

1st Workshop on local adaptation promotion "How to promote adaptation action in region?"

Mitsubishi Building, 2-5-2 Marunouchi, Chiyoda-ku, Tokyo, 5 December 2018

Local and regional adaptation measures in the context of national and international ambitions: the case of Rotterdam

Dr. Kim van Nieuwaal – Climate Adaptation Services



National policy: National Climate Adaptation Strategy

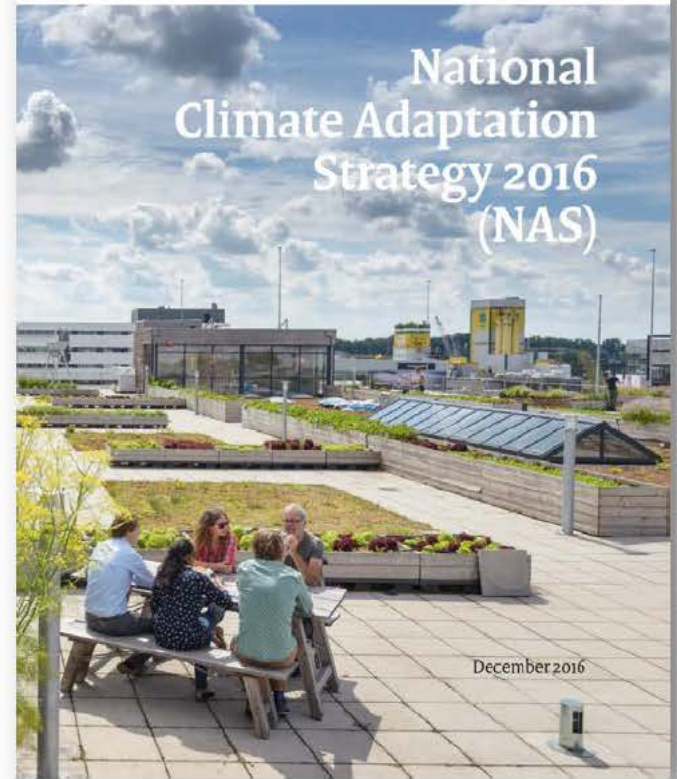
Four climate trends and their impact on nine sectors

C2

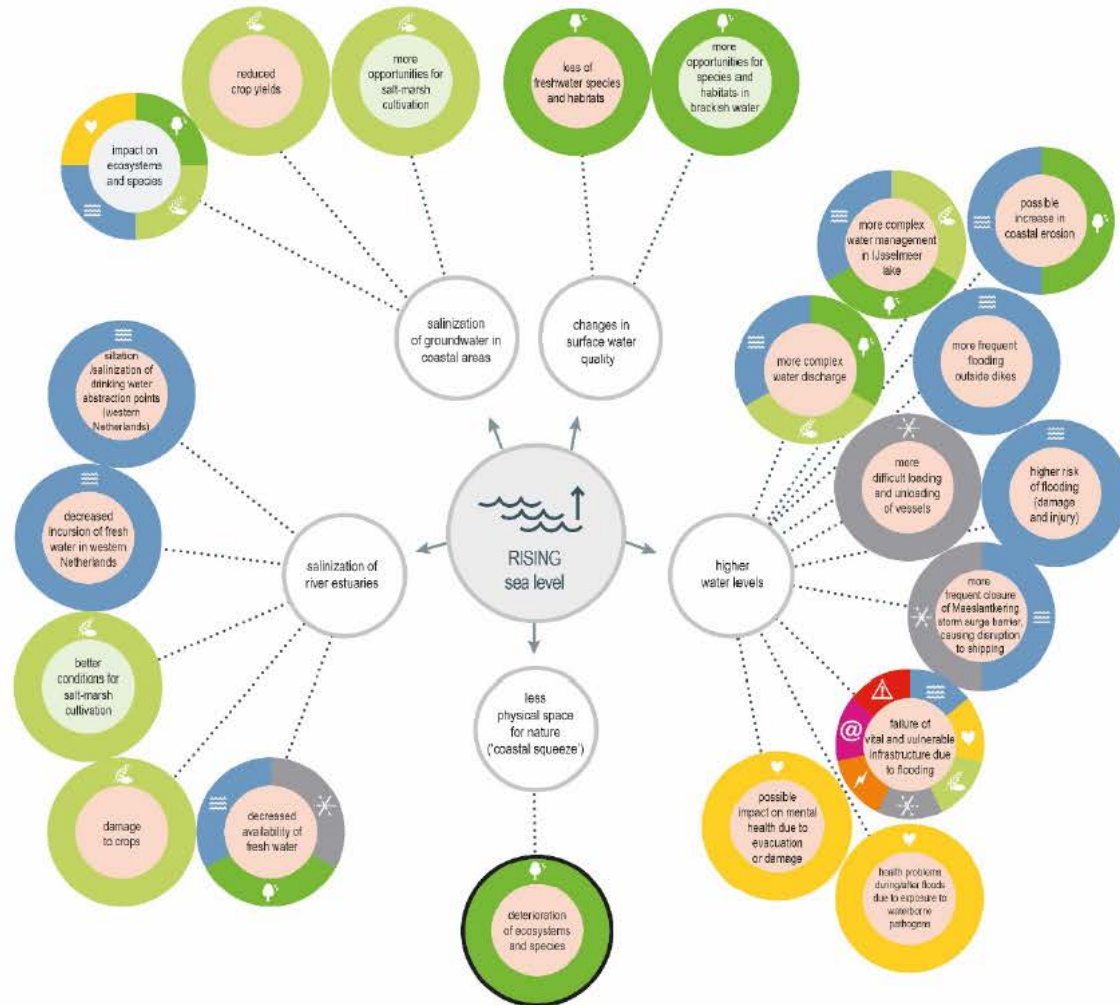


Adapting with ambition

National Climate Adaptation Strategy 2016 (NAS)



NAS NL: effects of sea level rise



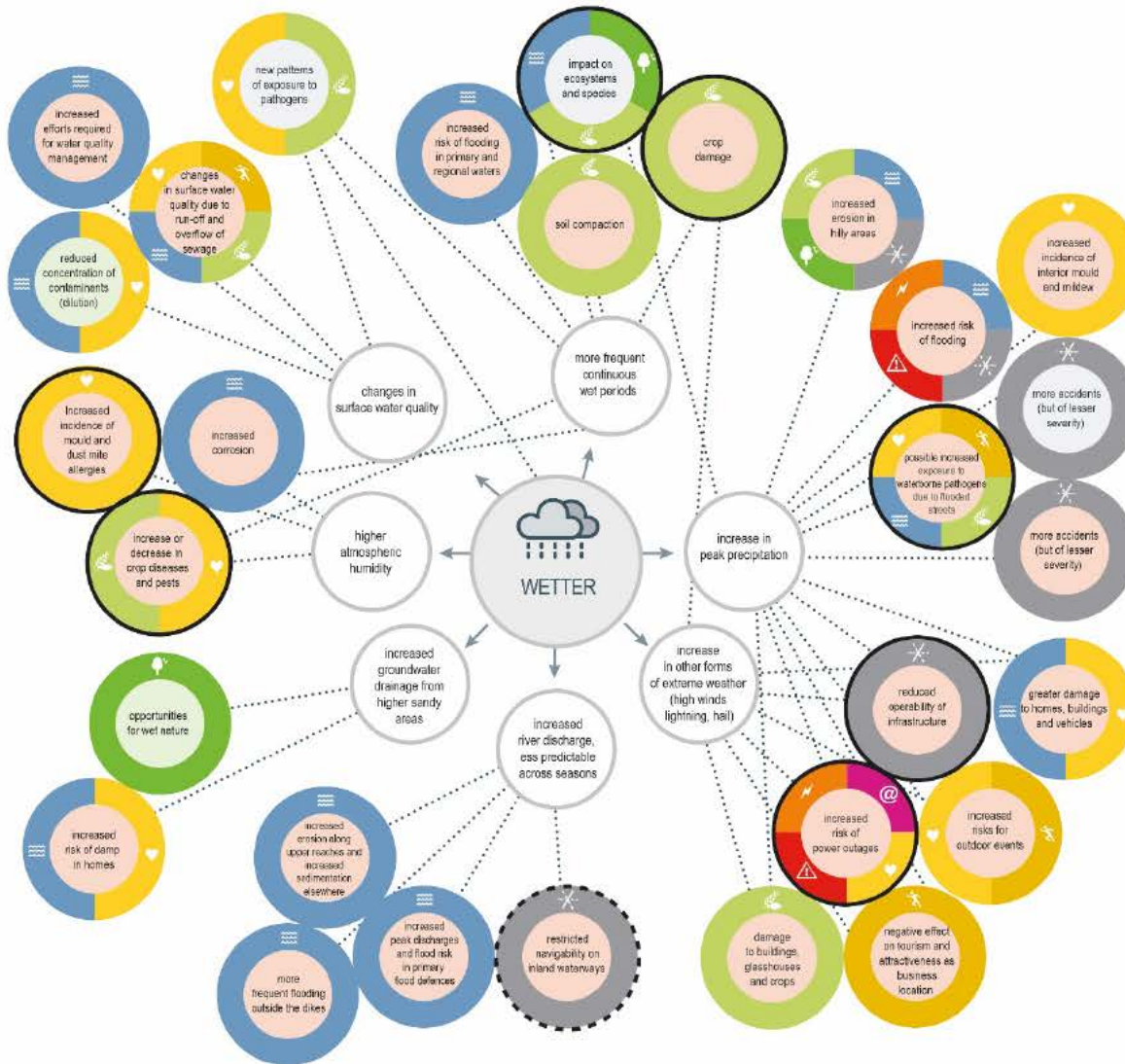
National Climate Adaptation Strategy (NAS) Climate trends, climate impacts and consequences for sectors



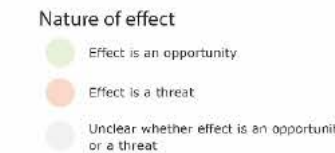
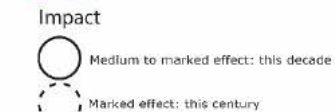
source: - PBL, Aanpassen met beleid klimaatverandering: klimaatverandering (Adapting to climate change), 2013
 - PBL, Aanpassen aan klimaatverandering/klimaatverandering (Adapting to climate change), 2015
 - NAS workshop sessions, 7 June, 1 September and 12 October 2016

Disclaimer: These diagrams offer a simplified and incomplete representation of the actual situation. In the interests of clarity, not all components of the known causal relationships are shown.
 PBL Scientific check on this version

NAS NL: effects wetter



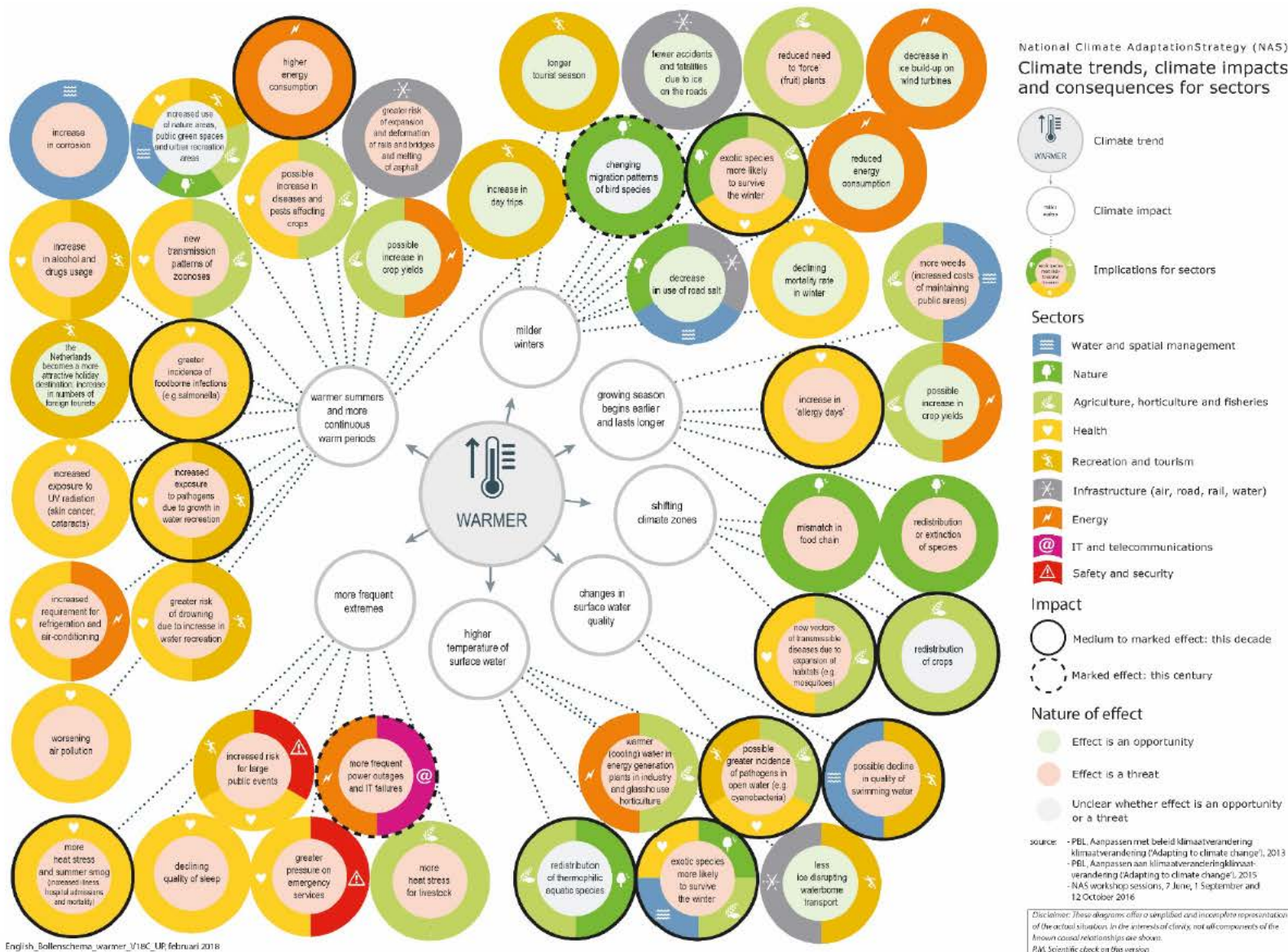
National Climate Adaptation Strategy (NAS) Climate trends, climate impacts and consequences for sectors



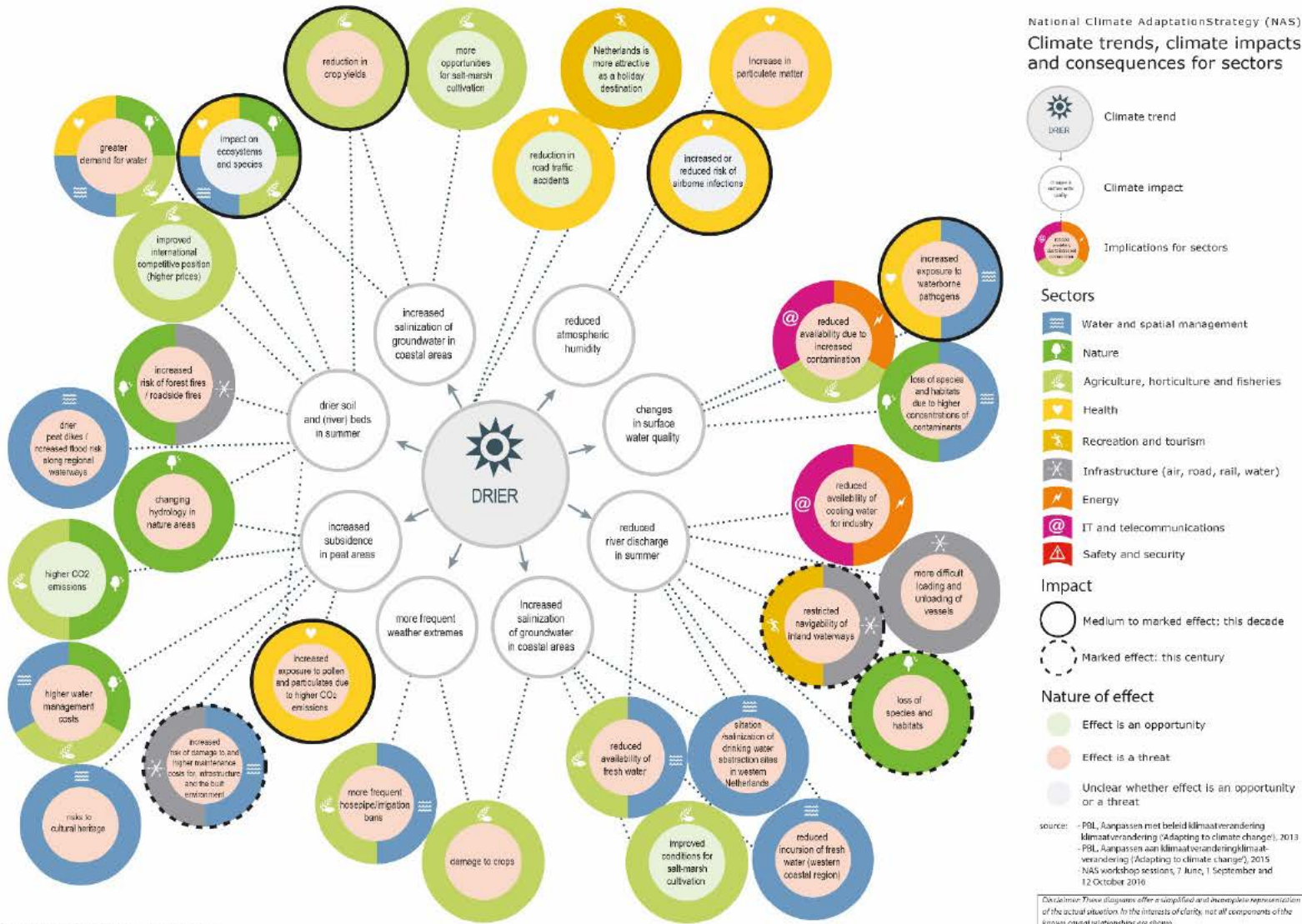
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P.M. Scientific check on this version

NAS NL: effects warmer




NAS NL: effects drier



National Climate Impact Atlas



Overstroming | **Wateroverlast** | **Droogte** | **Hitte**

Download  Gidsmodellen voor landschapstypen  Zoek gemeente 



Klimaat-effecten Selecteer scenario

Huidig **2050WH**

oppervlaktewater

Hittestress door warme nachten    

 1 dag

Gevoelige functies en ruimtelijke kenmerken

Beweegbare bruggen  

Zwemwaterlocaties  

Stedelijk hitte eiland effect  



Klik hier voor het kaartverhaal hitte



One Aim:

- Keeping NL a good, safe and attractive place to live and work for present and future generations (→ 2100, long term perspective)

Two Goals:

- Safe, now and in the future (2050-2100)
- Fresh water supply guaranteed, also in dry periods

Three Basic values:

- Solidarity, Flexibility and Sustainability

Not in answer to a disaster, but in advance, to be prepared or avoid it

National Climate Impact Atlas




[CLIMATE IMPACT ATLAS](#) [STORY MAPS](#) [ABOUT THE ATLAS](#) [PARTNERS](#) [HELPDESK](#)  

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Klimaateffecten Selecteer scenario

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Stedelijk hitte eiland effect  



Klik hier voor het kaartverhaal hitte

Story Mapping

BUILDING RESILIENCE IN THE HINDU KUSH HIMALAYAN REGION



Introduction



Heat Stress



Droughts



Landslides



Fire Outbreak



Floods



+ Submit your Adaptation Solution

National webportal for climate adaptation



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Where do I start?

This knowledge portal supports a range of users in the climate-proof and water-resilient planning of their environment. We help you get started on spatial adaptation.

Policy-makers



→ [Policy-makers](#)

Private parties



→ [Private parties](#)

Teachers and students



→ [Teachers and students](#)

Residents



→ [Residents](#)

The Rotterdam Experience



The Process



Water = Urban Quality...



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



Pumping + green banks

Timeline Rotterdam 's transition process towards a resilient delta city



Water -----

+ Spatial Planning -----

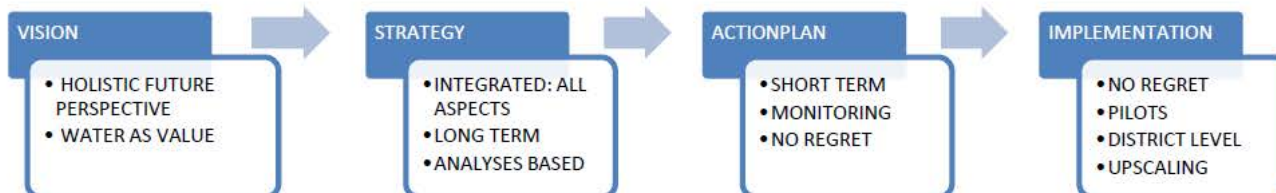
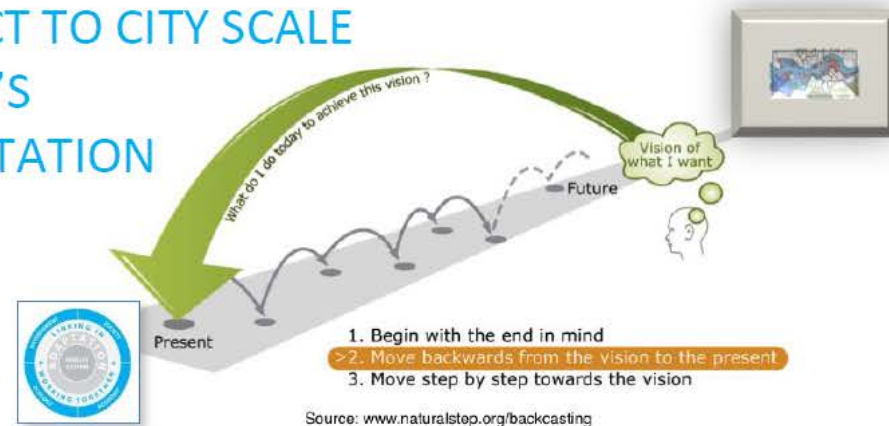
+ Climate Change -----

+ Resilience (wide spectrum) -----



Rotterdam Approach (10 principles)

1. TRANSFORM CHALLENGE'S INTO **OPPORTUNITIES**
2. **ADD VALUE**: CREATE A BETTER CITY (HOLISTIC)
3. USING WATER AS A **DESIGNING** PRINCIPLE
4. INVEST IN **MULTI BENEFIT** SOLUTIONS
5. LONG TERM VISION WITH **SHARED** OWNERSHIP
6. SHORT TERM **ACTION** PLAN
7. LEARNING BY DOING: START **NO REGRET** MEASURES
8. **UPSCALE** FROM OBJECT TO DISTRICT TO CITY SCALE
9. **EMBED** CLIMATE RESILIENCE IN 4 P'S
10. CREATE AN **ECOSYSTEM** OF ADAPTATION



Implementation



Green Roofs Program: community involvement



ZOHO: First Climate Proof District



Building a green framework and programmatic clusters for and with the neighbourhood



Rotterdam climate change adaptation strategy

Perspective for the climate resilient delta city

Illustrative reproduction of the possibilities for climate adaptation for different types of city districts

- What **measures** could we apply here?
- Which **stakeholders** are important to play a role?
- What **value** is added by those measures?
- Which stakeholders **profit**?



City centre



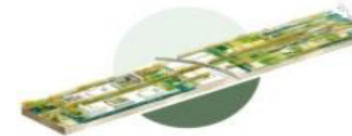
River zone districts



Urban districts near centre



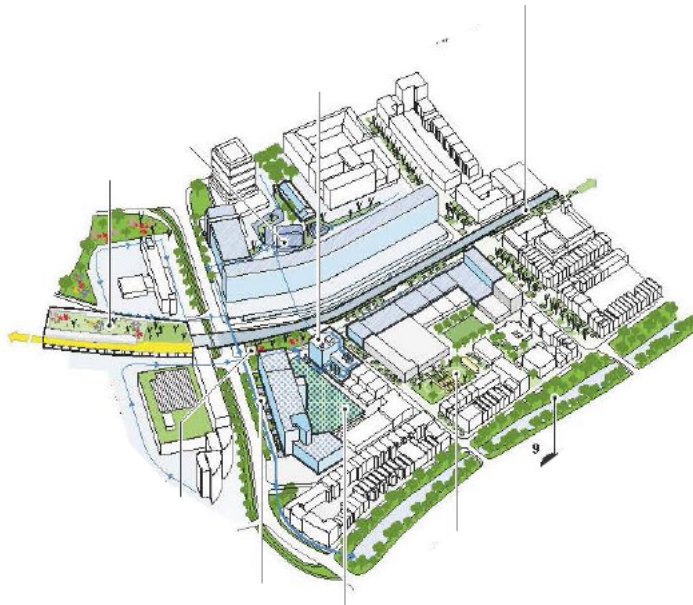
Port areas



Suburbs



City-Port



FROM PILOT TO MAINSTREAM

Water Sensitive Rotterdam



POST-OFFICE

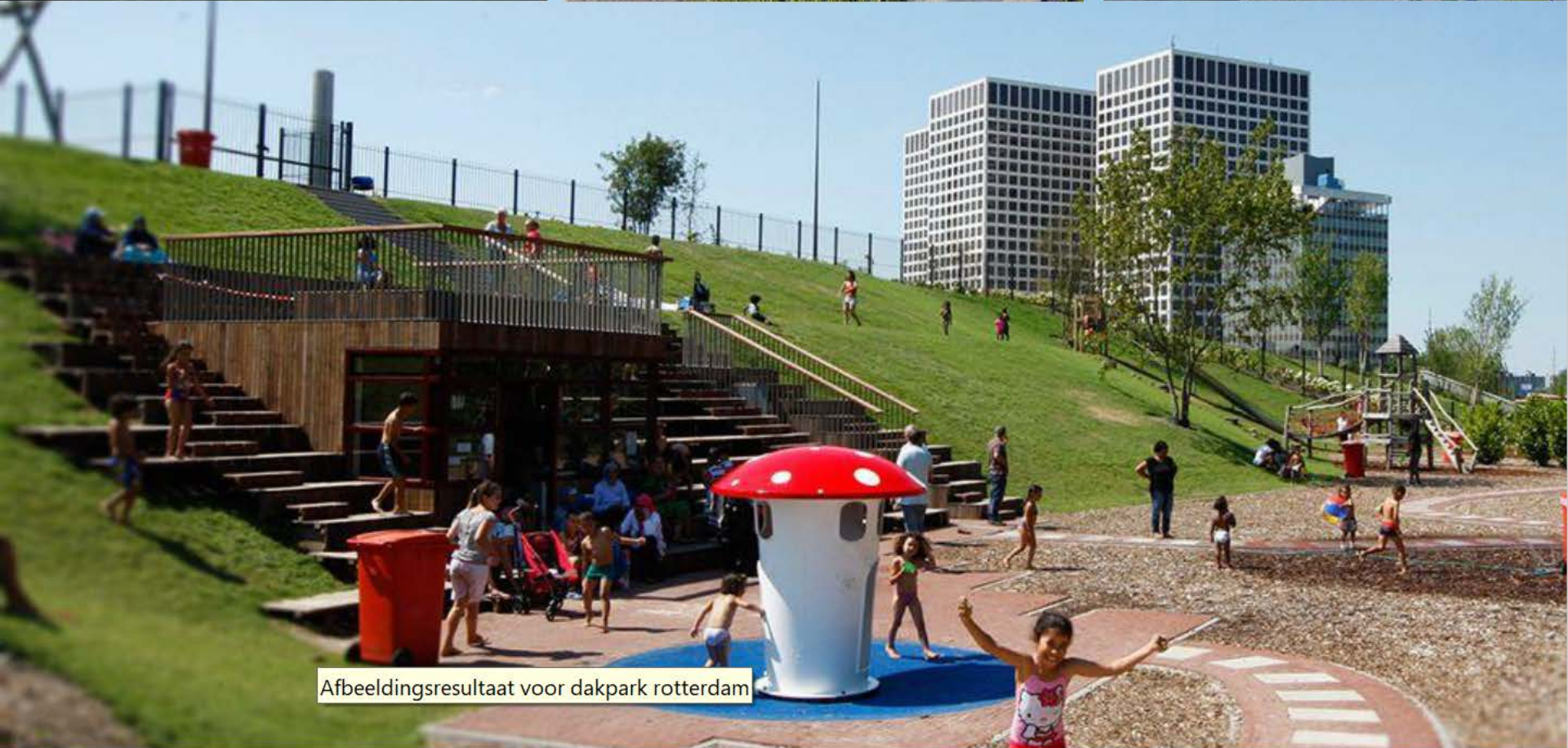


7 SEASONS



DE URBANISTEN

GREENING HOFBOGEN = WORK IN PROGRESS



Afbeeldingsresultaat voor dakpark rotterdam

...SEALEVEL RISE - RESILIENCE BY DESIGN...



Building with Nature: green solutions



- 1: NEW ECO-HABITATS**
- 2: REUSE OF SEDIMENTS**
- 3: WAVE REDUCTION**
- 4: BETTER WATER QUALITY**

New Business cases



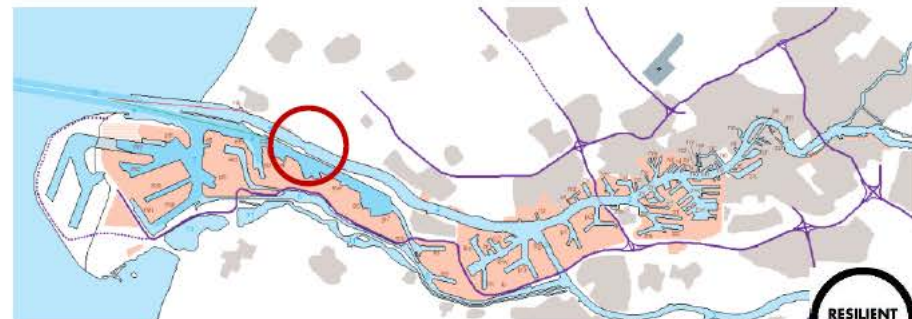
Huidige situatie

Current



Toekomstige situatie

Future





Opportunity: Adaptive Water Front development



Next Level



GROWTH IN THE INTERNET OF THINGS

THE NUMBER OF CONNECTED DEVICES WILL EXCEED 50 BILLION BY 2020



CHALLENGES



ROTTERDAM RESILIENCE STRATEGY.

READY FOR THE
21ST CENTURY

CONSULTATION
DOCUMENT



Gemeente Rotterdam

SPONSORED BY THE
ROTTERDAM FOUNDATION

100

RESILIENT CITIES

**ROTTERDAM.
MAKE IT
HAPPEN.**

RESILIENT
ROTTERDAM

OUR RESILIENCE 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

GOAL 4:
**CLIMATE ADAPTIVE ROTTERDAM
TO A NEW LEVEL**



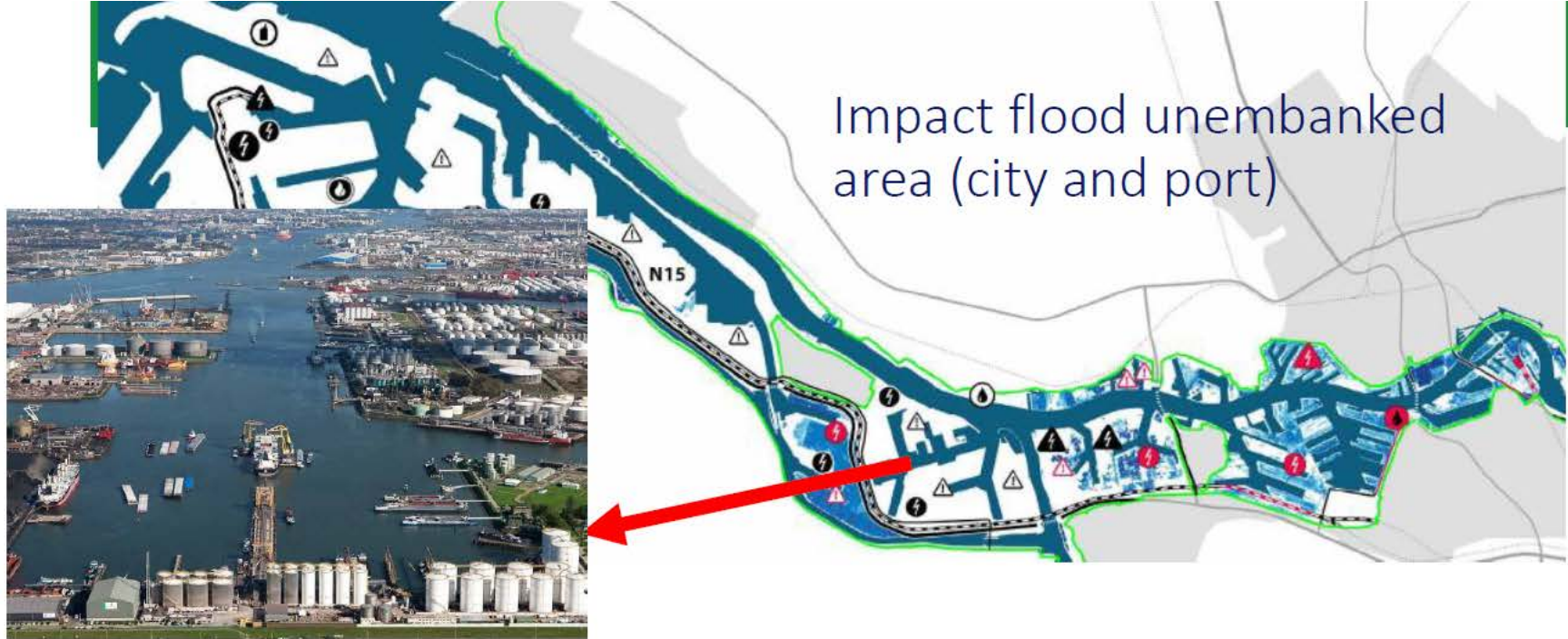
“Climate proof plus cyber proof critical infrastructure”

“Large scale implementation of small scale solutions together with citizens”

“Next level of integrated approach”

**1.000.000 M2 SUSTAINABLE
ROOF LANDSCAPE IN
ROTTERDAM CITY CENTRE**





- Flood probability (1:4.000)

vs

External safety regulation (1:100.000)

Questions adressed via public/private joint fact finding:

- vulnerability of chemical plants?
- acceptable risk level?

Return period	Direct losses (in billions Euro)	Indirect losses (in billions Euro)	Total losses (in billions Euro)	Time to recover (99% of initial production)
1/10	0.22	0.13	0.35	18 days
1/100	0.44	0.29	0.73	78 days
1/1,000	0.76	0.61	1.37	173 days
1/2,000	0.92	0.83	1.76	255 days
1/4,000	1.10	1.14	2.23	351 days
1/10,000	1.88	2.51	4.39	647 days
EAD (million Euro/year)	36.1	23.4	59.5	

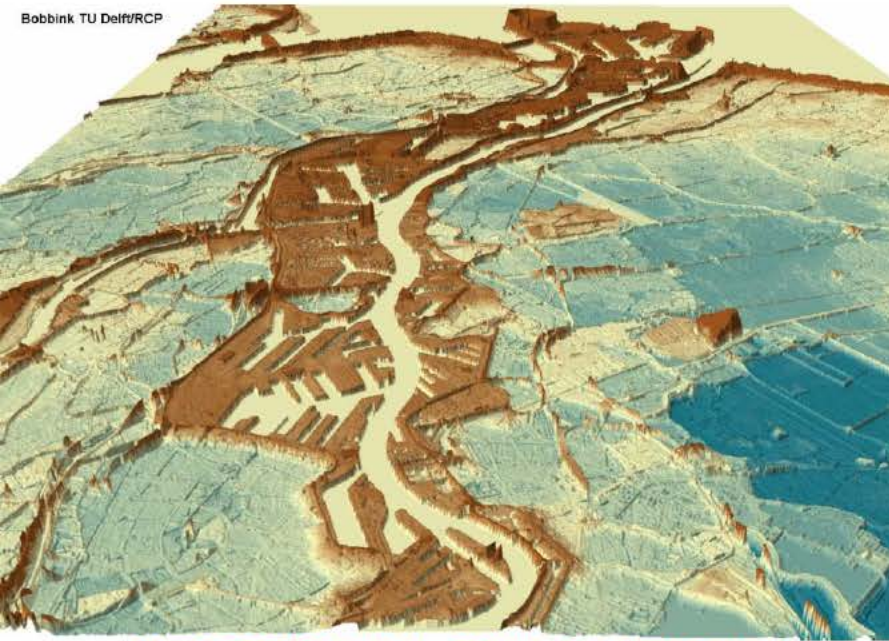
Estimated flood damage is very high due to chain effects



EFFECTS RELATED TO CLIMATE CHANGE



Bobbink TU Delft/RCP

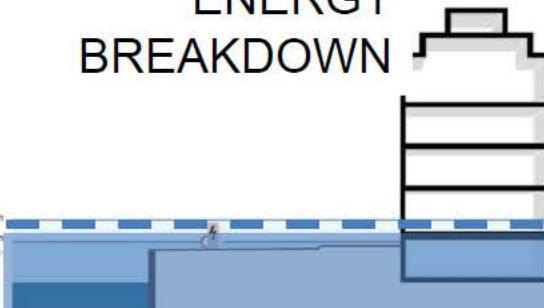


VERTIKAAL EVACUEREN



FLOODING & ENERGY BREAKDOWN

+ 100 cm
+ 30 cm
ground level



The historic outer-dike areas are the most vulnerable to damage by flooding

Transformer stations are vulnerable to inundation depths greater than 30 cm

