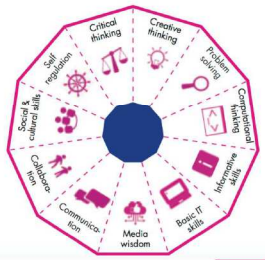
"Skilled and healthy citizens in a balanced society"

WE-SOCIETY

21ST CENTURY SKILLS

STRONG SHOULDERS

21ST CENTURY SKILLS



GOAL 4:
CLIMATE ADAPTIVE ROTTERDAM TO A NEW LEVEL

WATER SENSITIVE ROTTERDAM (WSR)

EMBEDDING CLIMATE ADAPTATION INTO THE URBAN FABRIC OF THE CITY

This action will develop and enhance existing programmes aiming to prepare the city for the impacts of climate change. Measures included within this action are in line with projects already completed in Rotterdam such as Benthemplein, and will be designed to support community learning – specifically in respect of understanding the urgency of the need to take action on climate change. Measures will range in their type and scale but we envisage:

- A large number small projects that can be led by citizens and businesses under the motto "many small actions; make a big difference"
- A small selection of key projects specifically designed to inspire and create publicity and profile
- Effective large-scale projects that run quietly in the background to deepen understanding, support research and tools developed (e.g. rigorous cost / benefit analysis).

RELATED ACTIONS

9 PLAN FOR CLIMATE RESILIENT CRITICAL INFRASTRUCTURE

An important part of the Delta Program is "spatial adaptation", such as spatial adjustments to the existing city within the dykes. An important part of this is critical infrastructure. A new spatial plan will be developed based on regional analysis of critical infrastructure resilience to climate change.

RESILIENCE VALUE

- Supports knowledge sharing, innovation and networking.
- A spatial overlay and mapping can deliver co-benefits in considering development growth opportunities and overlaying other considerations such as socio-economic metrics, renewable energy potential and broader infrastructure opportunities and constraints.

LENS	
SCALE	
OWNER	Municipality, Central Government, Water Boards, Deltaprogram partners, RDC
PARTNERS	Municipality, Central Government, Water Boards, Deltaprogram partners, RDC
FINANCE (POSSIBLE)	Municipality, Central Government, Water Boards
STATUS	New
RESULT	Short-term
RELATED	K L

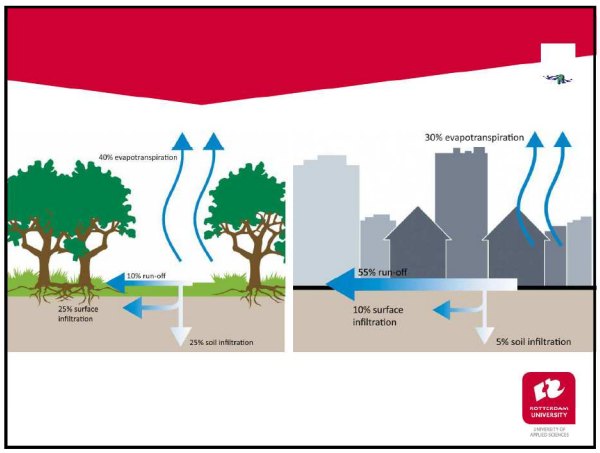
VERTICAL EVACUATION PLANNING

An important part of the National Delta Program is the concept of "multi-layer safety". This involves prevention (1st layer) spatial adaptation (2nd layer) and evacuation (3rd layer). The evacuation layer has yet to be fully planned and developed. The pilot study "crisis management during floods" found that vertical evacuation needs proper consideration as a serious option for layer 3. Specifically, consideration should be given to the fact that the highest areas are located along the river, outside the dykes and the entire port area. We will develop a vertical evacuation plan as part of our resilience strategy implementation.

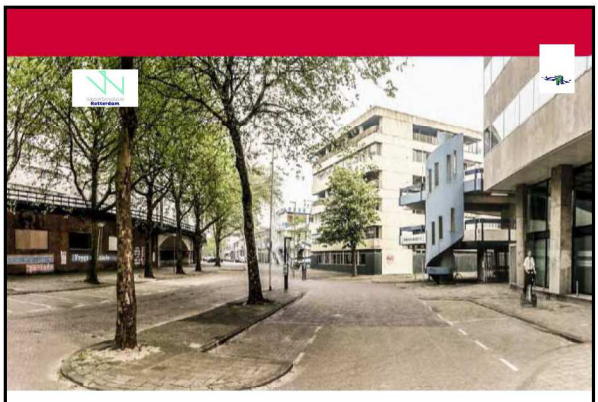
RESILIENCE VALUE

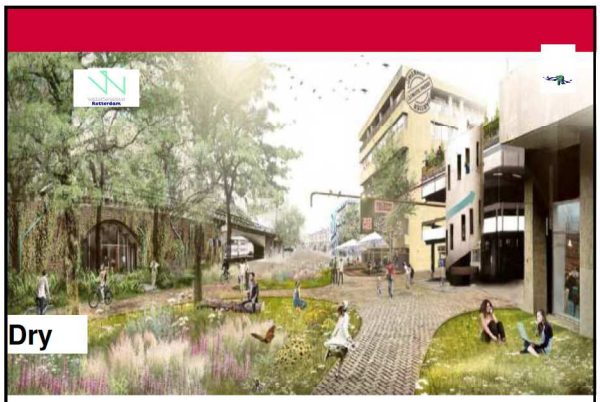
- Supports preparedness and embeds considerations for evacuation into all aspects of the city and port.

LENS	
SCALE	
OWNER	municipality
PARTNERS	central government, water boards, RDC
FINANCE (POSSIBLE)	central government, water boards, Regional Safety Board, RDC
STATUS	New
RESULT	Short-term
RELATED	S L



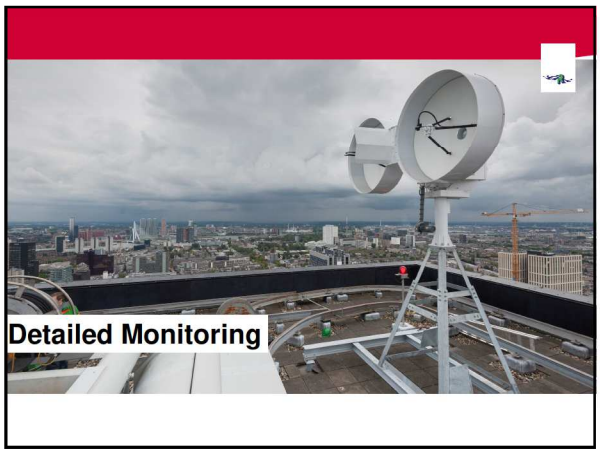
Rotterdam Roofscapes

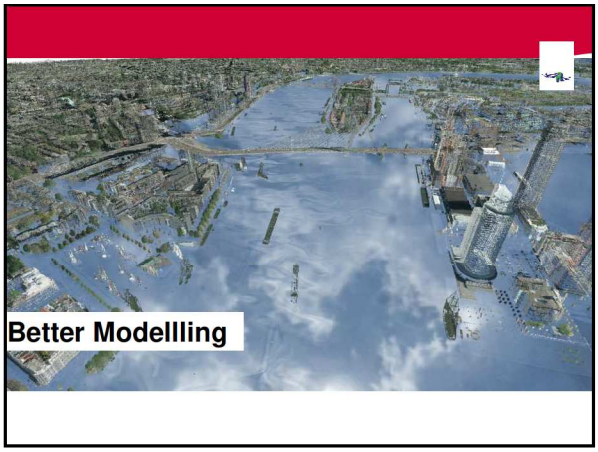


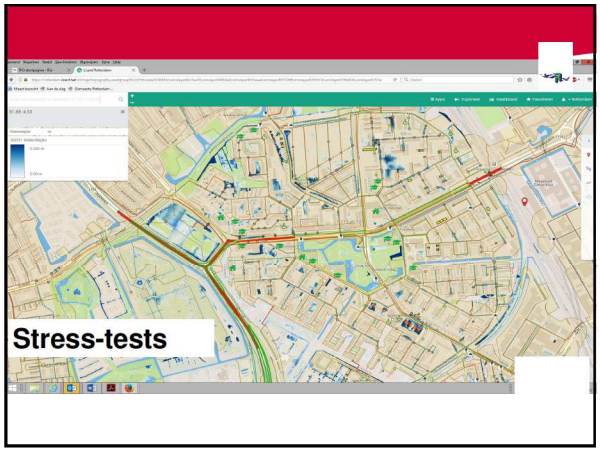


Dry

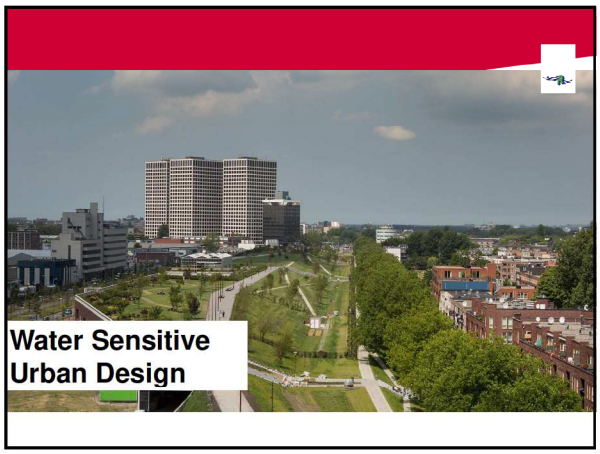

Wet


Detailed Monitoring

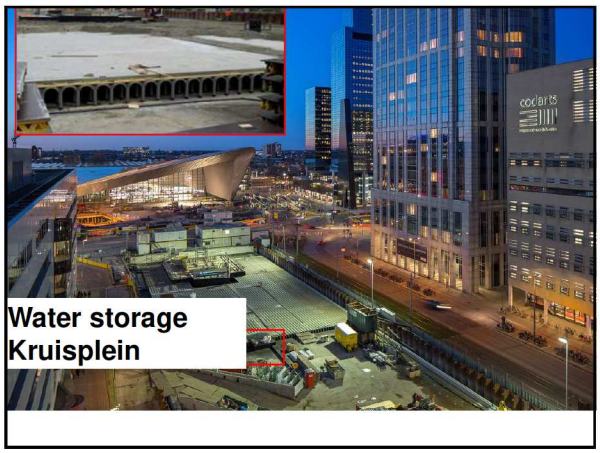

Better Modellling

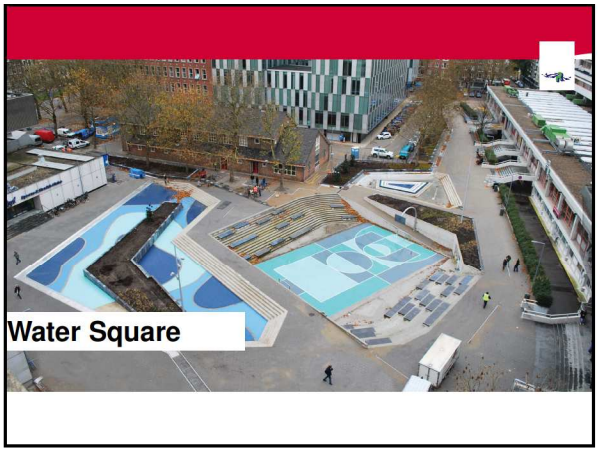

Stress-tests

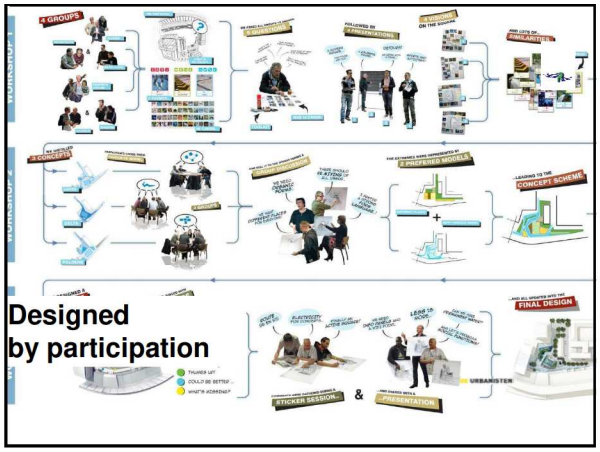

Water Sensitive
Urban Design


Water Sensitive
Urban Design

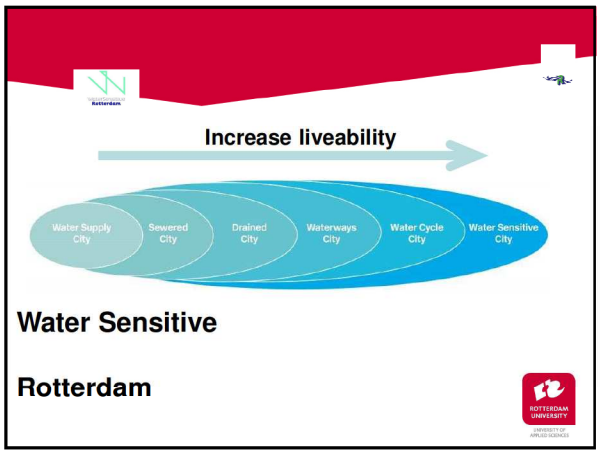

Water Sensitive
Urban Design

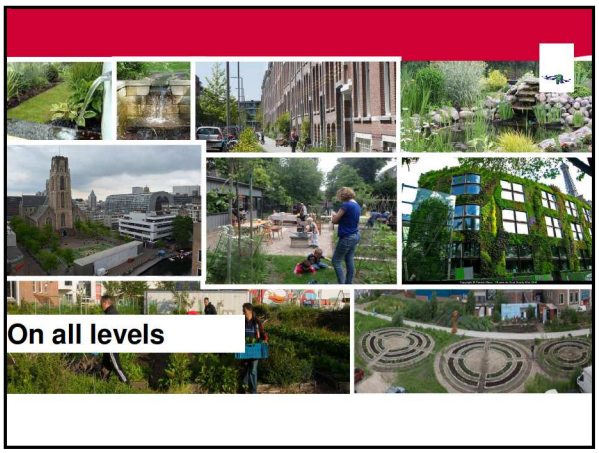

Water storage
Kruisplein

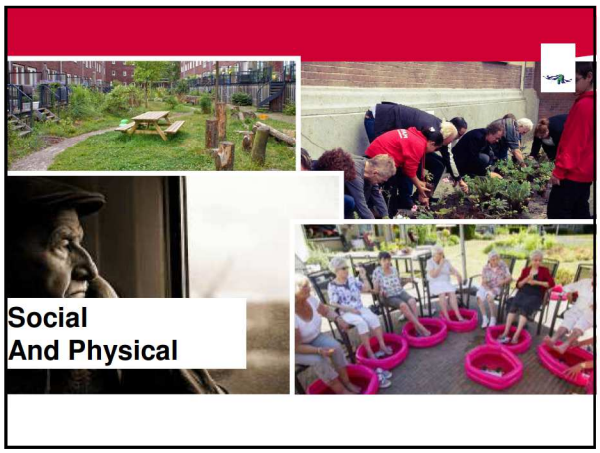

Water Square

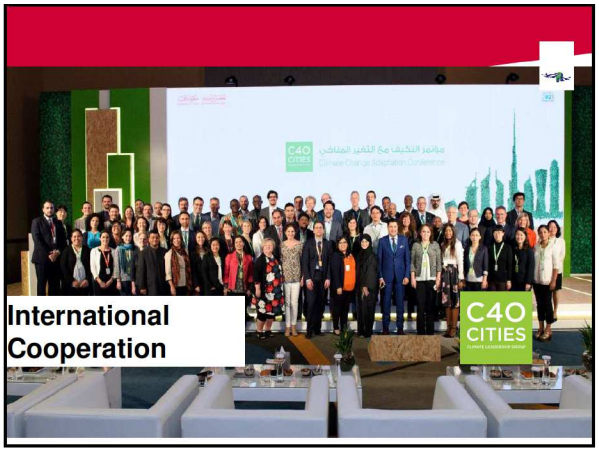

Designed
by participation


Social
Housing
Project
Developer
Private
Homes


Increase liveability
Water Supply City
Sewered City
Drained City
Waterways City
Water Cycle City
Water Sensitive City
Water Sensitive
Rotterdam


On all levels


Social
And Physical


International
Cooperation
C40
CITIES


City to City
Cooperation
Jakarta-Rotterdam
Dutch Training and
Exposure Program
(DUTEP)
Recommendation
DAN BUKA PUASA BERSAMA
HOGESCHOOL ROTTERDAM


Butuanon River Scan 2018, Philippines
FLOOD FREE
LETS WORK
TOGETHER!!
RAFI and USC
Challenge
SANI-EMBANKMENT PROJECT SA MA-A SLAUGHTERHOUSE,
APROBADO NA SA KONSEHO