Rotterdam:
Water & Climate Resilient Delta City

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@ResilientRdam

www.resilientrotterdam.nl

Proudly brought to you by Water New Zealand

Stormwater 2023

Te Roopu Wai Āwhātanga

23–25 May | Cordis, Tāmaki Makaurau Auckland

RESILIENT ROTTERDAM

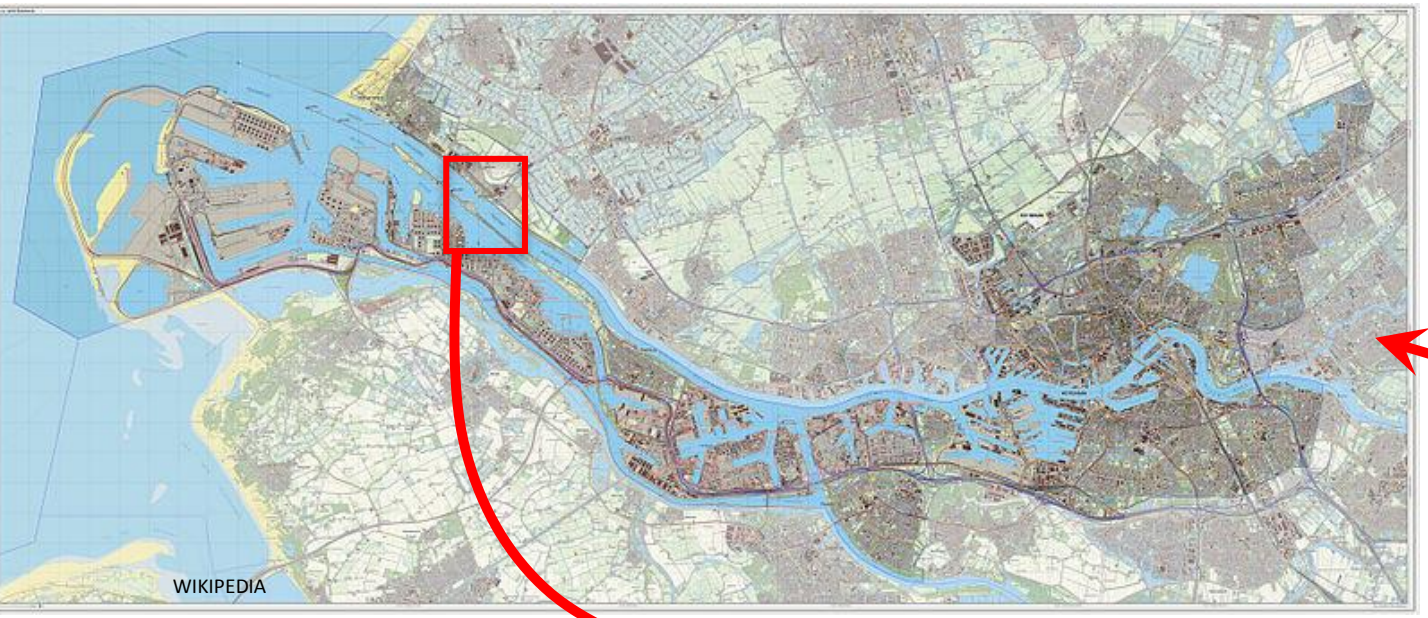
Rotterdam Delta and Port City

City

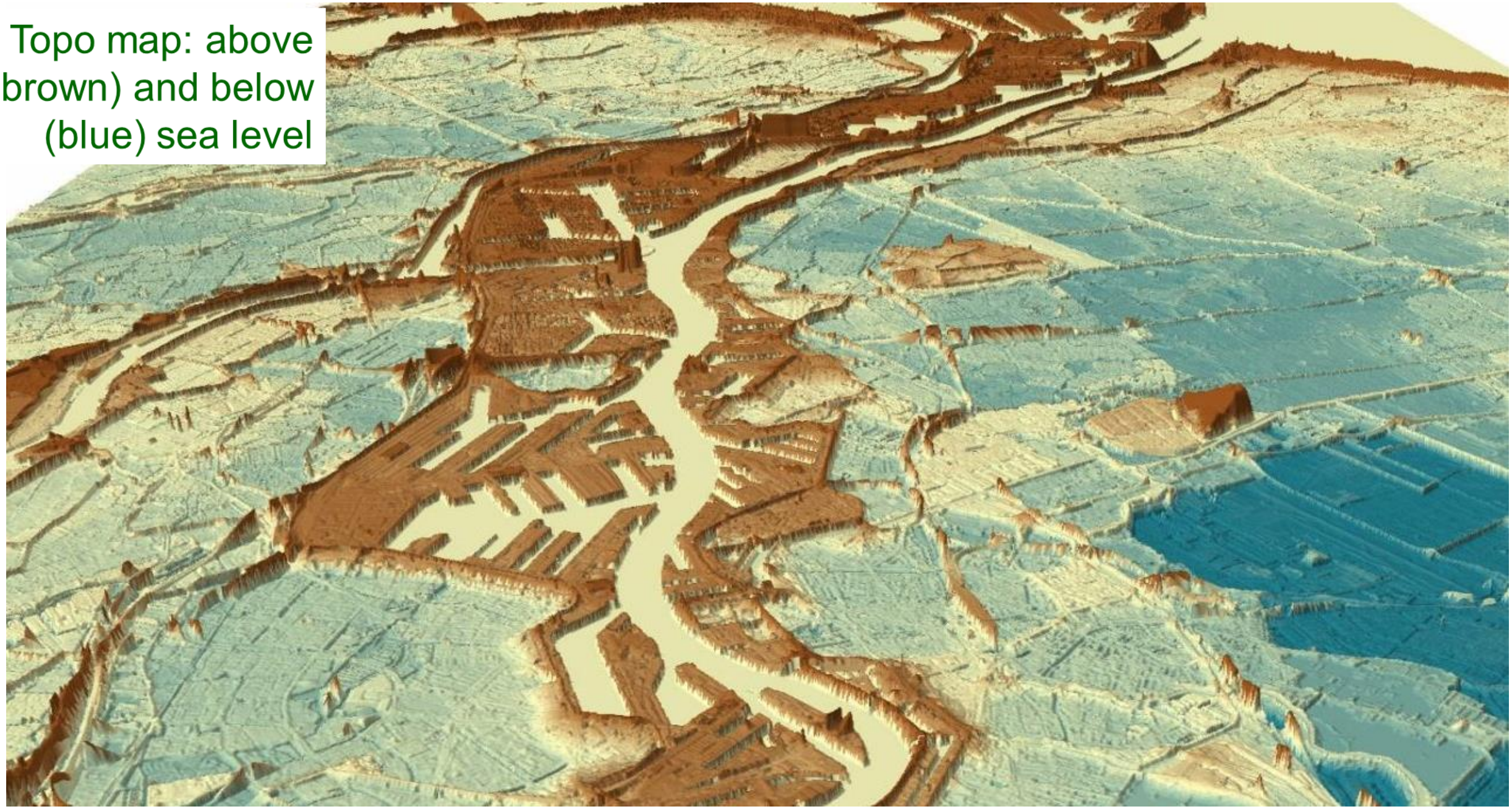
Area :	320 km2
Inhabitants:	650.000
Nationalities:	175
Municipal Budget:	4 billion Euro's

Port

Area:	105 km2 (50 km2 commercial sites)
Length of port area:	45 km.
Direct employment:	over 70,000 jobs



Topo map: above (brown) and below (blue) sea level




HANDEL


RAFIE
DIMENSION


+ 50.000 HOUSES
RESILIENT ROTTERDAM
willemswerf
SHOW TIME
HUDSON'S BAY
de Maas
westermeijer
STEDIN
f/otografie


Precipitation
Sea
River
Groundwater

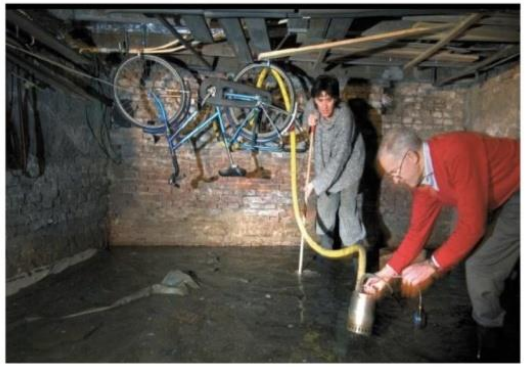
Effects related to Climate Change

Flooding Noordereiland

Water quality

Excessive rain fall

Levee breakthrough (drought)



Inundated cellars

Heat waves

Integrated and Holistic approach is needed

VULNERABLE DELTA CITY

URBANIZATION

CLIMATE CHANGE

MULTIPLE CHALLENGES

WE NEED TO ACT: INTEGRATED & HOLISTIC & INCLUSIVE WITH STAKERHOLDERS AND CITIZENS

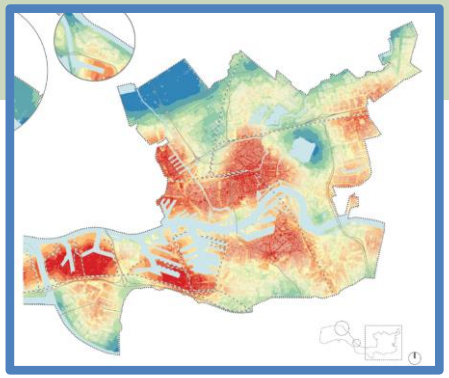
NEW NARRATIVE

WE CAN USE WATER RESILIENCE AS LEVERAGE FOR A MORE LIVEABLE AND ATTRACTIVE CITY

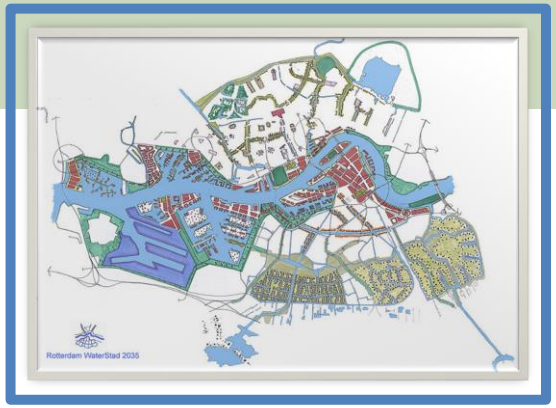
Adaptive ànd Attractive!

ROTTERDAM APPROACH: COMPONENTS

RISK ASSESSMENT
- IDENTIY CLIMATE RISKS
- AND URBAN HOTSPOTS



VISION
- HOLISTIC FUTURE PERSPECTIVE (LT)
- WATER AS VALUE
- LIVING WITH WATER



STRATEGY
- INTEGRATED: ALL ASPECTS
- CITY + DISTRICTS
- ANALYSES BASED

ACTIONPLAN
- SHORT TERM
- MONITORING
- NO REGRET

IMPLEMENTATION
- NO REGRET
- PILOTS
- DISTRICT LEVEL
- UPSCALING

ROTTERDAM CLIMATE CHANGE ADAPTATION STRATEGY

Holistic, multi-level and multi-stakeholder strategy

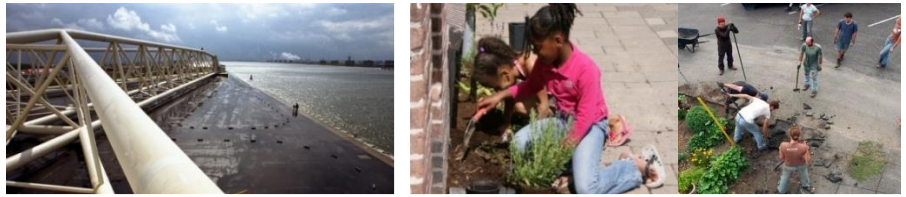
Robust and resilient

Sewerage + watersquare

Protection and moving in tune

Dikes + adaptive building en design

Delta works, small scale projects



Storm surge barriers + 'Remove tile, plant greening'

Technology and nature based

Pumping + green river banks

PROGRAM FRAMEWORK ROTTERDAM WEATHERWISE 2030

1 CLIMATE ADAPTATION CHALLENGES


Flooding


Rainfall


Heat


Groundwater


Land Subsidence


Drought

2 IMPLEMENTATION OPPORTUNITIES


New Developments


Existing built Environment


Energy- / Mobility- / biodiversity Transition


Public Space


The Rotterdammers

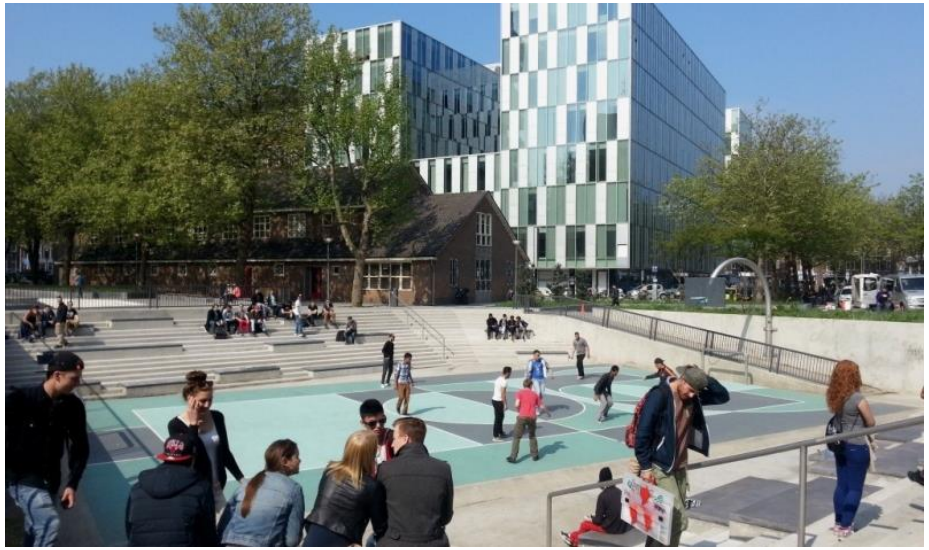
ASSESSMENT FRAMEWORK

4 WEATHERWISE PRIORITIES 2030

3 TOOLKIT MEASURES

Implementation agenda 2022 - 2026

Implementation agenda 2026 - 2030



MULTI BENEFIT SOLUTIONS

WATER SQUARE Benthemplein…

MULTI BENEFITS: SOCIAL RESILIENCE

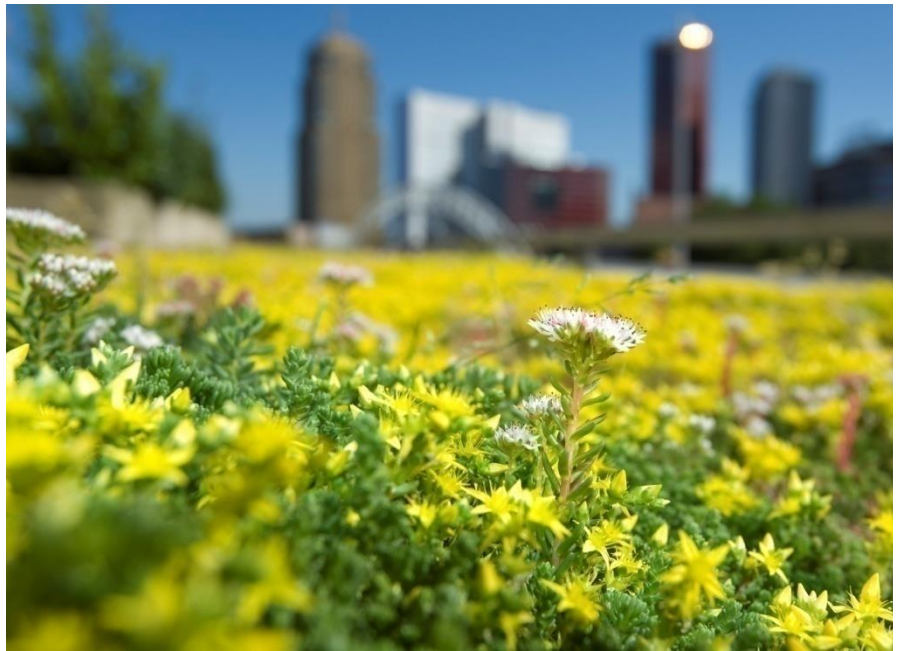
RESILIENT ROTTERDAM

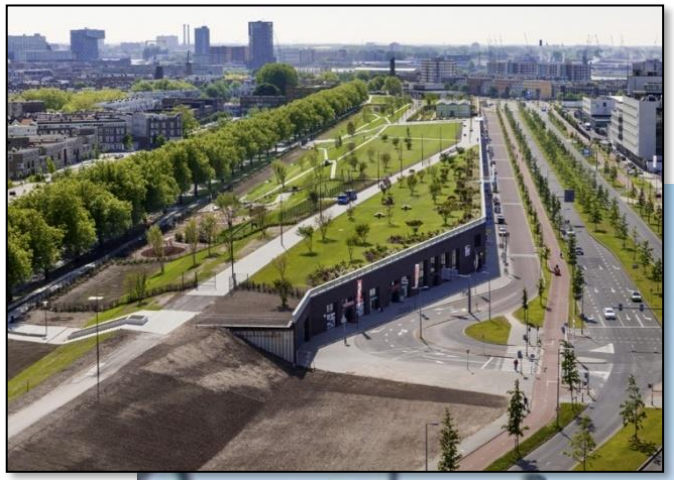
… CLIMATE RESILIENCE BY DESIGN...

‘URBAN FLOODPLAIN’


ZUIDAS

GREEN ROOFTOP PROGRAM (460.000 m2)





… SEA LEVEL RISE - CLIMATE RESILIENCE BY DESIGN...

BUILDING WITH NATURE: green solutions

TIDAL PARKS:

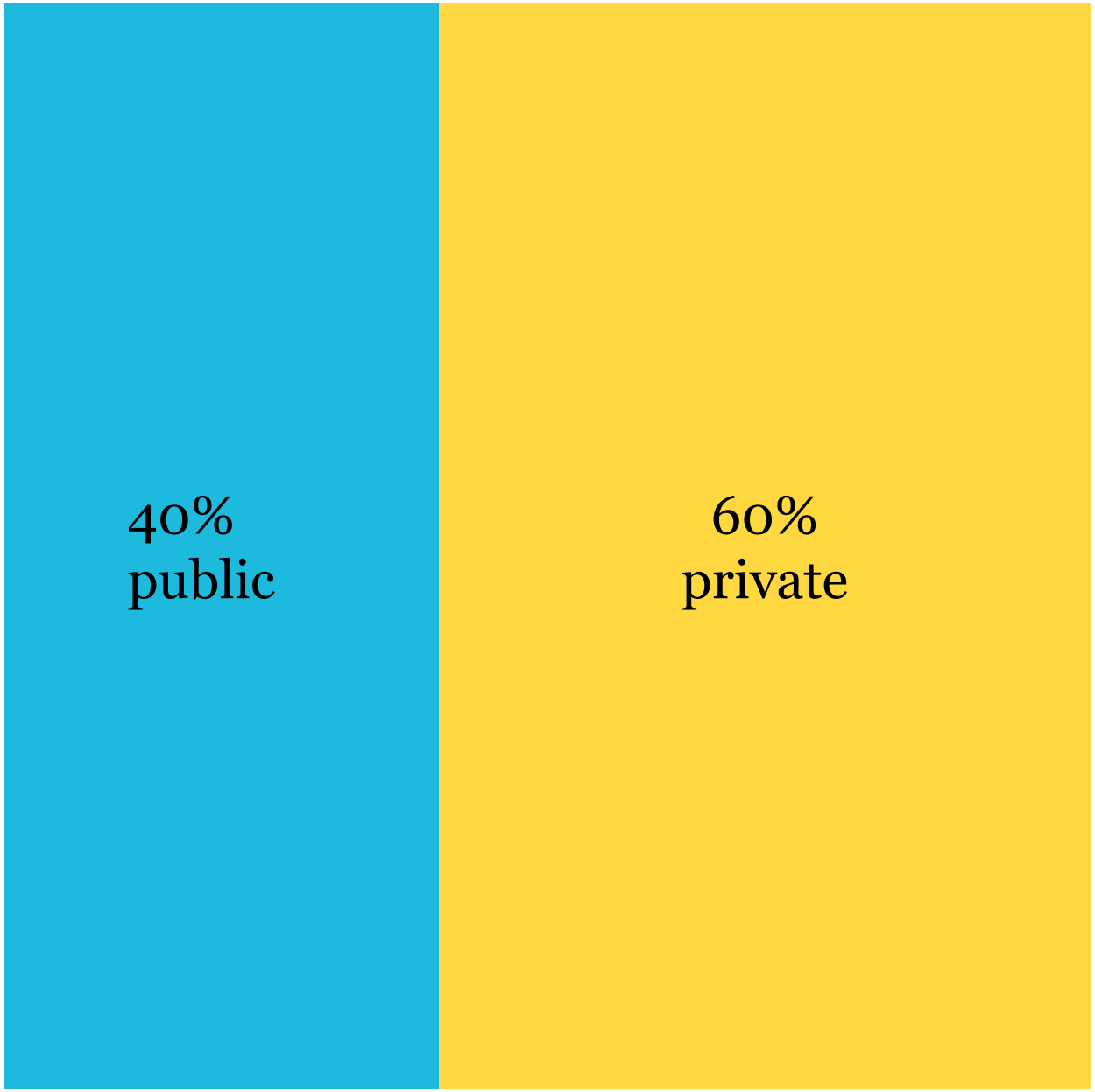
1: NEW ECO-HABITATS

2: REUSE OF SEDIMENTS

3: WAVE REDUCTION

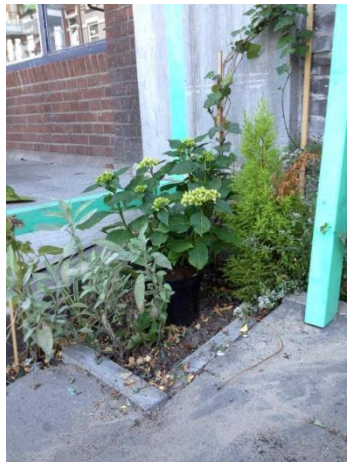
4: BETTER WATER QUALITY

FLOATING URBAN DEVELOPMENT


40%
public
60%
private

From ‘together with citizens’ to ‘done by citizens’






POST-OFFICE

NATIONAL COMPETITION
TILE POPPING

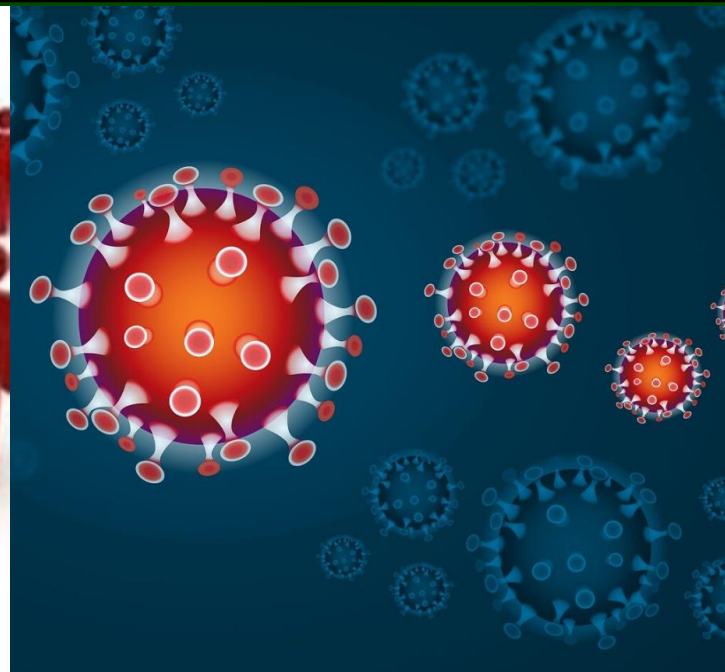
Bloomberg CityLab Environment

One Way to Green a City: Knock Out the Tiles

Removing the Netherlands’ ubiquitous tiles from front gardens is part of a broader initiative to expand green space in several cities.

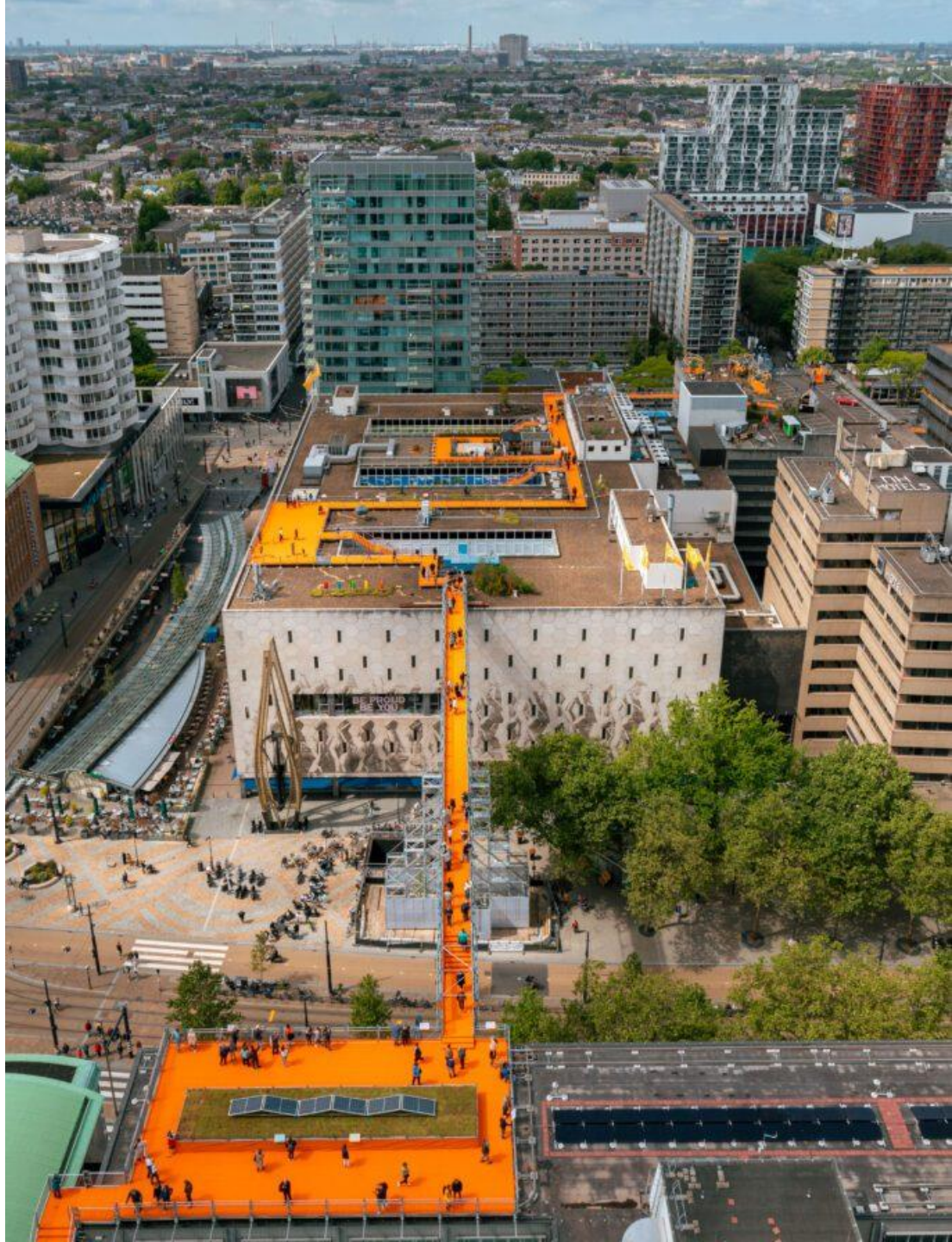
By Diederik Baazil
5 januari 2021 07:00 CET

MORE CHALLENGES



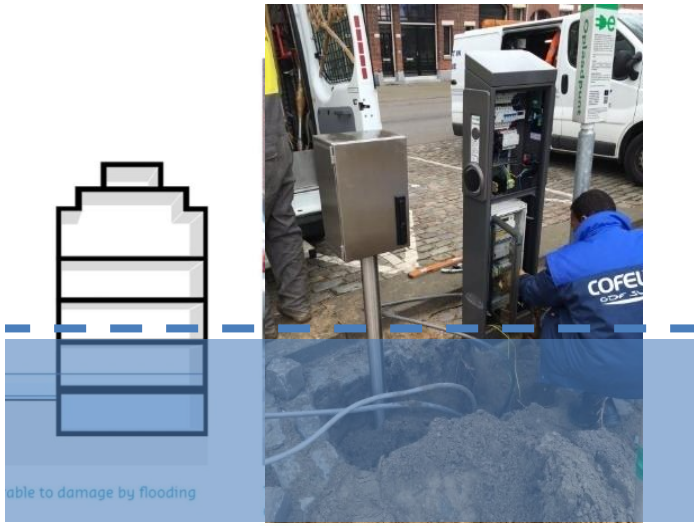
MULTI-FUNCTIONAL ROOFTOP LANDSCAPE

NEXT LEVEL INTEGRATED APPROACH NEEDED



ACCELERATION SEA LEVEL RISE

FLOODING & VITAL INFRASTRUCTURE: CASCADE EFFECTS



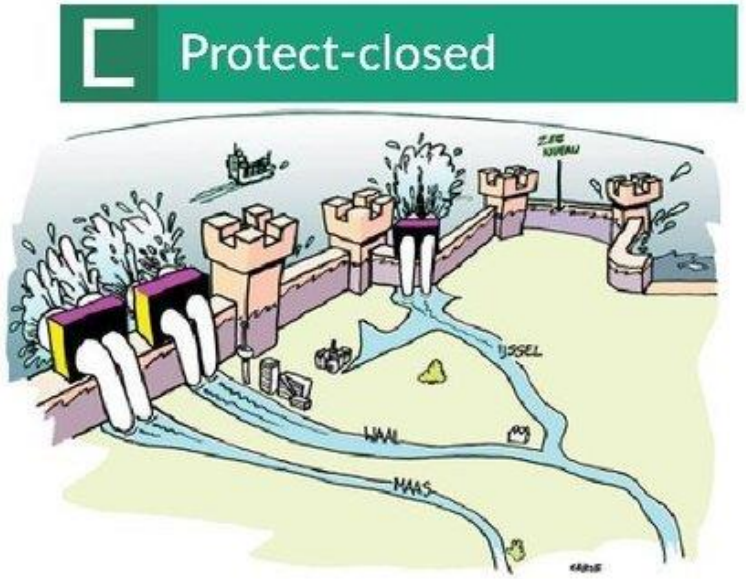
LONG TERM SCENARIO'S 3 METER SEA LEVEL RISE
WATER RESILIENCE < > ECONOMICAL RESILIENCE

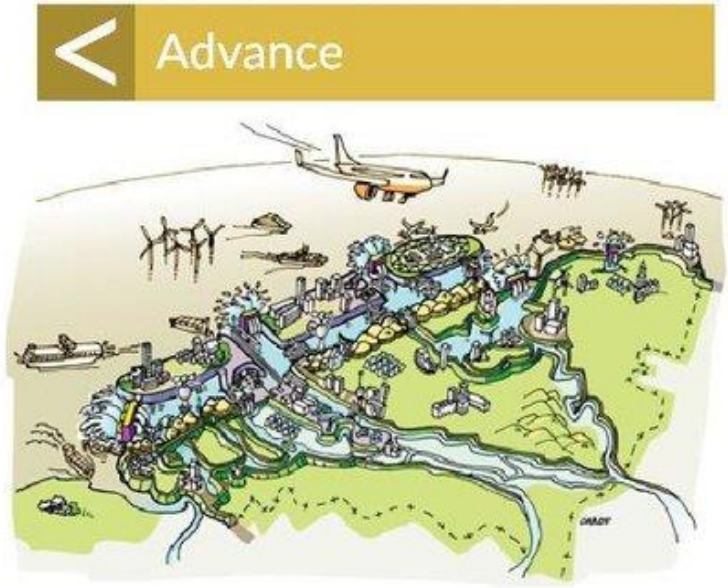
MANAGED RETREAT?

4 LONG TERM FUTURE SCENARIO'S (EXTREMES)

RETHINK THE DELTA!

IMPORTANT FOR SHORT TERM DECISIONS





CLIMATE AND CYBER RESILIENT INFRASTRUCTURE IS NEEDED

New York: b by Hurricane Sandy in okt. 2012: Black-out

Source: Iwan Baan

SMART *AND* RESILIENT !?

HOW RESILIENT IS OUR CRITICAL INFRASTRUCTURE?

CITIES EXCHANGE!!
WATER ADAPTATION COMMUNITY (GCA-WAC)

Accra, Ghana
Addis Ababa, Ethiopia
Cape Town, South Africa
Dakar, Senegal
Durban, South Africa
Kigali, Rwanda
Lagos, Nigeria
Luxor, Egypt
Nairobi, Kenya
Paynesville, Liberia

EUROPE AND THE MIDDLE EAST

Amman, Jordan
Athens, Greece
Barcelona, Spain
Belfast, U.K.
Belgrade, Serbia
Bristol, U.K.
Byblos, Lebanon
Glasgow, U.K.
Greater Manchester, U.K.
Lisbon, Portugal
London, U.K.
Milan, Italy
Paris, France
Ramallah, Palestine
Rome, Italy
Rotterdam, The Netherlands
Tbilisi, Georgia
Tel Aviv-Yafo, Israel
The Hague, The Netherlands
Thessaloniki, Greece
Vejle, Denmark

ASIA PACIFIC

Bangkok, Thailand
Can Tho, Vietnam
Chennai, India
Christchurch, New Zealand
Da Nang, Vietnam
Deyang, China
Huangshi, China
Jakarta, Indonesia
Kyoto, Japan
Mandalay, Myanmar
Melaka, Malaysia
Melbourne, Australia
Pune, India
Semarang, Indonesia
Seoul, South Korea
Singapore
Surat, India
Sydney, Australia
Toyama, Japan
Wellington, New Zealand

LATIN AMERICA AND THE CARIBBEAN

Buenos Aires, Argentina
Cali, Colombia
Colima, Mexico
Guadalajara, Mexico
Ciudad Juarez, Mexico
Medellin, Colombia
Mexico City, Mexico
Monterrey, Mexico
Montevideo, Uruguay
Panama City, Panama
Porto Alegre, Brazil
Quito, Ecuador
Rio de Janeiro, Brazil
Salvador, Brazil
San Juan, Puerto Rico
Santa Fe, Argentina
Santiago Metropolitan Area, Chile
Santiago de los Caballeros, Dominican Republic

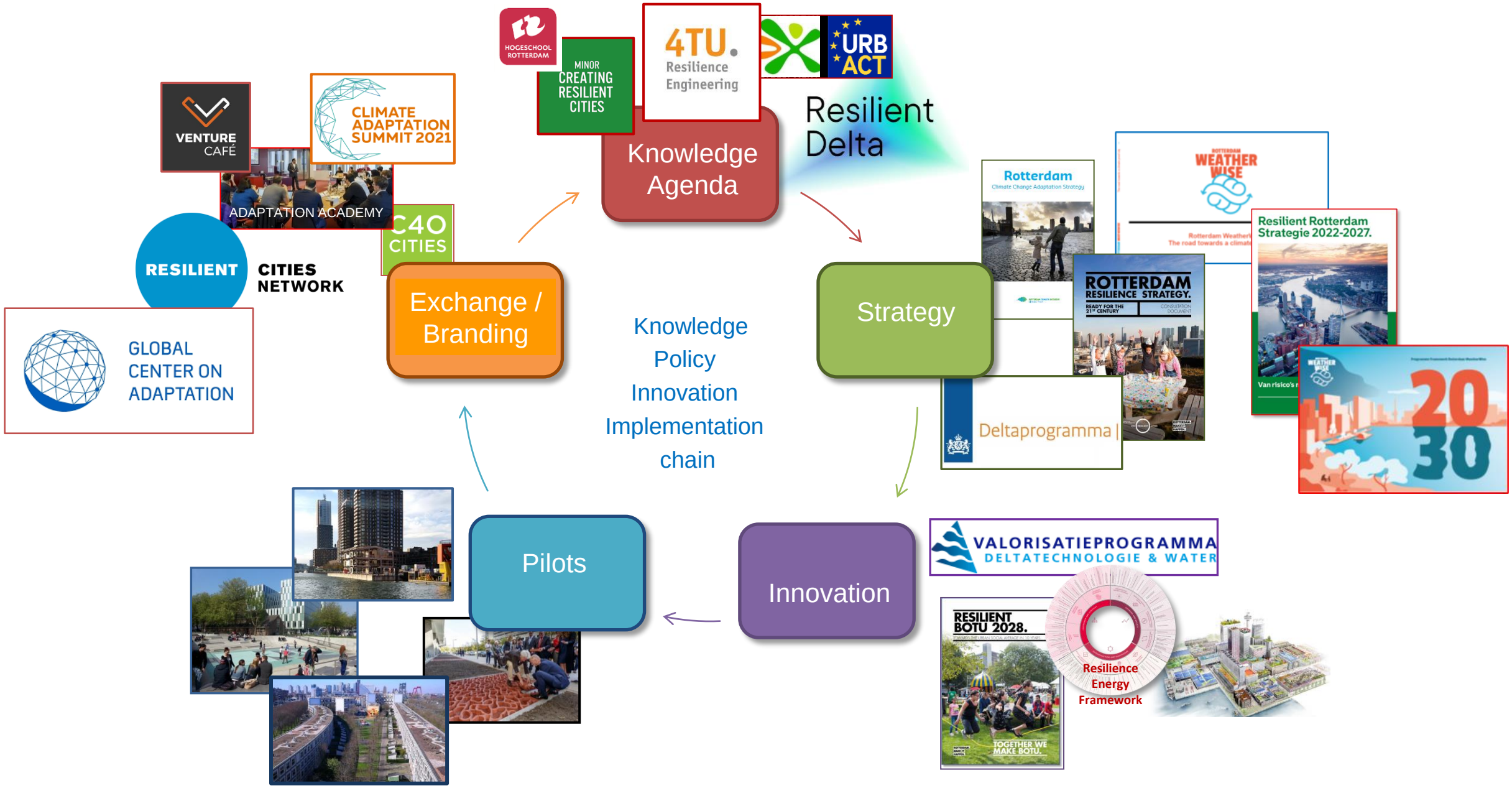
NORTH AMERICA

Atlanta, U.S.
Berkeley, U.S.
Boston, U.S.
Boulder, U.S.
Calgary, Canada
Chicago, U.S.
Dallas, U.S.
El Paso, U.S.
Greater Miami & the Beaches, U.S.
Honolulu, U.S.
Houston, U.S.
Los Angeles, U.S.
Louisville, U.S.
Minneapolis, U.S.
Montreal, Canada
Nashville, U.S.
New Orleans, U.S.
New York, U.S.
Norfolk, U.S.
Oakland, U.S.
Pittsburgh, U.S.
San Francisco, U.S.
Seattle, U.S.
St. Louis, U.S.
Toronto, Canada
Tulsa, U.S.
Vancouver, Canada
Washington, D.C., U.S.

Resilient Cities Network

A new global initiative

THE RESILIENT ROTTERDAM 'ECOSYSTEM'



INTEGRATED/HOLISTIC APPROACH NEEDED!

ON ALL LEVELS WE HAVE TO BRAKE DOWN SILO'S

BASED ON ACTIVE PARTICIPATION OF RESIDENTS

MULTI BENEFIT SOLUTIONS ARE NEEDED

COLLABORATE EN EXCHANGE WITH OTHER CITIES

RESILIENT ROTTERDAM

www.resilientrotterdam.nl

Resilient Rotterdam Strategy 2022-2027