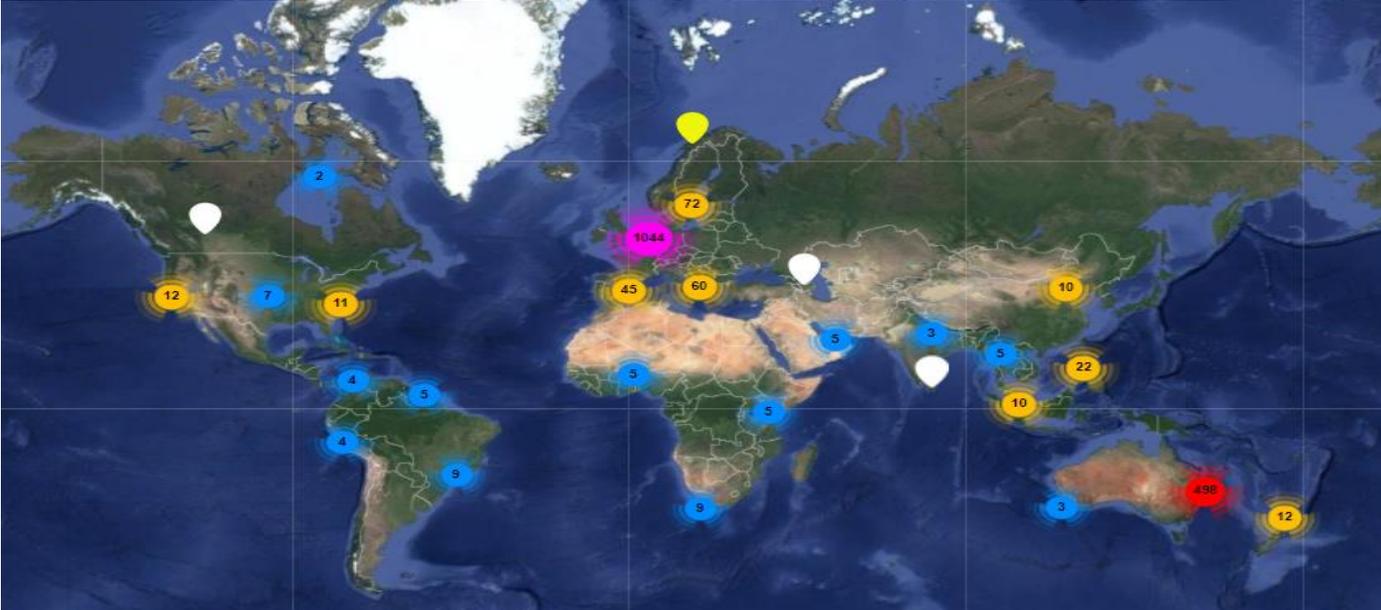


# Stormwater management approaches and best practices in urban environment

iWater project  
FINAL CONFERENCE, Riga May 2018



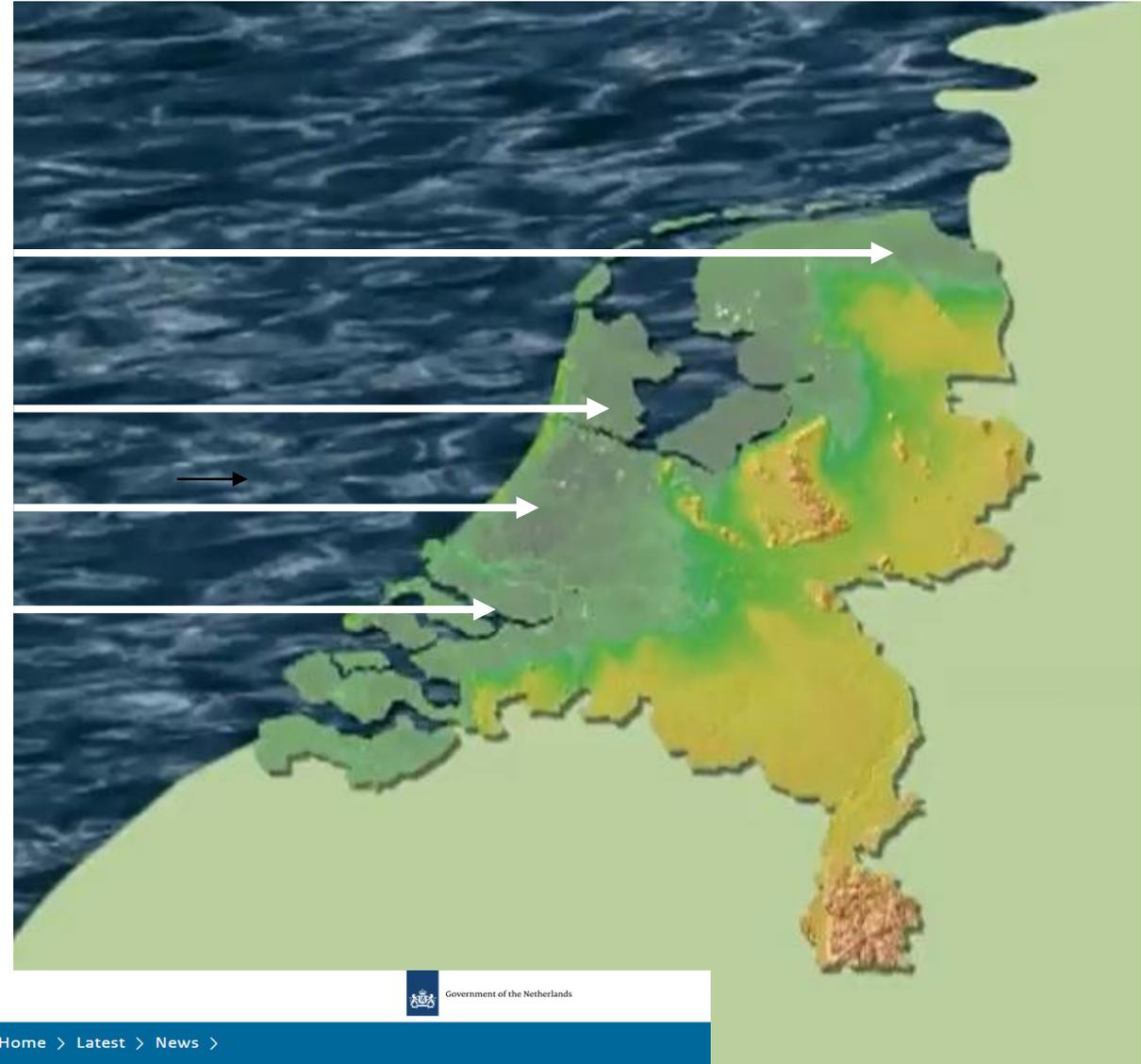
**ClimateScan**  
@Climate\_Scan  
climatecan.nl promotes international knowledge exchange on #urbangreen #greeninfrastructure #suds #naturebasedsolutions 4 #climatechange in urban areas.  
Amsterdam, The Netherlands  
climatecan.nl

**dr.ir. F (Floris) Boogaard PhD**  
**professor spatial transformations:**  
**[Fcb@tauw.nl](mailto:Fcb@tauw.nl) / +31651556826**

# Introduction: SuDs in Holland



miscentrum NoorderRuimte



Groningen and Rotterdam will accommodate Global Climate Adaptation Centre

News item | 21-09-2017 | 08:00

talent. move the world.

# Dealing with Climate change is a choice

Negative and Passive?



Positive, ready for action?



**share** your talent. **move** the world.

# Content

Analysing your area

Analysis

1. Introduction
2. Climate adaptation 2.0

– **BMPs**



- Governance/participation
- LT: Cost effectiveness

Formulating your ambition

Ambition

3. Tools (dissimination)
4. Take home messages

- More info
- Working together?

Policy and implementation

Action

Analysis

Analysing your area

Ambition

Formulating your ambition

Action

Policy and implementation

Worse case  
climate  
Long term

## DAY 2 | Tuesday, May 8<sup>th</sup>, 2018

08:30 – 09:00 Arrival & Coffee

09:00 – 09:10 Opening

*Opening Speech*

*By the City of Riga, speakers to be confirmed*

09:10 – 10:00 **Keynote**

*Keynote speech on stormwater management approaches and best practices in urban environment*

*By Dr.ir. F.C. (Floris) Boogaard, Hanzehogeschool Groningen | Delft University of Technology*

10:00 – 10:45

**Success stories of the iWater project: Stormwater Planning in the iWater cities**

*Green Factor: a tool adjusted for stormwater management in the City of Helsinki (by Viliina Evokari, City of Helsinki)*

*Development of stormwater-adapted green area planning tool (ZIPPI) for the City of Riga municipality (by tbc.)*

*Stormwater Management TOOLBOX by iWater (by Elisa Lahde, Aalto University)*

*Moderator: ... City of Helsinki*

10:45 – 12:00

**Key findings of the iWater project: Stormwater Management in the iWater cities**

*Stormwater management strategy elaborated for the City of Soderhamn (by tbc.)*

*City of Helsinki Storm Water Programme: lessons learnt and key conclusions (by Kajsa Rosqvist, City of Helsinki)*

*Stormwater Management in the City of Tartu: our approach (by ...)*

*Integrated Stormwater Management Plan for the City of Jelgava: our approach, results and conclusions*

*Our succes story: Stormwater work in the City of Gavle*

*Moderator: Pilar Meseguer, City of Turku*

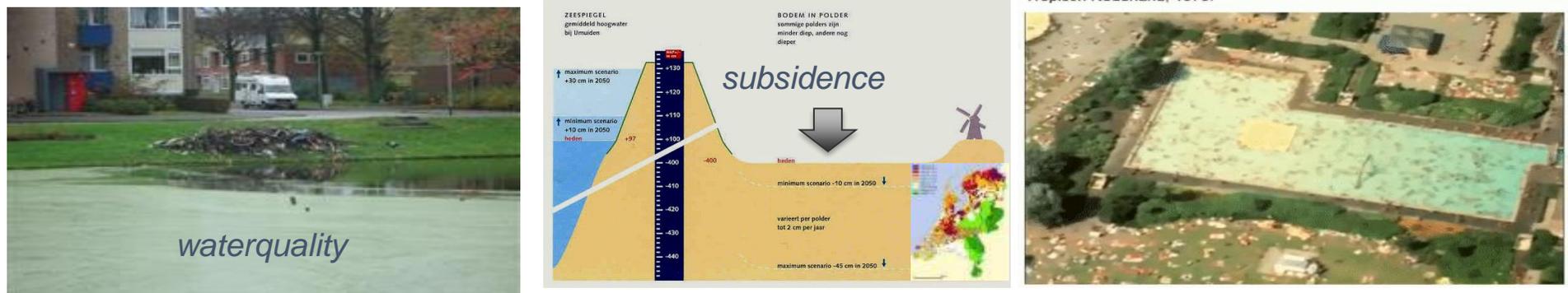
12:00 – 13:00 Lunch

# Challenges urban climate (change)

## Challenges urban climate (change): The Netherlands



examples of problems in the urban areas: floodings, degradation of waterways, heatstress, drought leading to lower groundwater table and subsidence with results as damage of buildings



share your talent. move the world.

# Challenges in urban climate change



Floodings



waterquality



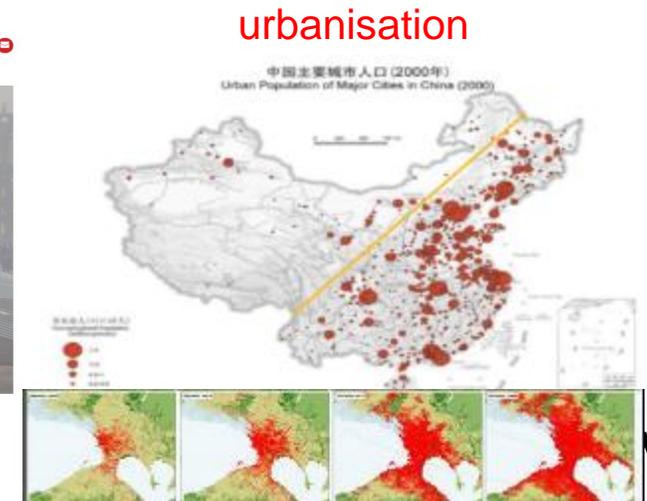
Heatstress



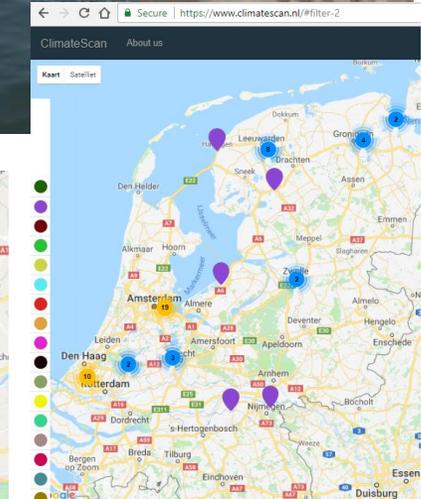
Floodings



Airquality

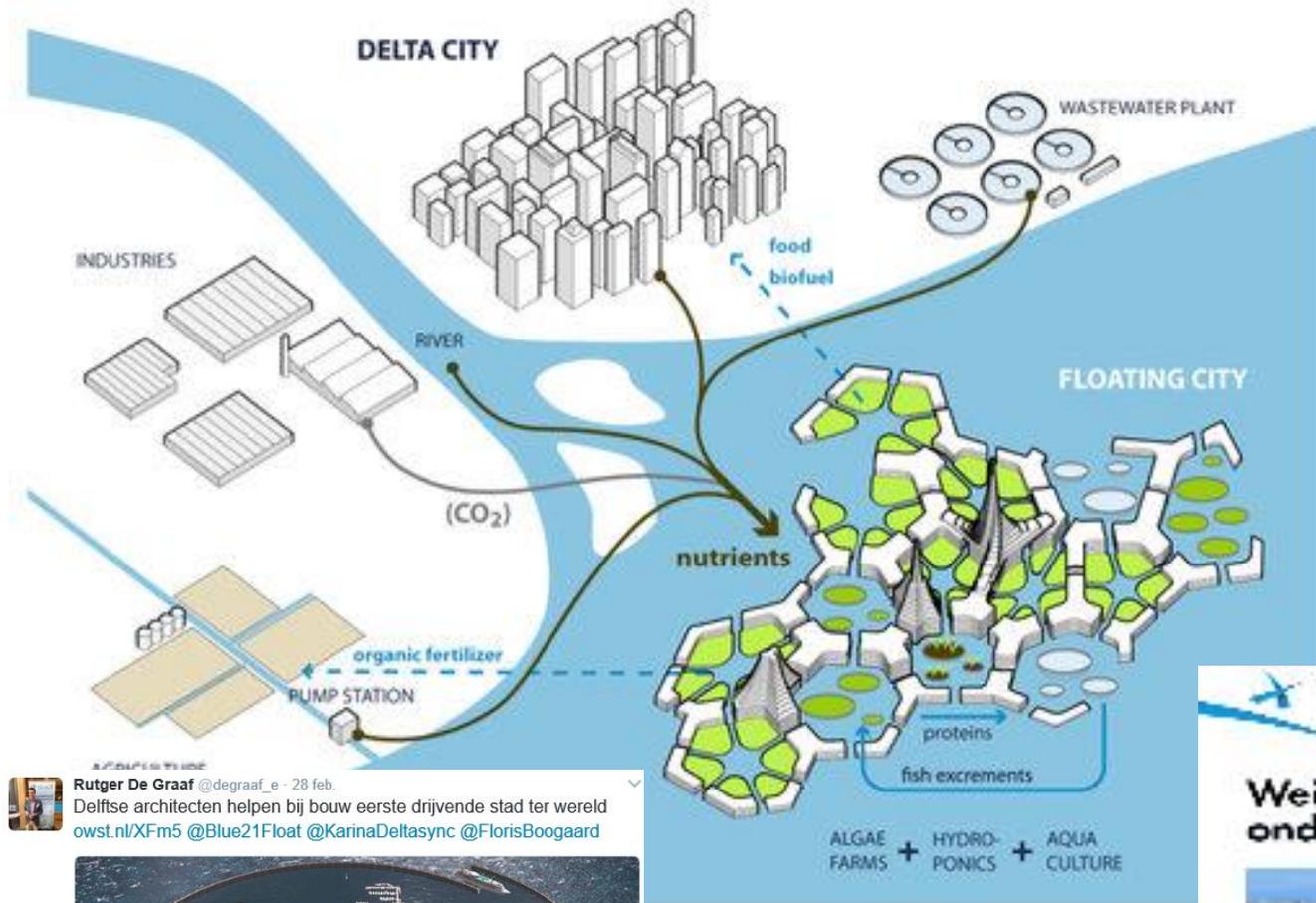


# Challenges urban climate (change)



share your talent. move the world.

# Future? New cities



Rutger De Graaf @degraaf\_e · 28 feb.  
Delftse architecten helpen bij bouw eerste drijvende stad ter wereld  
owst.nl/XFm5 @Blue21Float @KarinaDeltasync @FlorisBoogaard



Delftse architecten helpen bij bouw eerste drijvende stad ter wereld  
Een Delfts architectenbureau Blue21 werkt mee aan een bijzonder project. Zij onderzoeken op dit moment de bouw van 's werelds eerste drijvende st...



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# But for now: Accept & Adapt (mitigation for long term)

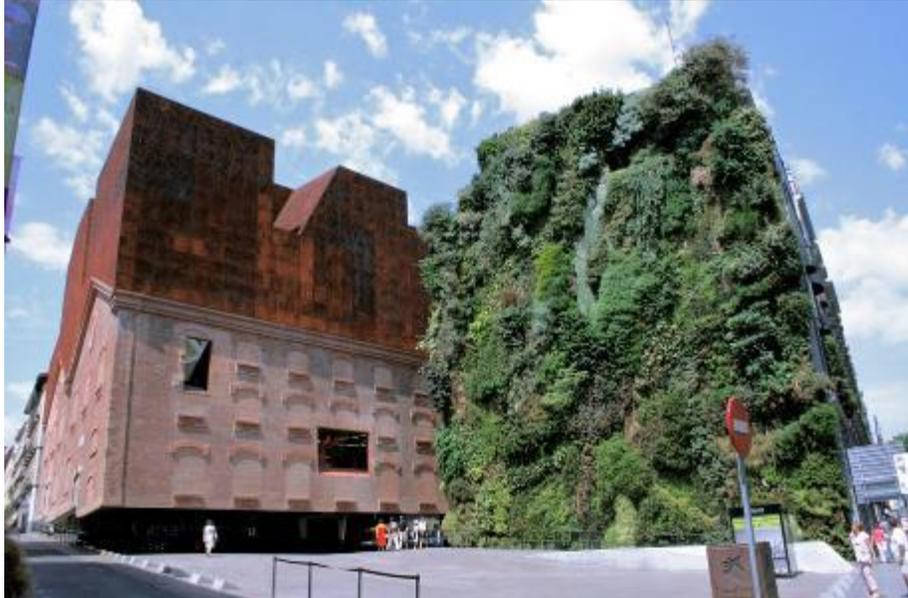


world.

# Smart cities: we need a plan



world.



22-5-2018

world.

# >1001 SUDS

13:30 – 16:30

## Stormwater Study Tour

13:30 – 13:45 | Built sustainable stormwater management solution: "Spice Home" parking lot

14:00 – 15:00 | iWater pilot site Tornakalns, Riga

15:45 – 16:30 | iWater pilot site Svēte River Flood Area, Jelgava

Guided by the teams of City of Riga & City of Jelgava

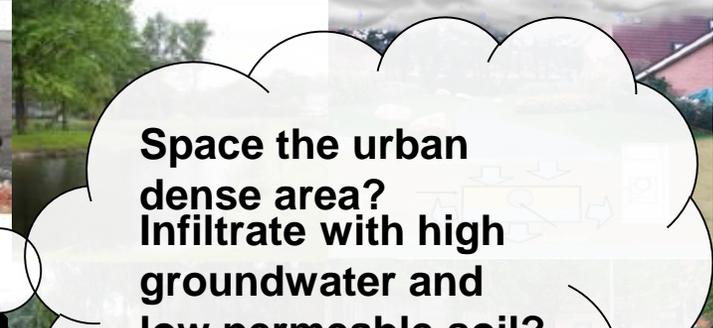
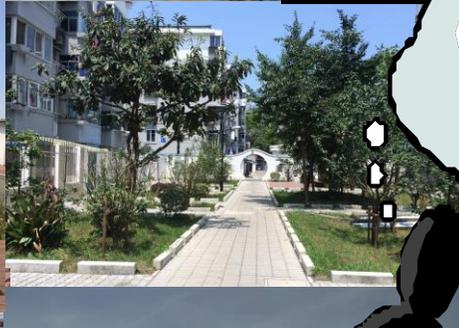


De delecta commissaris bezocht Betondorp

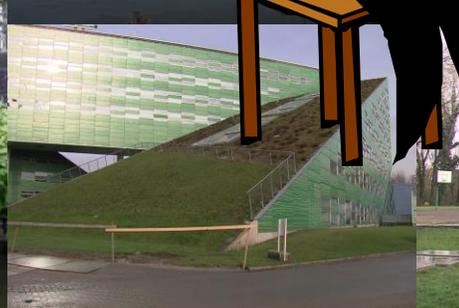


world.

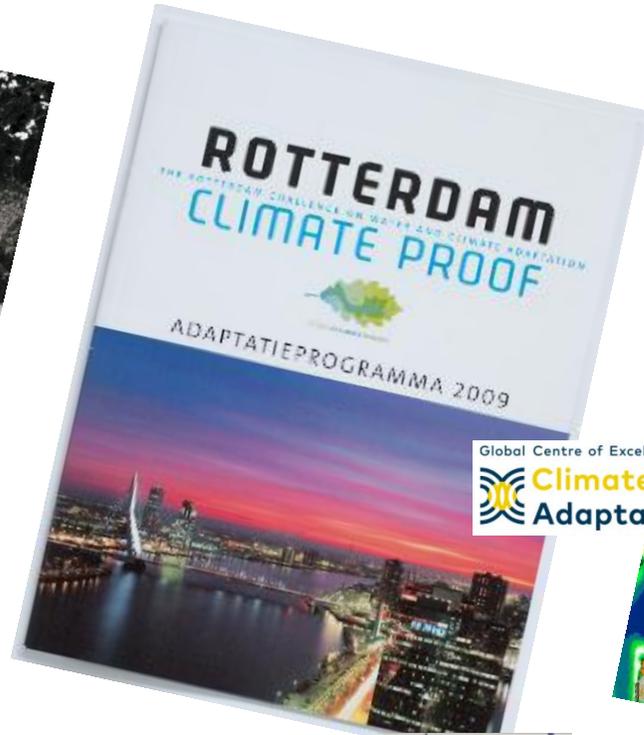
# >1001 SUDS



Space the urban dense area?  
Infiltrate with high groundwater and low permeable soil?  
Cold climates?  
Long term?

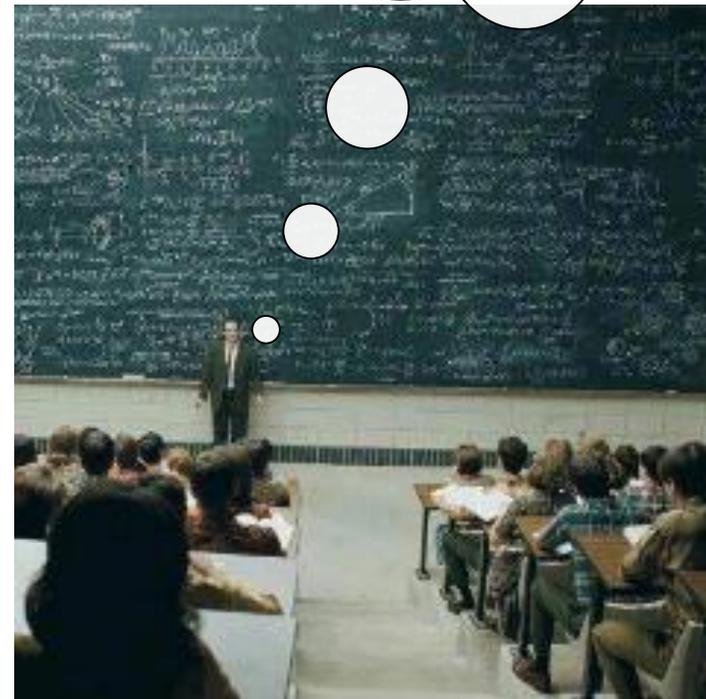
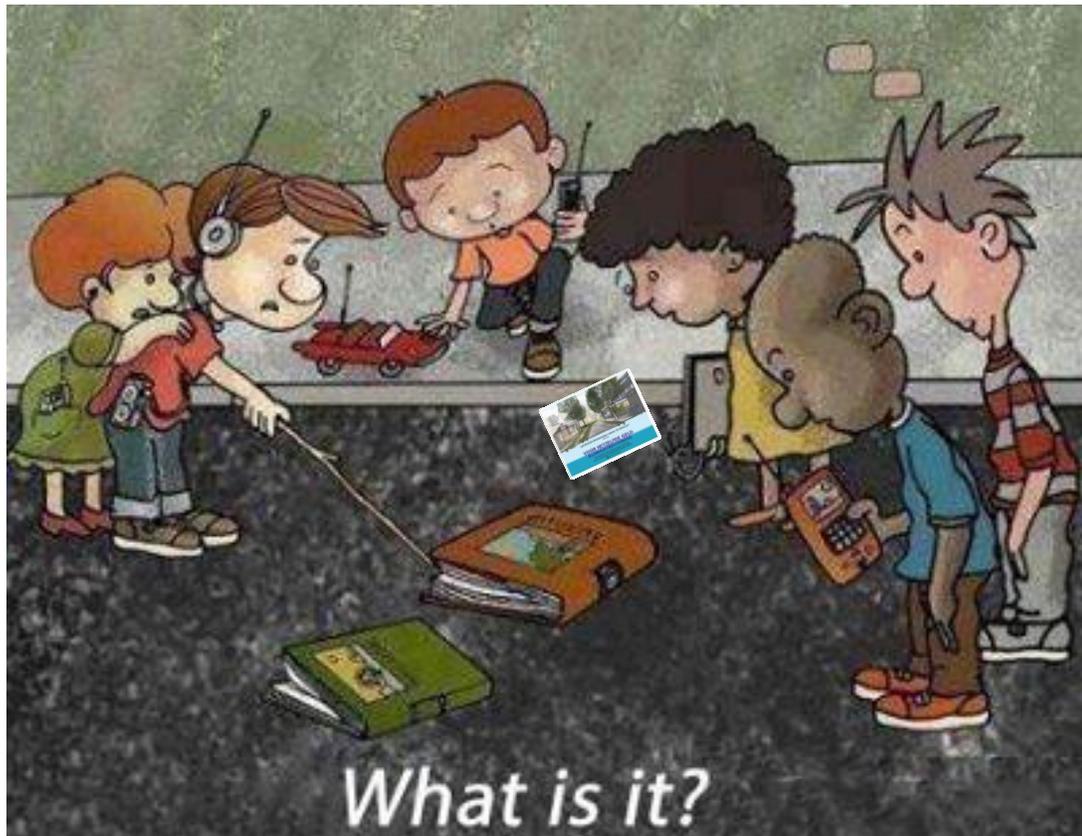


# Books ... for international knowledge exchange?



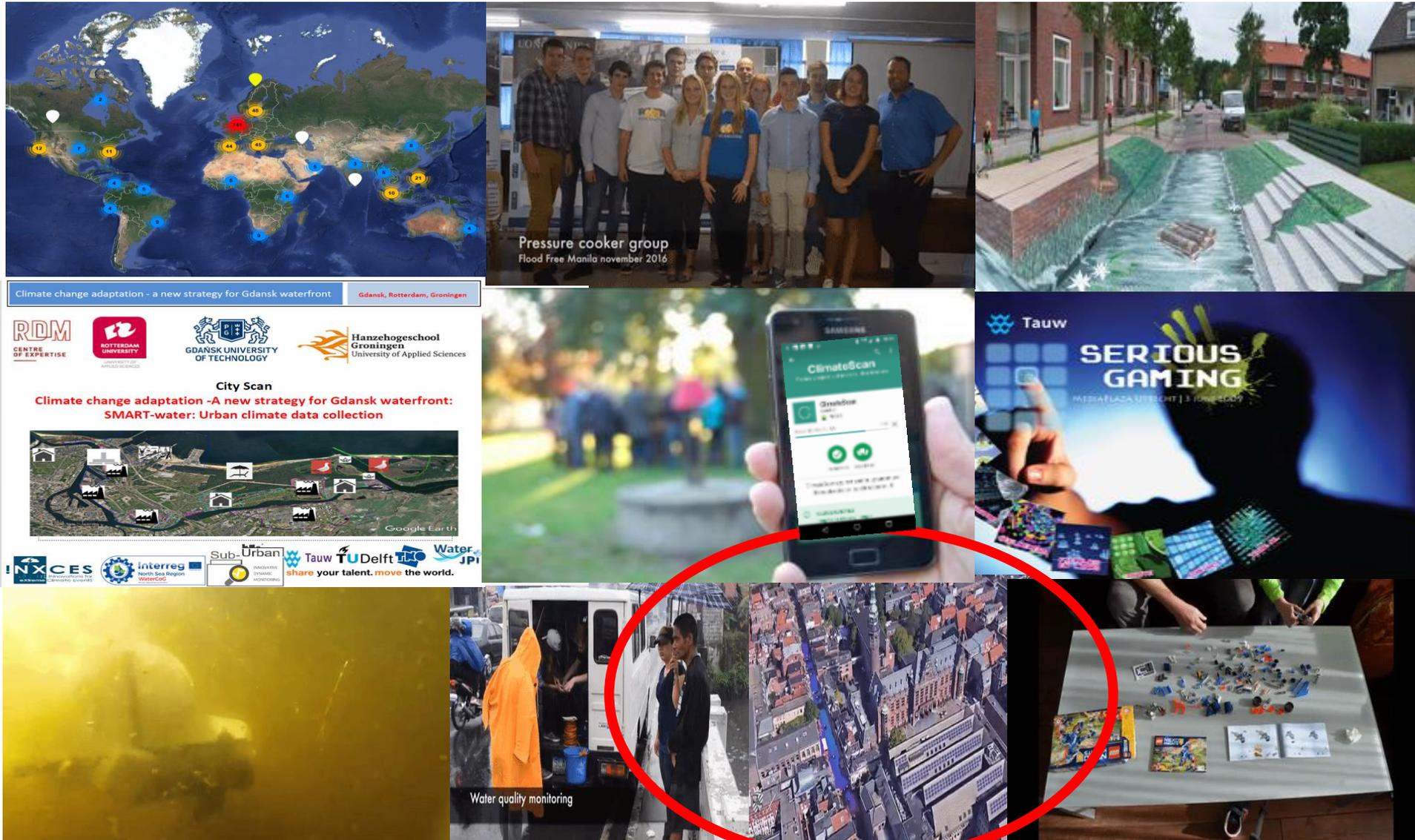
share your talent. move the world.

# Books ... for international knowledge exchange?

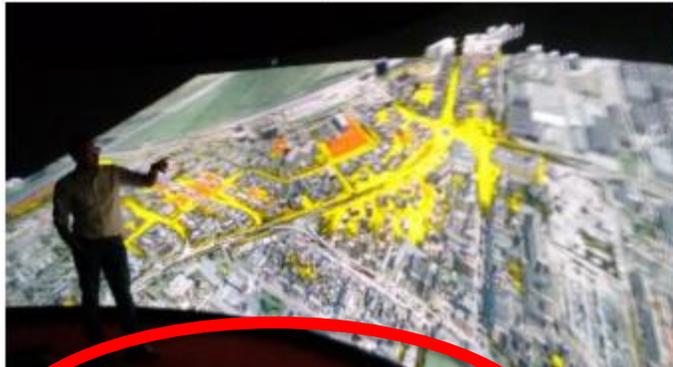


**share** your talent. **move** the world.

# international knowledge exchange tools (Erasmus): experience: interactive, V+A (augmented) reality, serious gaming, ...



# National climate adaptation



## Analysis

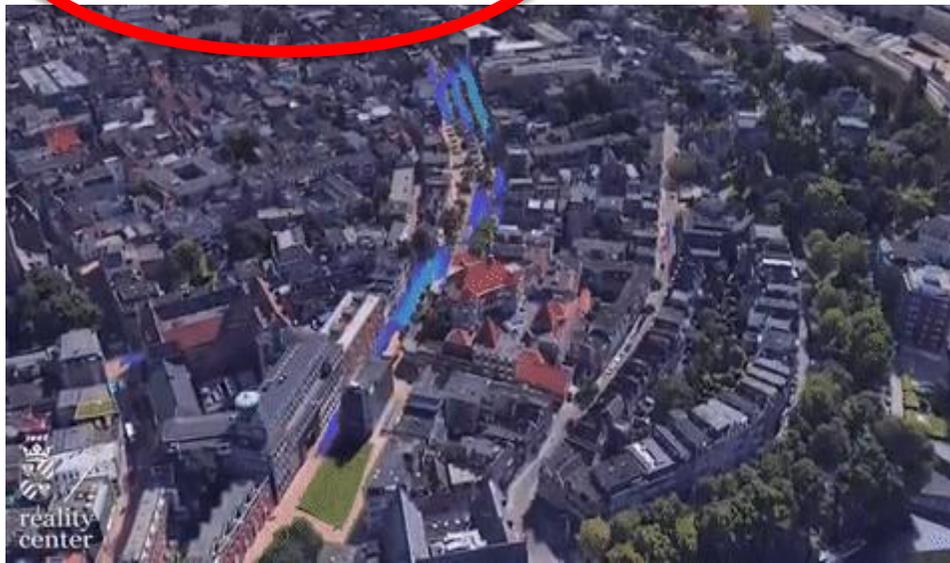
Analysing your area

## Ambition

Formulating your ambition

## Action

Policy and implementation



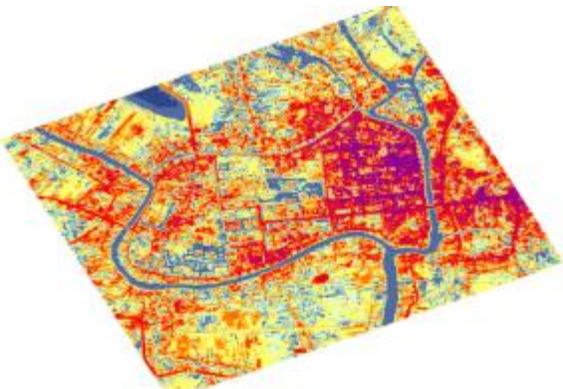
world.



Bergen, Norway



Denmark, Copenhagen



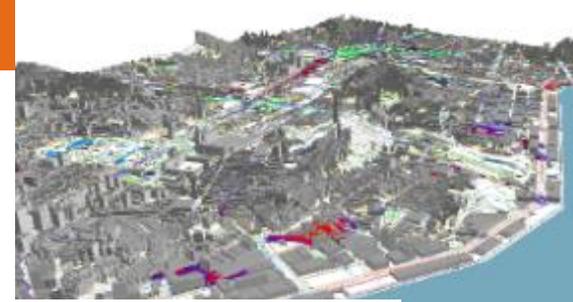
Thailand, Bangkok

# Mapping

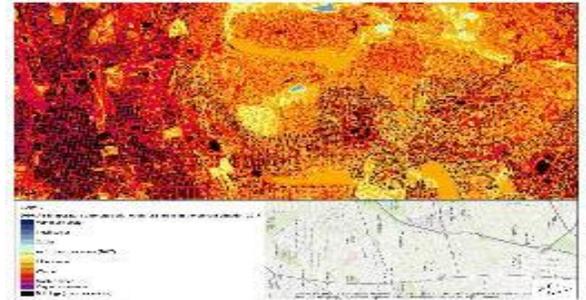
- Flooding
- Heatstress
- Drought
- Damage (cost)
- Subsidence
- Pollution
- Waterquality
- (im)mobility
- Opinion (social media)
- .... etc



Taiwan, Tainan



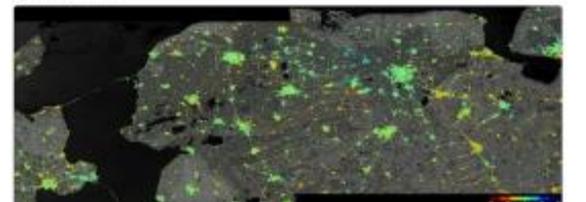
Brasil, Rio de Janeiro



Johannesburg, Heatstress

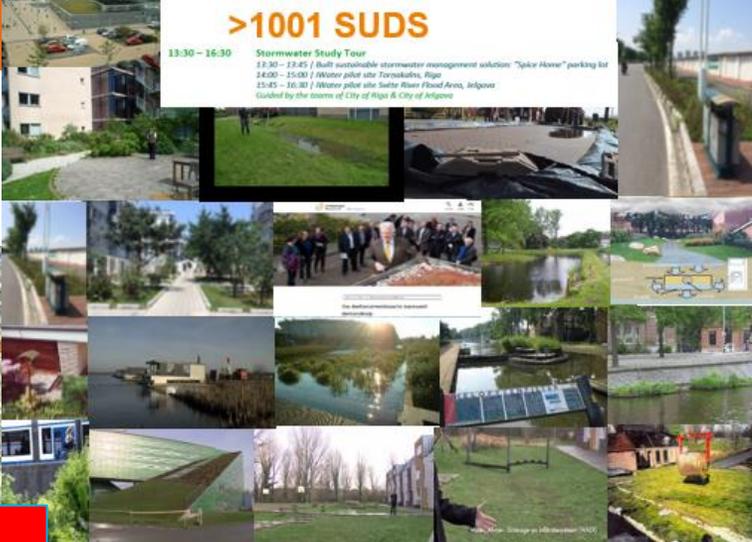


Groningen, NL



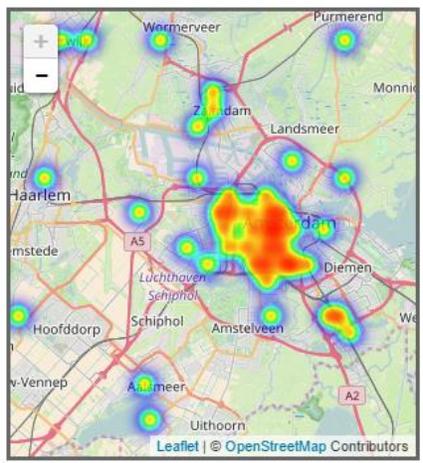
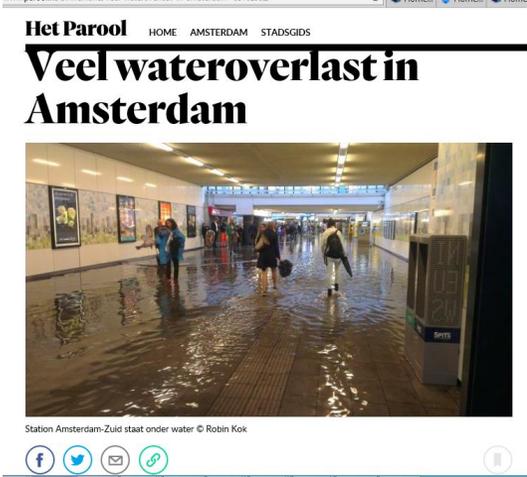
Satellite INSAR data

# Floodmodel Amsterdam



world.

# Example: Amsterdam



# Case studies INXCES, share BMPs climate specific challenges: from nordic to china



Bergen, Norway



Groningen, The Netherlands



#### Activities



Next: Bucharest?  
Data....

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# Europe vb Copenhagen

## Cloudburst in Copenhagen July 2011



Global Challenges  
**COPENHAGEN SOLUTIONS**

### July 2011 - damages

- More 150 mm rain within 2 hours
- Close to 1 billion euros
- Damage to critical infrastructure
- Hospitals minutes from evacuation
- Emergency services threatened



Global Challenges  
**COPENHAGEN SOLUTIONS**

## The economy of adapting!

### Damages over the next 100 year

Sea: 2-2.6 bill Euro.  
Rain: 2-2.1 bill Euro.  
Total: 4-4.7 bill Euro.

### Adaptation measures

Sea: 530 mill Euro  
Rain: 800 mill - 1.1 bill Euro  
Total: 1.3 - 1.6 bill Euro  
  
We save: 2.6 - 3.2 bill Euro.



Global Challenges  
**COPENHAGEN SOLUTIONS**

## Reality check



Global Challenges  
**COPENHAGEN SOLUTIONS**

world.

# Place? Climate city approach

## Multifunctional and space for water

- **Mapping flooding/heatstress**
- Buildings
  - Roofs
  - Green buildings
- Squares
  - Open areas
  - Playgrounds
- Roads
  - Road surface
  - Road storage
  - Near roads
- Green
  - parcs
  - Little green



world.

# Copenhagen

Swales near road copenhagen

Swale (wadl)



Created at: 21 Nov 2011

Description  
swales near road Copenhagen

Images

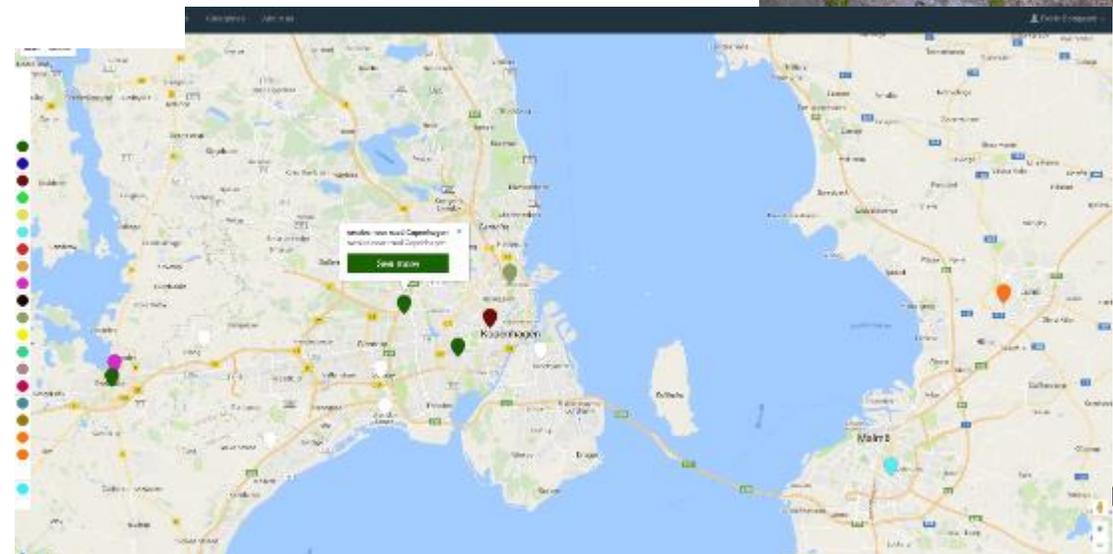


Videos



Downloads  
No download available

Websites  
No website added



# Copenhagen

## Watersquare copenhagen tasingen plads

Other categories (Diversen)



### Description

Watersquare Copenhagen

### Downloads

No downloads added

### Websites

[article about the watersquare](#)

### Samenvatting (Dutch description)

### Images



### Videos



**share** your talent. **move** the world.



a



b

# Water- squares

(source: [www.climatescan.nl](http://www.climatescan.nl))



c



d

# Nice pictures...But (how) do they work??

## 'S hertogenbosch, waterplein

Other categories (Diversen)

Google  
Created at: 28 Nov 2014

### Description

'S hertogenbosch, waterplein

### Images

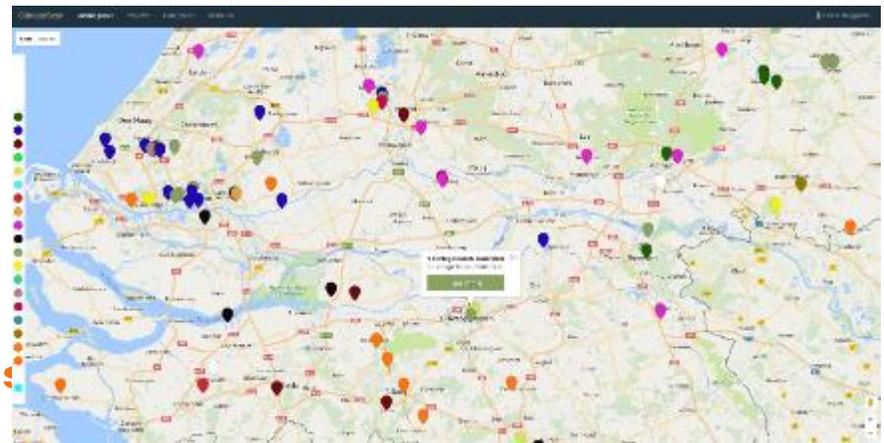
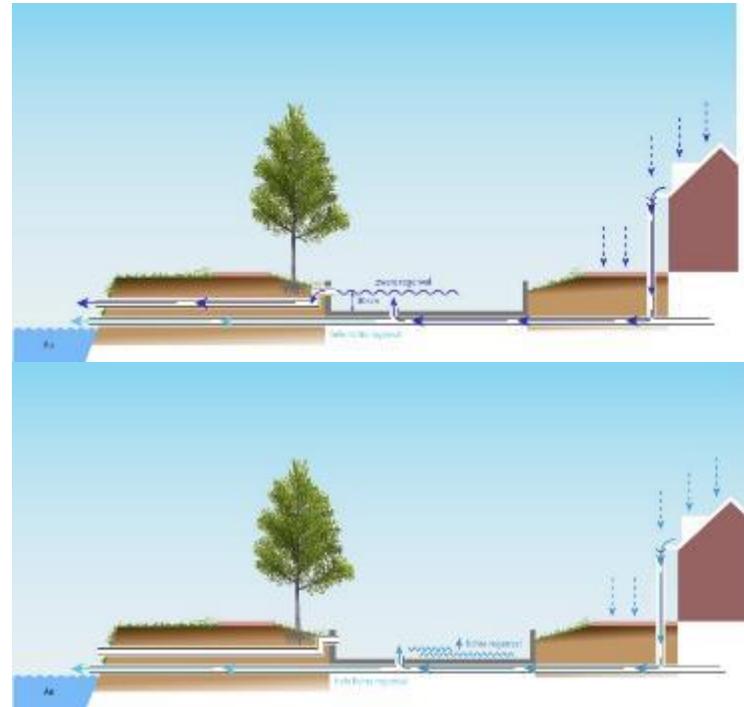


### Downloads

- Boogaard F et al Waterplein Eikendonkplein 's Hertogenbosch werkd. Thinking
- Boogaard F et al Waterplein Eikendonkplein 's Hertogenbosch H20

### Websites

No websites added



# Do SuDS work? Factor Time



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# Factor time



Sediment bassins



Permeable Pavement



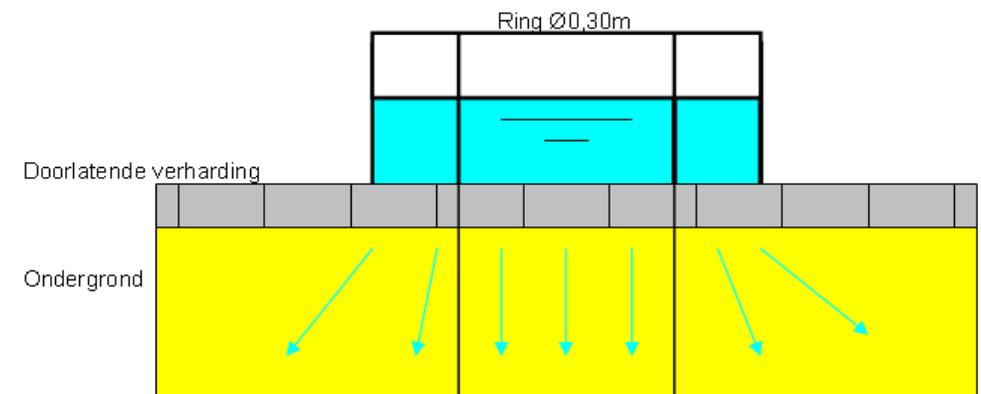
(Bio) swales



Constructed wetlands



# Monitoring methods: Infiltrometer





Think big

WWW.TUDELFT.TV

SUBSCRIBE

0:06 / 2:09

Flood Fighter

1.037 weergaven

2 0 DELEN

<https://www.youtube.com/watch?v=R14BajCwU6w>

share your talent. move the world.

# New monitoring method: full scale testing 'Flood Fighting'

Think BIG....

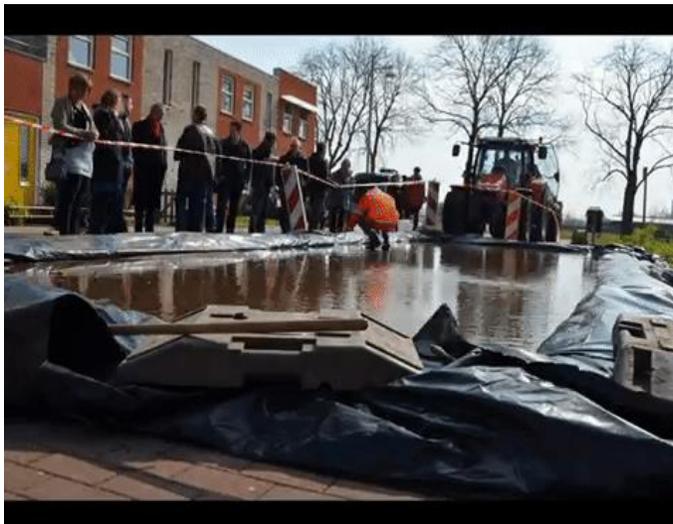


Various Dam Variations Used at the Different Test Locations (a) Impermeable barriers; (b) Plastic wrapped soil core; (c) Soil-filled plastic bags. [share](#) your talent. [move](#) the world.

# Results



25 locations



# Results

Results: Infiltration capacities: 20-342 mm/h

Zwolle - 256 mm/h

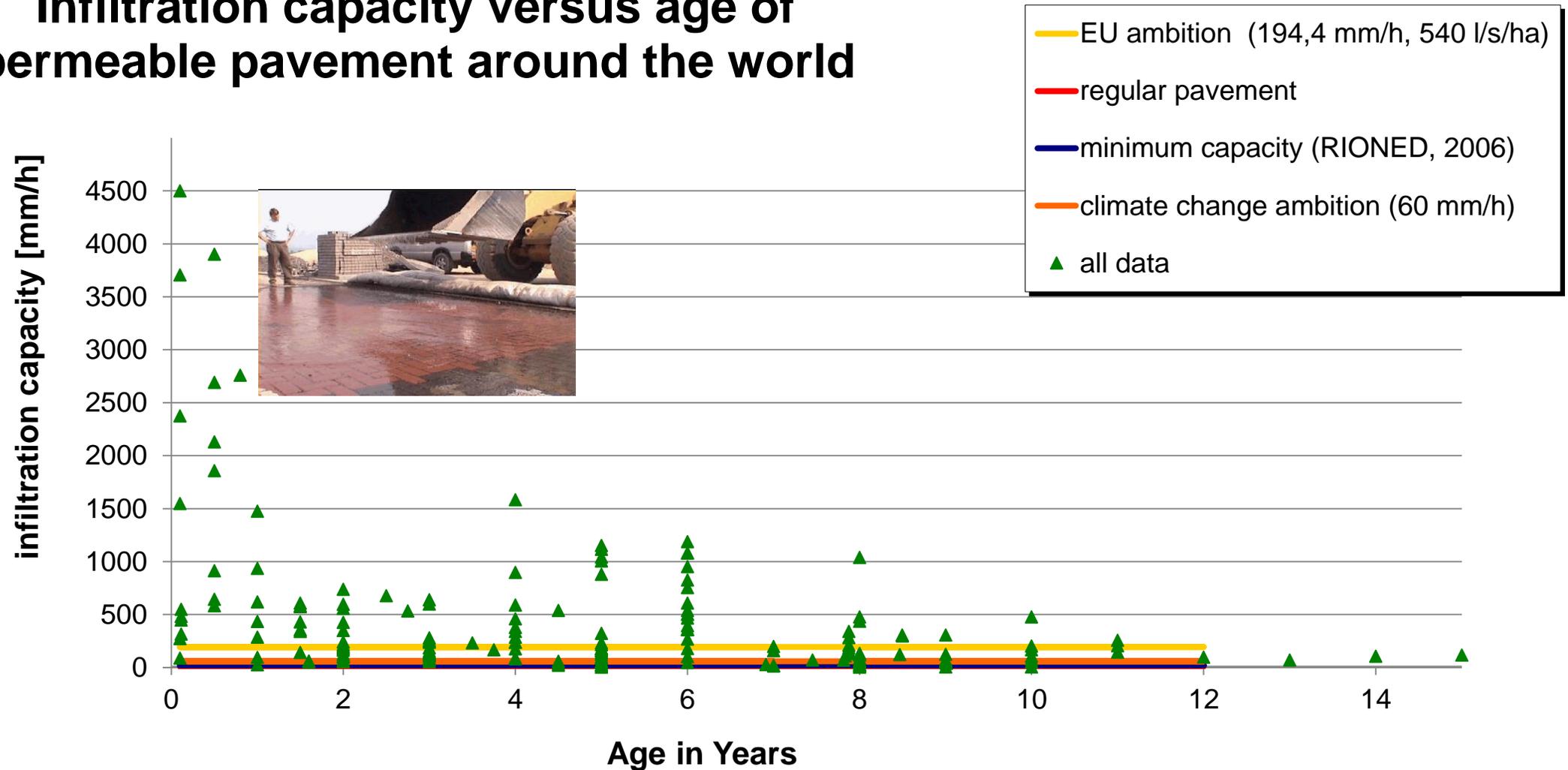
Effen - 96 mm/h

Dussen - 65 mm/h



# Results

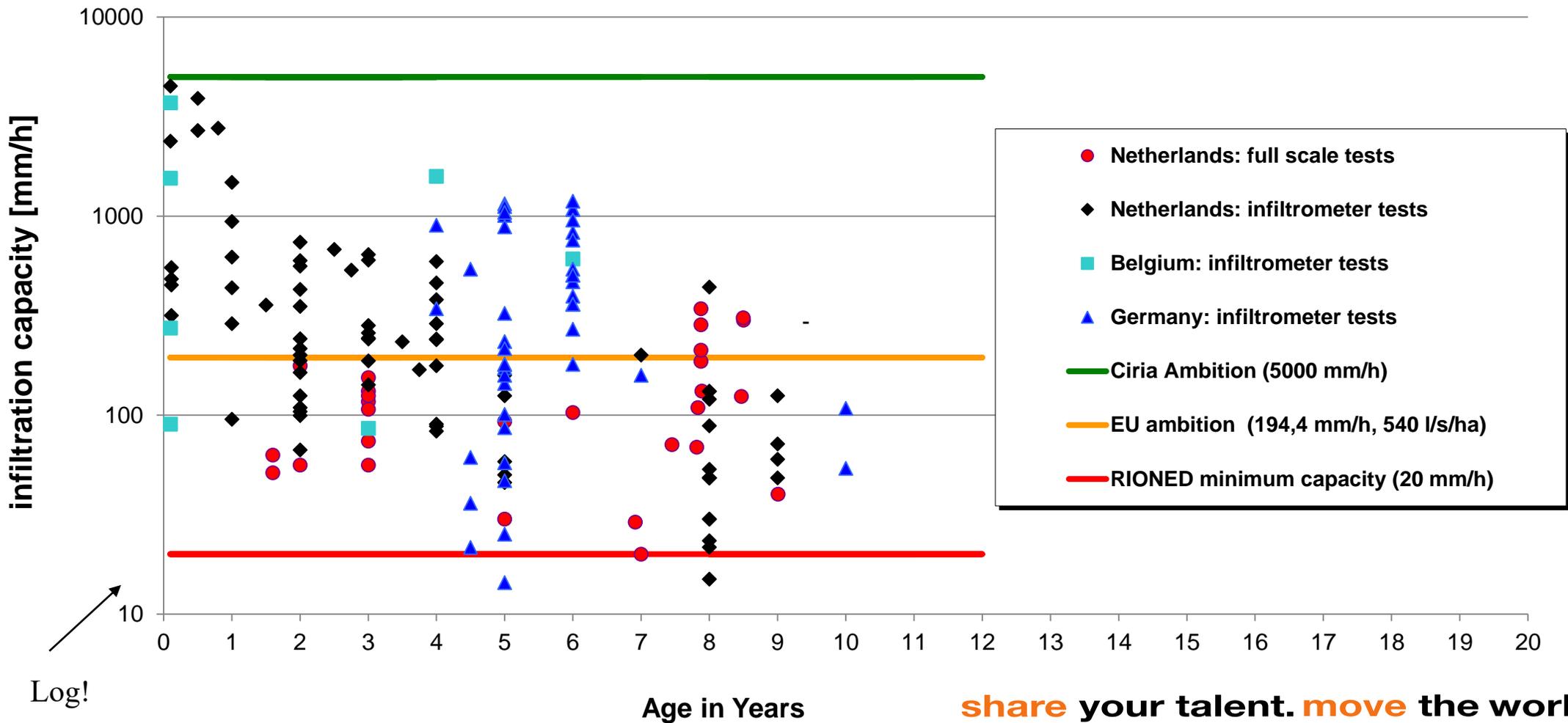
## Infiltration capacity versus age of permeable pavement around the world



reasons for variations infiltration rates: age. construction type, maintenance, variations in hydraulic ground conditions, pavement usage and environmental site conditions

# Results

## Infiltration capacity versus age of permeable pavement



# Long term

Maintenance is a major issue: efficiency factor in the order of 2-4

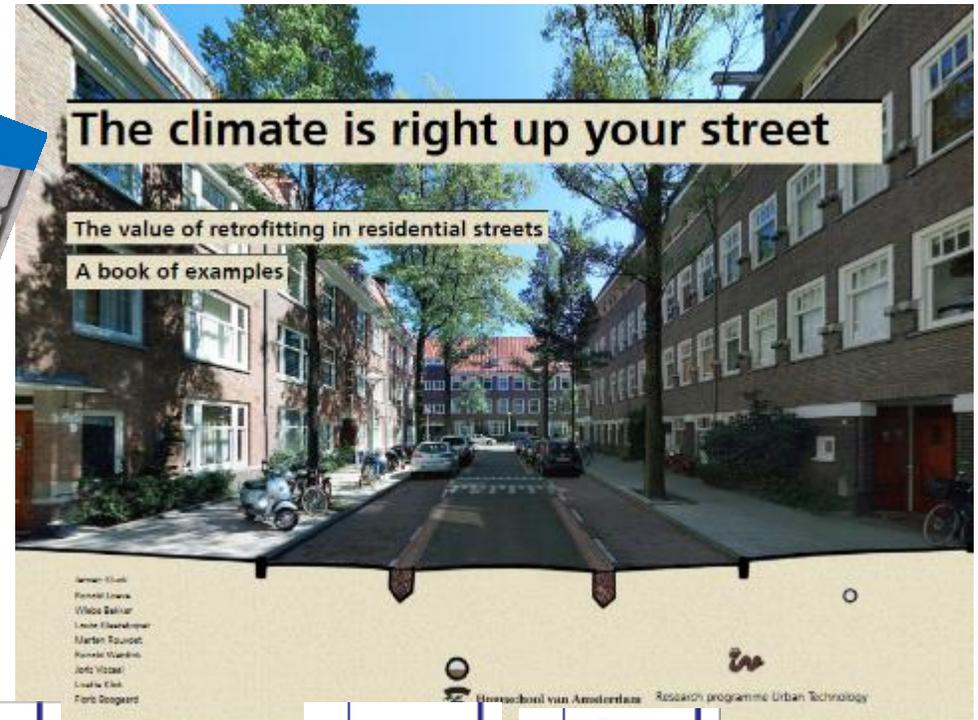
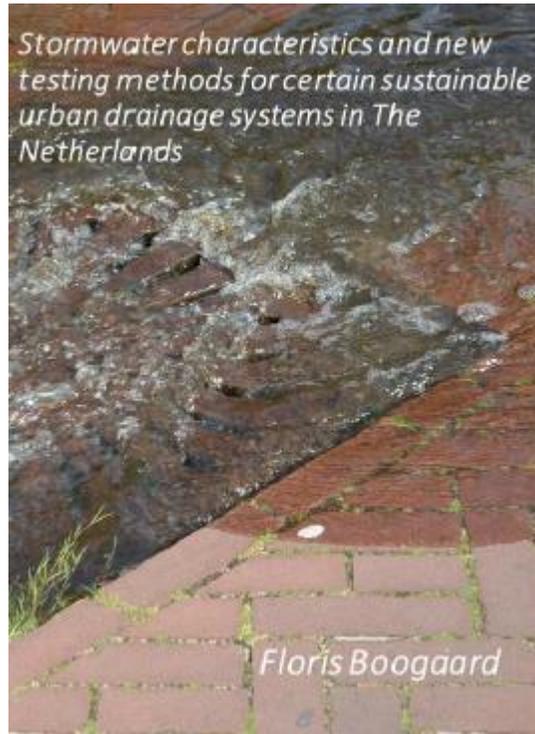
More research on different maintenance cost effective methods needed

Voor onderhoud - 65 mm/h

Na onderhoud - 184 mm/h



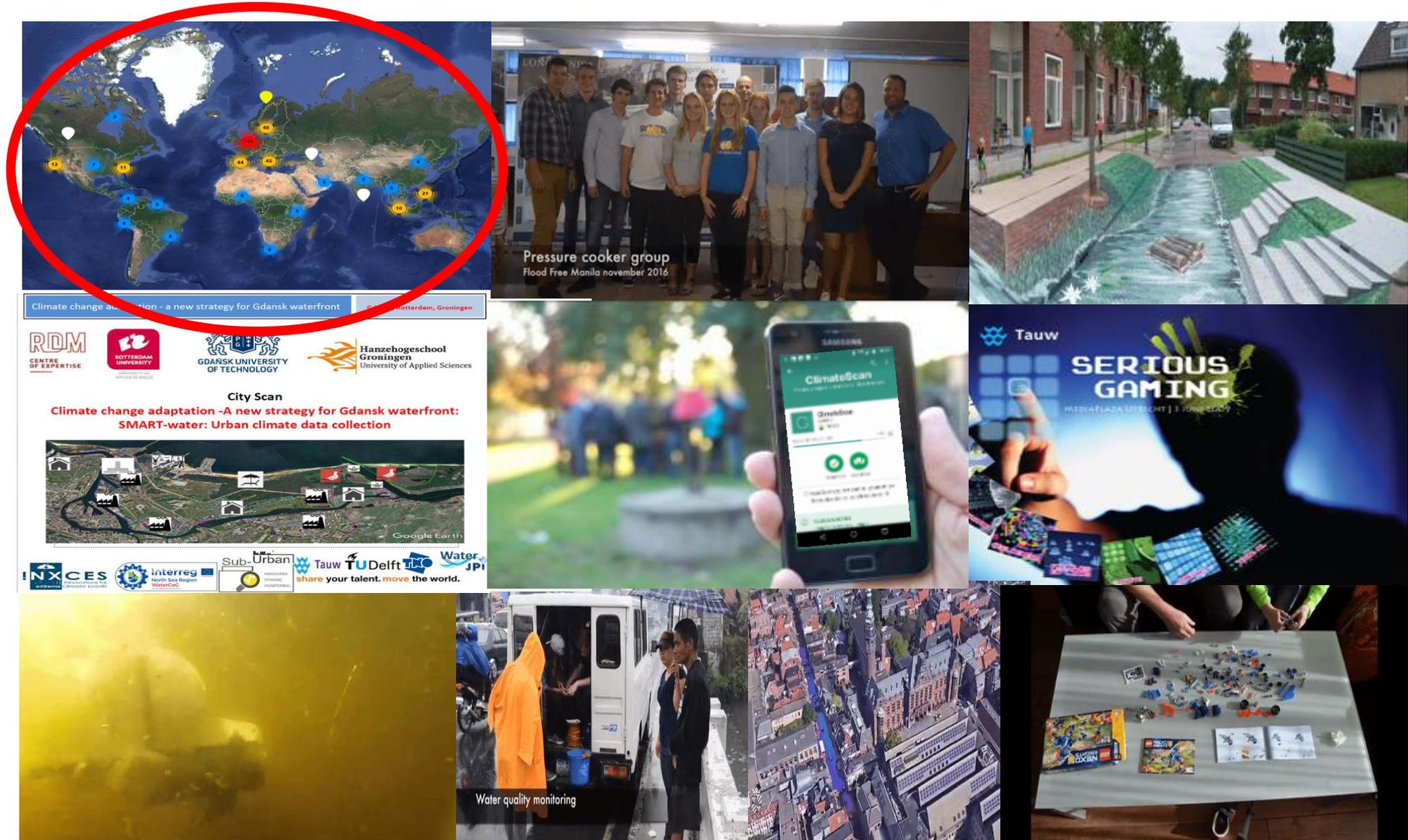
# So I wrote a book(s) about it....



Parameter	Unit	Nieuw ontwerp	Beaamte waarde		Bijdrage
			Minimaal	Maximaal	
Waterloop	mm	>25	0,5 - 0,8	0,5 - 0,8	<0,05
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8
Waterloop	mm	>25	>1	>1	0,5 - 0,8

share your talent. move the world.

# international knowledge exchange tools (Erasmus): experience: interactive, V+A (augmented) reality, serious gaming, ...



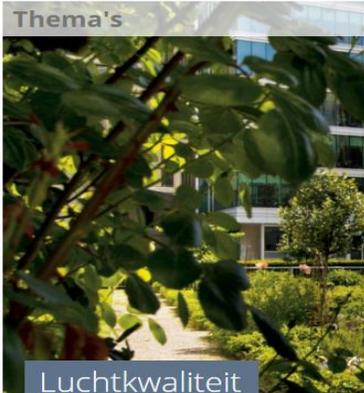
# Goal: knowledge exchange on SuDS for Books/Websites...International? interact?

**GROENBLAUWE NETWERKEN**  
voor duurzame en klimaatbestendige steden

atelier GROENBLAUW Zoeken English

Algemene informatie | Thema's | Maatregelen | Voorbeeldprojecten | Ontwerptool | Colofon | Contact

**Thema's**



**Luchtkwaliteit**

Een goede groenstructuur zorgt voor een betere ventilatie van de stad. Klik hier om meer te lezen over luchtkwaliteit.

**Groenblauwe ontwerptool**



Ontdek de beste maatregelen voor je project.

**Climate Adaptation Services**

OVER CAS PRODUCTEN PROJECTEN PUBLICATIES CONTACT

Home > Projecten > Kennisportaal Ruimtelijke Adaptatie

Kennisportaal Ruimtelijke Adaptatie

Home | Waar begin ik? | Hulpmiddelen | Voorbeelden | Bibliotheek | Stimuleringsprogramma

**Waar begin ik?**

Dit kennisportaal biedt verschillende gebruikers ondersteuning bij het klimaatbestendig en water robuust inrichten van hun omgeving.

**Nieuws**

**Tips**

**Klimaat-effectatlas**



Bekijk (toekomstige) dreigingen van overstromingen, wateroverlast, droogte en hittestress op de kaart. [Ga naar Klimaat-effectatlas](#)

**Groenblauwe netwerken**



Bekijk het overzicht van beschikbare ontwerp oplossingen en adaptatiemaatregelen. [Ga naar Groenblauwe netwerken](#)

Momenteel verzorgt CAS het beheer en onderhoud van het portaal. Heeft u tips, opmerkingen of vragen over het keuzemenu? Ga in direct contact op met webredacteur [Menno van Bijsterveldt](#).

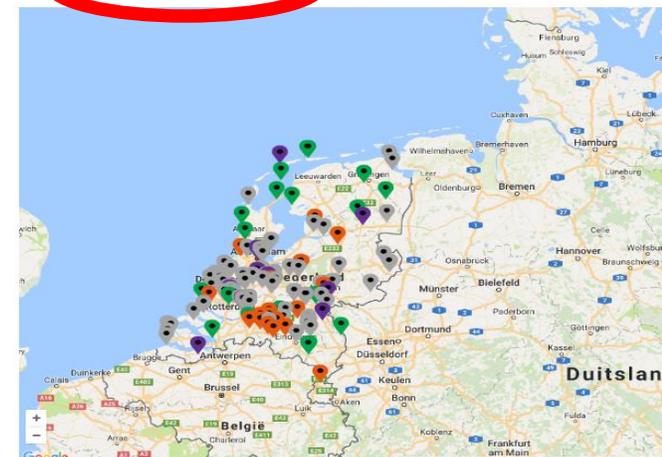
**Kennisportaal Ruimtelijke Adaptatie**

Home | Waar begin ik? | Hulpmiddelen | Voorbeelden | Bibliotheek | Stimuleringsprogramma | NAS

Home > Voorbeelden >

**Voorbeelden** **Straat niveau**

Wat speelt er bij u in de buurt? Hoe hebben anderen het aangepakt? De prikkertjes in onderstaande kaart geven aan waar ruimtelijke adaptatie in Nederland wordt toegepast. Daarnaast kunt u een overzicht van lokaal toegepaste adaptatiemaatregelen vinden via de [website ClimateScan](#).



126 resultaten gevonden

- Schaal
  - Gemeente
  - Landelijk
  - Provincie
  - Regio
  - Wijk / buurt
- Stadium
  - Afgerond
  - In uitvoering
- Thema RA
  - Droogte
  - Hitte
  - Overstroming
  - Wateroverlast
- Type project
  - Beleed
  - Onderzoek
  - Ontwikkeling

Impactproject | Klimaat stresstest | Natuurlijke klimaatbuffer | Praktijkvoorbeeld

the world.

# Semi structured interviews: functionalities of a Web-based international knowledge exchange tool?

Most stakeholders would like to have tools that are (top 5):

1. 'do it yourself';
2. Free (no registration cost, free photo and film material);
3. Provide more detailed information (exact location);
4. Interactive (local and international examples, benchmark);
5. link to scientific research on SUDS (publications, links to EU projects etc);

# Method: provided tool for knowledge exchange on suds: [www.climatescan.nl](http://www.climatescan.nl)

The screenshot shows the ClimateScan website interface. At the top, there are navigation links for "ClimateScan", "About us", "Login", and "Registratie". Below this, there are tabs for "Kaart" and "Satelliet". The main content area is a map of Europe with various colored markers (circles) indicating different categories of Sustainable Urban Drainage Systems (SUDS). A legend on the left side of the map lists these categories with corresponding colored circles:

- No filter
- Swale (Wadi)
- Floating urbanisation (Drijvend bouwen)
- Permeable pavement (Waterdoorlatende/passerende verharding)
- Green roofs (Groene daken)
- Subsurface infiltration (Ondergrondse infiltratie)
- Hollow gully free roads (Dutch: kolkloze wijk)
- Problem area (Probleem gebied)
- Settlement basin (Lamellenfilter)
- Constructed wetland (Helofytenveld)
- Stormwater quality improvement (regenwater zuivering)
- Other categories (Diversen)
- Cultural Heritage (Cultureel Erfgoed)
- Opportunities for adaptation (Kansen voor adaptatie)
- Stormwater on private property (Regenwater op eigen terrein)
- Do it yourself / Urban Farming
- Water storage in the rural-urban fringe (waterberging in de stadsrandzone)
- Monitoring with underwater drones (water quality and ecology)
- Waterharmonica: biological link to change (well) treated waste water into usable surface water
- Waterharmonica international- biological link to change (well) treated waste water into usable surface water
- Constructed wetlands: GWT plants (source: Fabio Masi)
- Watersquare (waterplein)
- Klimaatboom

At the bottom of the legend, there is a URL: <https://www.climatescan.nl/#filter-1> water and Energy



Learning by doing  
Keep it simple

share your talent. move the world.

# 'cold climate' Project example Bergen (Norway)



## Description

The swales is part of the historical World Heritage Site: Bryggen in Bergen, on the west coast of Norway. The average annual rainfall in Bergen is 2,250 mm/y and annual mean temperature of 7.6 °C, varying from 1.3 to 14.3 °C. Dry swales in this area are predominately used increase the groundwater level and humidity in the top soil cost-effectively to avoid oxygenation and loss of highly organic cultural deposits in the subsurface. The study swales consist of two grassed areas positioned side by side. Each swale is approximately 20 m long, 6 m wide and has an average slope of 1:2. The swales are primary installed to capture and treat stormwater runoff from upstream roofs and roadway.

## Samenvatting (Dutch description)

### Images



### Videos



## Downloads

- publication on swales in Bryggen and around the world
- waterseries Bergen Noorwegen, Bryggen
- abstract and poster ParisV, 2015
- Monitoring mitigation management, the groundwater project 'safeguarding the world heritage site of Bryggen in Bergen'
- Protecting the Past and Planning for the Future, Results from the project 'Cultural Heritage and Water Management in Urban Planning'
- abstract Cost Sub Surface, Bucharest 2017

## Websites

Bergen INXCES pilot study

## Contribute

Get this project

Description

Downloads

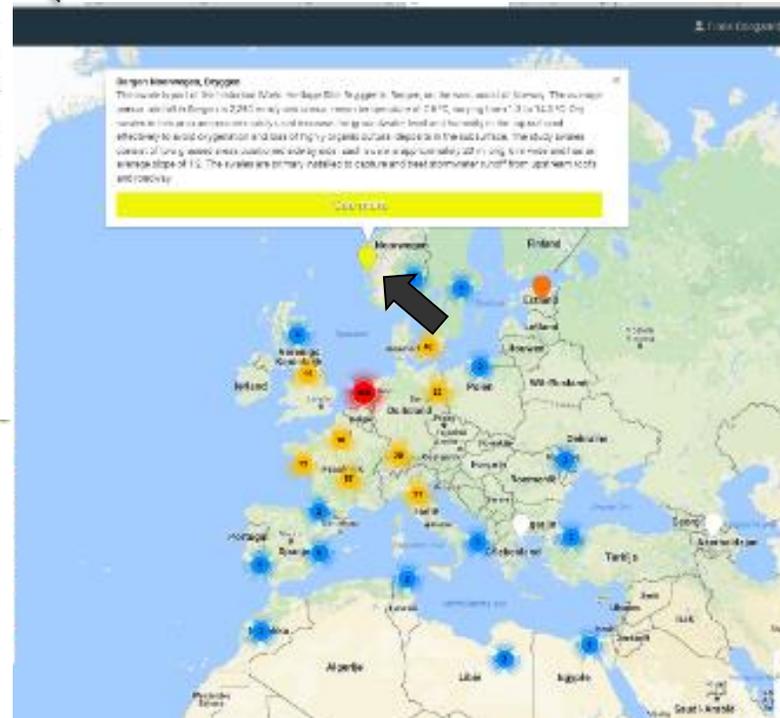
Images

Movies

Books

Scientific papers

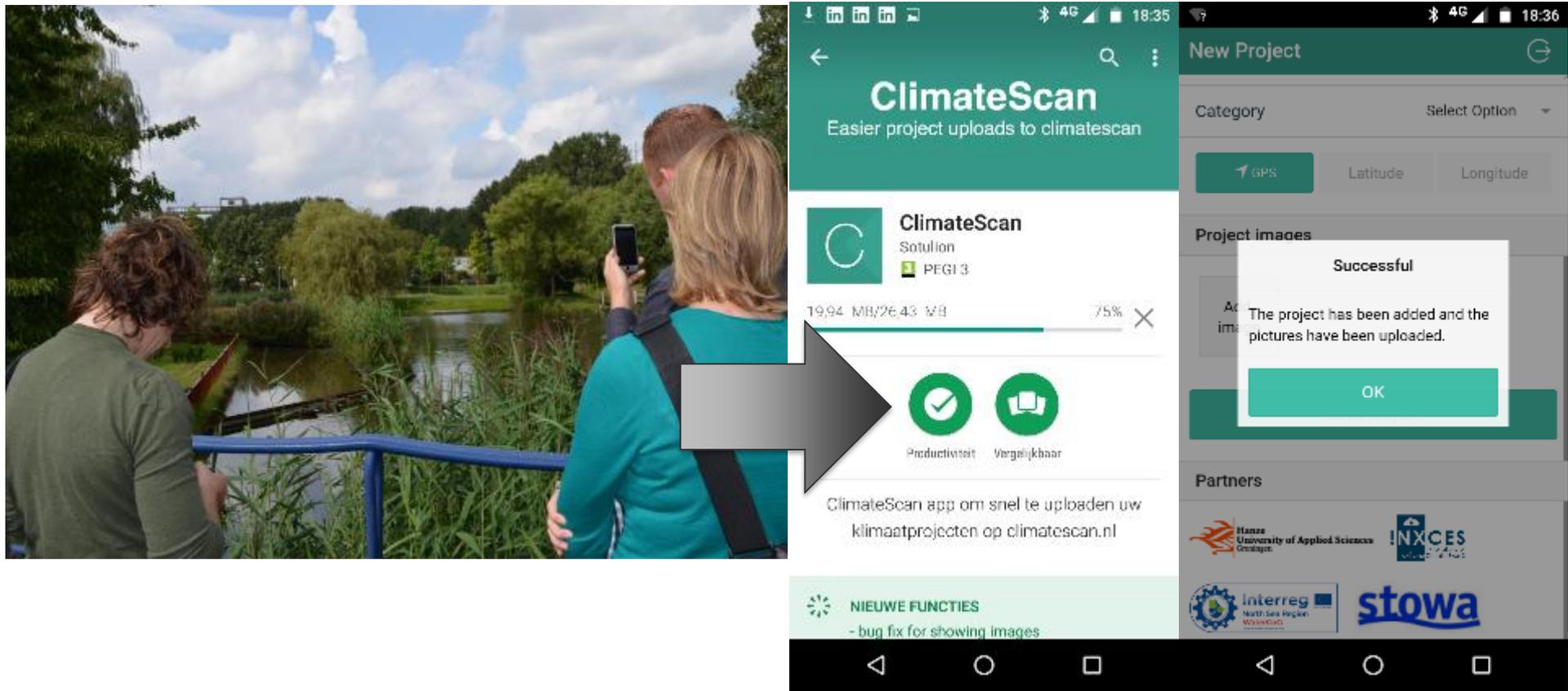
Link to websites



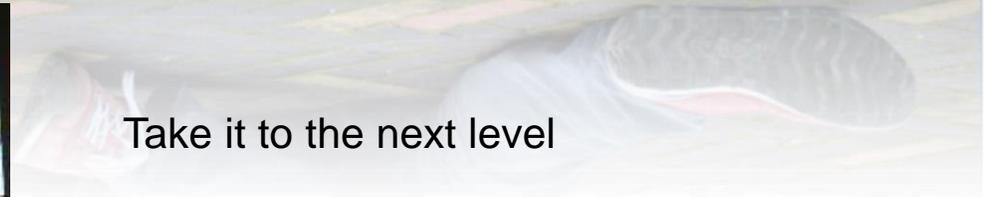
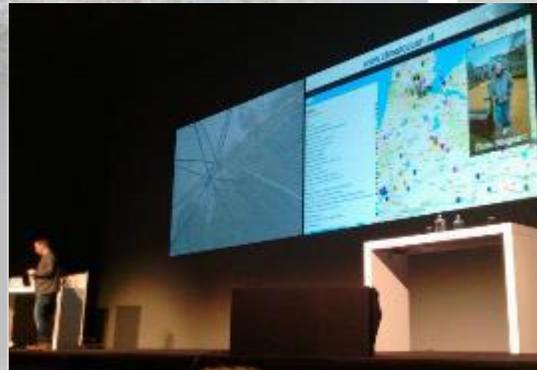
the world.

# Easy uploads (during fieldtrips ...)

- (android) App
  - GPS
  - Photo, category (description)



# high quality photos and videos, docs, links, ...

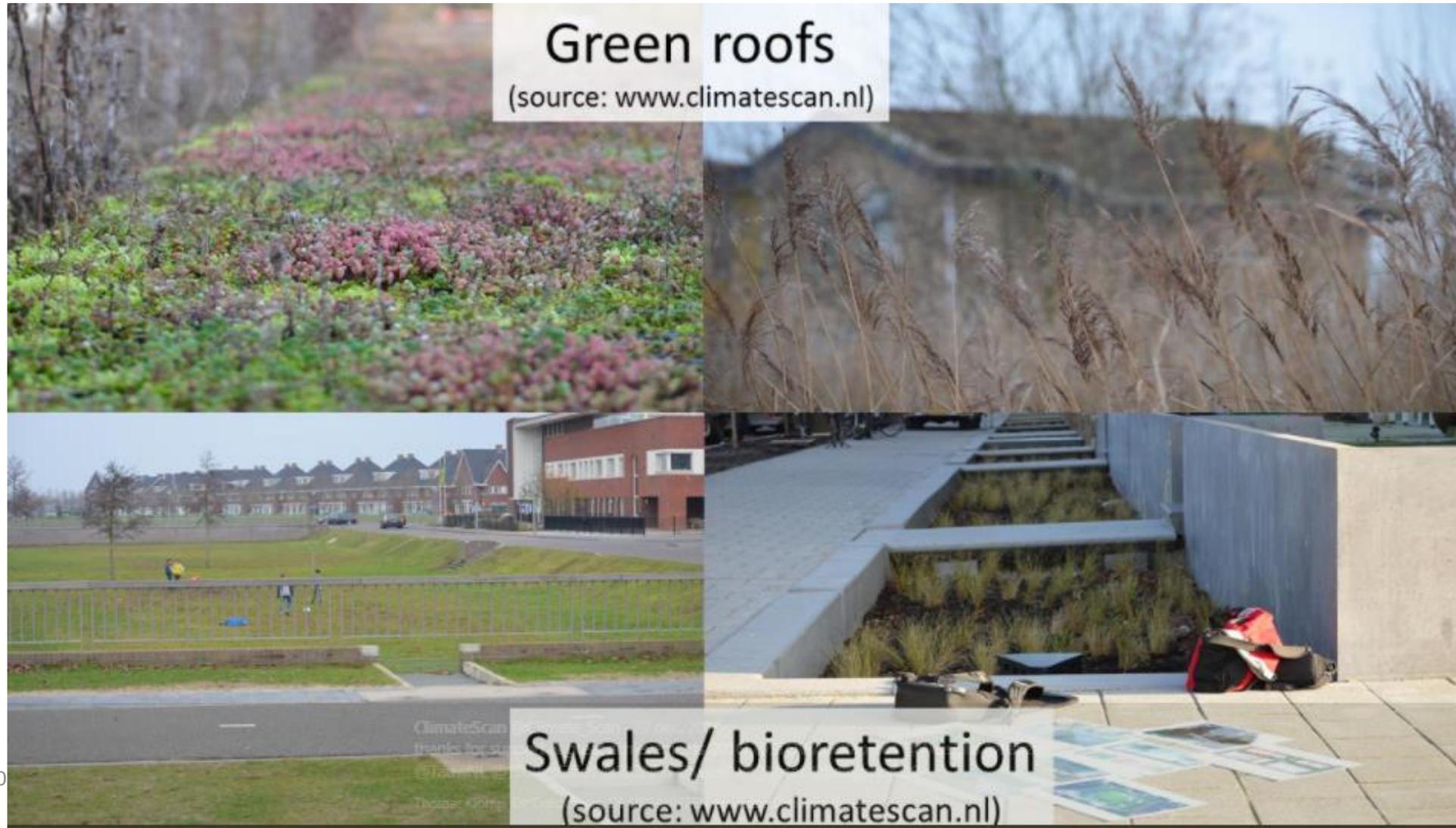


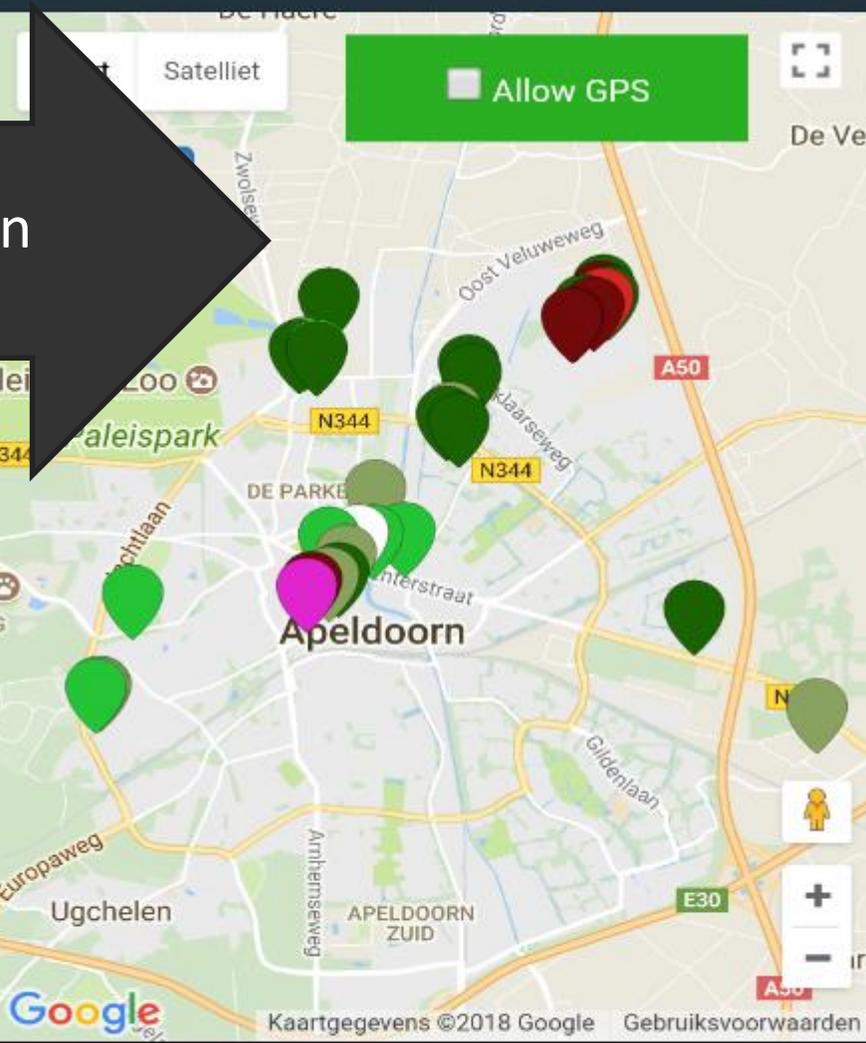
Take it to the next level

**share** your talent. **move** the world.

# Upload from desk: docs, links, pictures & movies

HR, Gif, videos etc  
From climatescan community





map your climate adaptation measures in 1 day



# Results: >3000 projects >10.000 international users (2 years)

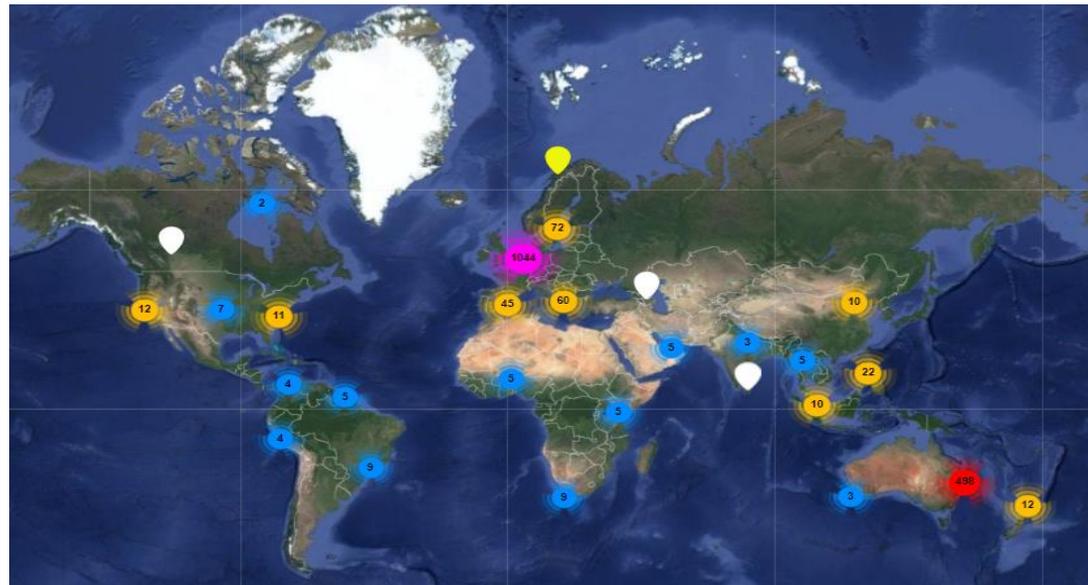
[www.climatescan.nl](http://www.climatescan.nl)



Legend

Click on a category to filter!

- No filter
- Sirate (Wadi)
- Floating urbanisation (Drijvend boswezen)
- Permeable pavement (Waterdoorlatende/passerende verharding)
- Green roofs (Groene daken)
- Subsurface infiltration (Ondergrondse infiltratie)
- Hollow gully free roads (Dutch: lokaalce wijk)
- Problem area (Probleem gebied)
- Settlement basin (Lameltefilter)
- Constructed wetland (Heddytenvekt)
- Stormwater quality improvement (regenwater zuivering)
- Other categories (Diversen)
- Cultural Heritage (Cultureel Erfgoed)
- Opportunities for adaptation (Kansen voor adaptatie)
- Stormwater on private property (Regenwater op eigen terrein)
- Do it yourself / Urban Farming
- Water storage in the rural-urban fringe (waterberging in de stadsrandzone)
- Monitoring with underwater drones (water quality and ecology)
- Waterharmonica: biological link to change (well) treated waste water into usable surface water
- Waterharmonica international: biological link to change (well) treated waste water into usable surface water
- Constructed wetlands: GWT plants (source: Fabio Masi)
- Watersquare (waterplein)
- Klimaatboom



Land ?	Sessies ? ↓
<b>Country Top 10</b>	
% van totaal: 100,00% (5.382)	
1.  Netherlands	4.270 (79,34%)
2.  United Kingdom	188 (3,49%)
3.  Russia	157 (2,92%)
4.  United States	116 (2,16%)
5.  Denmark	70 (1,30%)
6.  Romania	70 (1,30%)
7.  Belgium	68 (1,26%)
8.  Germany	66 (1,23%)
9. (not set)	50 (0,93%)
10.  Austria	36 (0,67%)

the world.

# www.climatescan.nl, can you infiltrate in Holland (/Riga)?

6.4 Resilience frameworks and approaches



Internationaal, citizen science

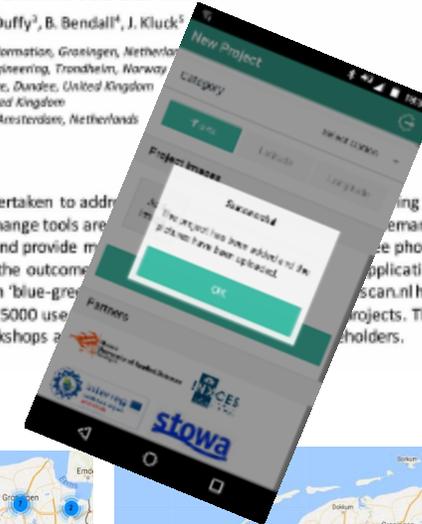
## ICUD-0412 Web-based international knowledge exchange tool on urban resilience and climate proofing cities: www.climatescan.nl

F. Boogaard<sup>1</sup>, J. Tipping<sup>1</sup>, T. Muthanna<sup>2</sup>, A. Duffy<sup>3</sup>, B. Bendall<sup>4</sup>, J. Kluck<sup>5</sup>

- 1 Hanzel University of Applied Science, Spatial transformation, Groningen, Netherlands
- 2 NTNU, Department of Civil and Environmental Engineering, Trondheim, Norway
- 3 Abertay university, Urban Water Technology Centre, Dundee, United Kingdom
- 4 The River Trust, water governance, Cornwall, United Kingdom
- 5 University of applied science Amsterdam, water, Amsterdam, Netherlands

### Summary

There is a wide diversity of projects undertaken to address urban resilience in the world. International knowledge exchange tools are needed to facilitate demand tools that are interactive, open source and provide multiple forms of media (text, photo and film material). This abstract details the outcomes of a pilot application for international knowledge exchange on 'blue-green infrastructure' projects. www.climatescan.nl has proven to be a successful tool with over 5000 users and has supported over 100 projects. The tool is used in several international workshops and conferences.



### Legend

Click on a category to filter

No filter

- Swale (Wadi)
- Floating urbanisation (Drijvend bouwen)
- Permeable pavement (Waterdoorlatende/passerende verharding)
- Green roofs (Groene daken)
- Subsurface infiltration (Ondergrondse infiltratie)
- Hollow gully free roads (Dutch: kolkloze wijk)
- Problem area (Problem gebied)
- Settlement basin (Lameltefilter)
- Constructed wetland (Haloïfytenveld)
- Stormwater quality improvement (regenwater zuivering)
- Other categories (Diversen)
- Cultural Heritage (Cultureel Erfgoed)
- Opportunities for adaptation (Kansen voor adaptatie)
- Stormwater on private property (Regenwater op eigen terrein)
- Do it yourself / Urban Farming
- Water storage in the rural-urban fringe (waterberging in de stadsrandzone)
- Monitoring with underwater drones (water quality and ecology)
- Waterharmonica: biological link to change (well) treated waste water into usable surface water
- Waterharmonica international: biological link to change (well) treated waste water into usable surface water
- Constructed wetlands: GWT plants (source: Fabio Masi)
- Watersquare (waterplein)
- Klimaatboom
- ENERGY (projects related to water and Energy)
- waterbergingsgebied (storage for water)
- surface water storage and infiltration (oppervlaktewater berging en infiltratie)
- klimaatadaptief groen
- Rainwater harvesting residential (regenwatergebruik woning)



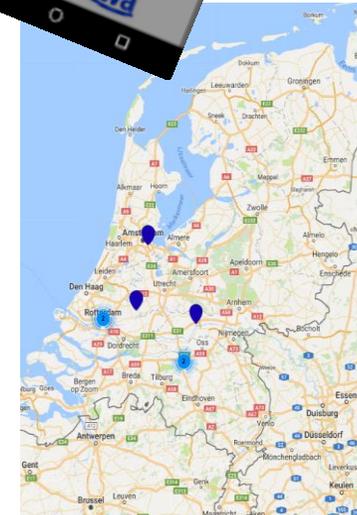
Permeable pavement >75



swales: >100



Green roofs >75

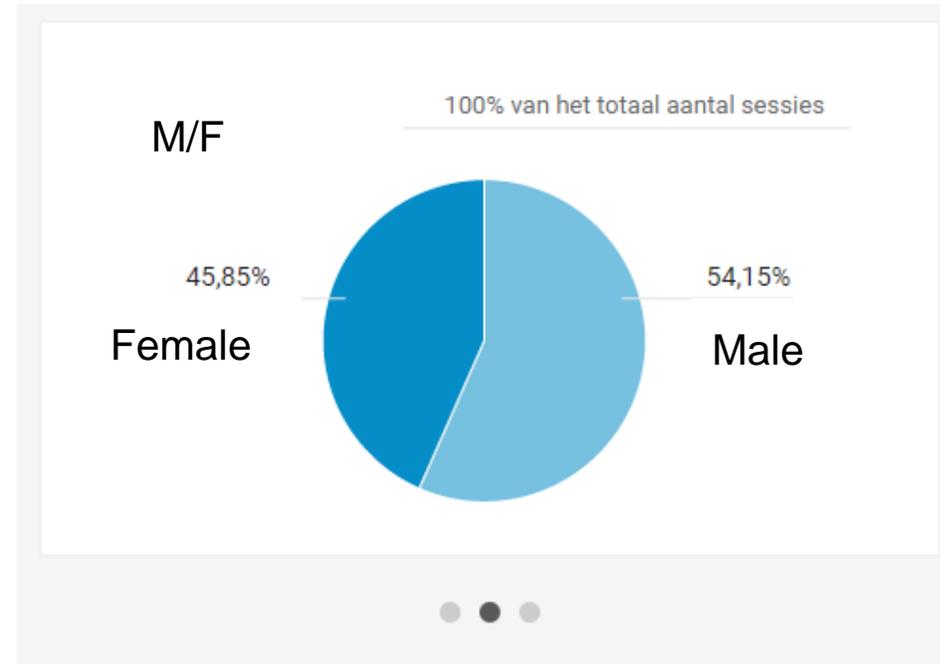
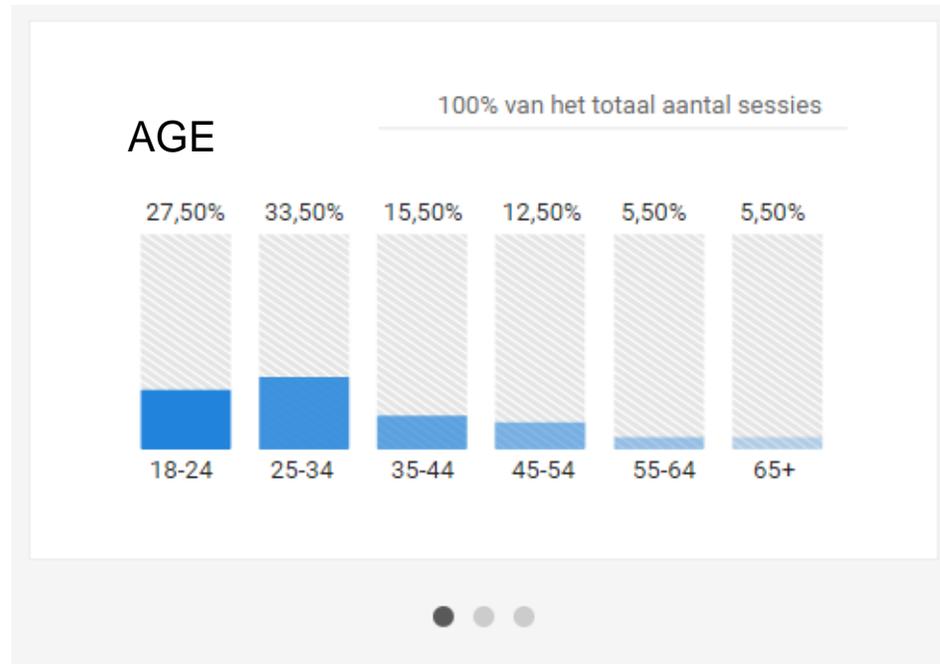


Watersquares >10

world.

# Target group: educational SuDS

- (Young) professionals



*More than 60% of the users is younger than 34 years users resulting in engagement with an important target group: young professionals*

# Learning from SuDS: Full scale testing

 **ClimateScan** @Climate\_Scan · 4 apr.  
permeable pavement tested @ResilientRdam 50 @HollandWater locations:  
[climatescan.nl/#filter-3](https://climatescan.nl/#filter-3) @amoudmoleenaar @100ResCities @OostrA @TaufNL  
🌐 Vertalen uit het Engels



🗨️ 10 🍷 5 📺

 **ClimateScan** @Climate\_Scan · 22 jun.  
overschatten we het functioneren van #wadi 's en doorlatende verhardingen?  
[h2owaternetwerk.nl/vakartikelen/1...](https://h2owaternetwerk.nl/vakartikelen/1...) @WDODelta @TaufNL @hanze  
@Waternetwerker



🗨️ 7 🍷 6 📺

**world.**

# Vintage SuDS: social media

 **ClimateScan**  
@Climate\_Scan

#SuDS are sustainable: 20 years ago the first #swales were constructed in Netherlands, time to look back. #GreenInfrastructure #SmartCity

Vertalen uit het Engels



07:34 - 25 aug. 2017 vanuit [Amsterdam, Nederland](#)

28 retweets 26 vind-ik-leuks

share your talent. move the world.

# Vintage SuDS

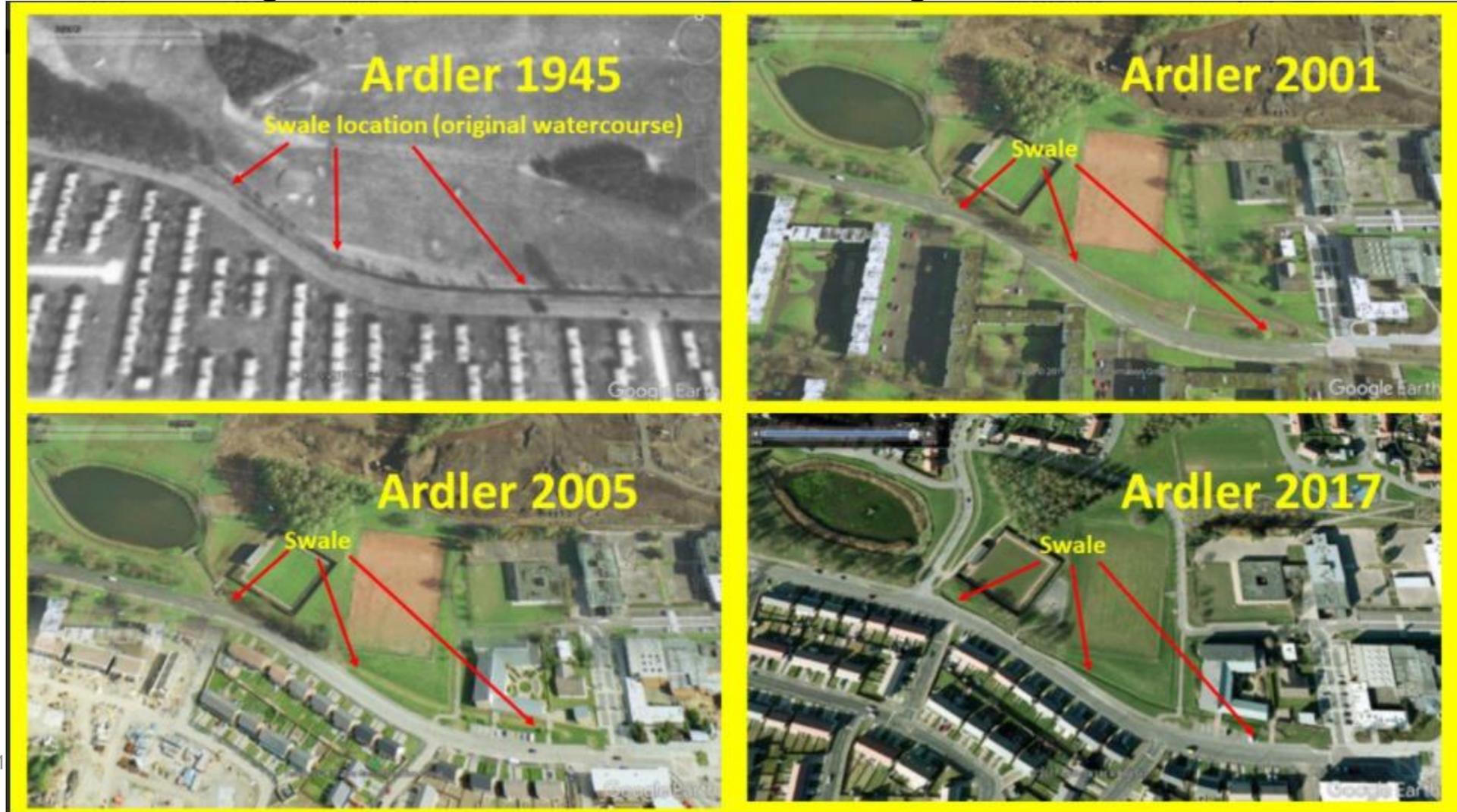


Local-Net Water @LocalNet\_Water · 1 sep.

Als antwoord op @Climate\_Scan @RIONED en 8 anderen

#Swales that stand the test of time @Climate\_Scan! A vintage #Swales/#SuDS challenge! @Sudsulike @gaye\_tuilsolutn @NeilGCVGNP @Max\_GCVGNP

vintage #Swales/#SuDS challenge



# Vintage SuDS



# Innovative SuDS & EU projects

**ClimateScan**  
@Climate\_Scan

using sheep for low cost sustainable maintenance of swales?  
[climatescan.nl/projects/201/d...](https://climatescan.nl/projects/201/d...) Find >1000 #SuDS #urbangreen on [climatescan.nl](https://climatescan.nl)

Vertalen uit het Engels



03:07 - 14 mei 2017

13 retweets 5 vind-ik-leuks

Local-Net Water, susdrain @ CIRIA, De Groene Stad en 6 anderen

13 5

**ClimateScan**  
@Climate\_Scan

D Hogeschool van Amsterdam [#BoscoVerticale #Sponge2020](https://climatescan.nl/projects/1476/...) is re [climatescan.nl/projects/1476/...](https://climatescan.nl/projects/1476/...)  
 #climatechange #spongecity #GreenInfrastructure #naturebasedsolutions



05:52 - 7 jul. 2017 vanuit Amstelveen, Nederland

8 retweets 5 vind-ik-leuks

Gemeente Leiden, Resilient Rotterdam, Stad Antwerpen en 7 anderen

8 5

iWater Interreg Central Baltic EUROPEAN UNION European Regional Development Fund

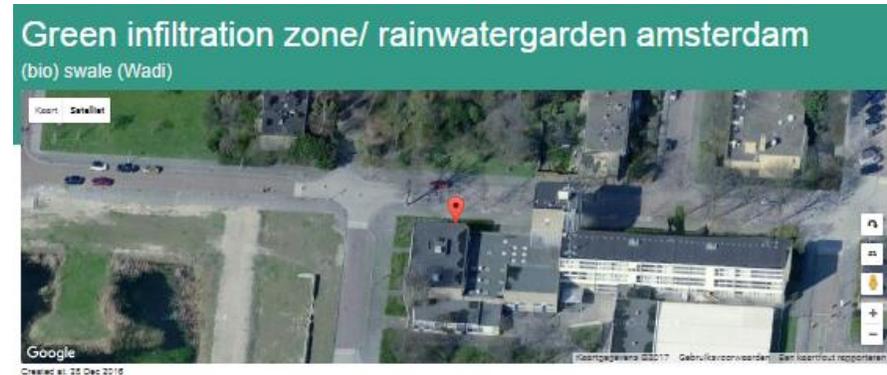


# Top views on climatescan (info BMPs)



**Description**  
In de nieuwbouwwijk Westerbouwlanden wordt hemelwater zichtbaar afgevoerd over de weg. Deze weg heeft geen goot, geen kolkken maar ligt alleen iets hol. Bandverlengingen laten het water vrij naar het groen en oppervlaktewater stromen.

**Images**

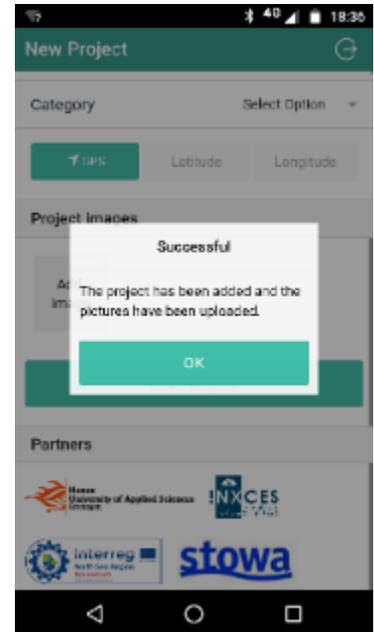


**Description**  
Een primeur voor Amsterdam: een waterbergende groenstrook, die nu 66.000 liter en straks zelfs 130.000 liter water kan opvangen, en er zo voor zorgt dat bewoners geen wateroverlast hebben bij hoosbuien. Vandaag opent wethouder Ludo Kock de groenstrook in een woonwijk op de Zuidas. Het is de eerste in zijn soort in Nederland. Wethouder Ludo Kock (VVD): "We zien dat het steeds vaker hard regent, en dat leidt tot wateroverlast zoals ondergelopen kelders. Deze groenstrook ziet er simpel uit, maar zorgt ervoor dat de kelders in deze buurt niet meer onderlopen. Een prachtig initiatief, helemaal omdat het relatief weinig kost." Omdat de groenstrook 35 centimeter lager ligt dan de omgeving, kan hij regenwater opvangen van de wegen en de daken in de buurt. De groenstrook kan bij een hoosbui zelfs even in een beek veranderen. Het water blijft maximaal 24 uur in de beiging en daarna stroomt het langzaam weg naar het oppervlaktewater en infiltreert het in de bodem. Als bij een zware bui de strook dreigt te overstromen, stroomt het via een overstort het riool in. Dit voorkomt dat het water de huizen in stroomt. Het leuke aan de strook is dat het opvangen van water wordt gecombineerd met een hoogwaardige inrichting van het groen. De groenstrook is geplant met planten die tegen veel water kunnen en het hele jaar groen zijn. De planten kunnen zelfs een tijdje onder water staan. De gemeente en Watermet willen deze groenstrook op meerdere plekken in de stad aanleggen. De waterbergende groenstrook wordt vanmiddag om vier uur officieel geopend. Hij ligt op de Zuidelijke Wandelweg, op de kruising met de Gassterlandstraat. De opening is openbaar.

**Downloads**  
No downloads added

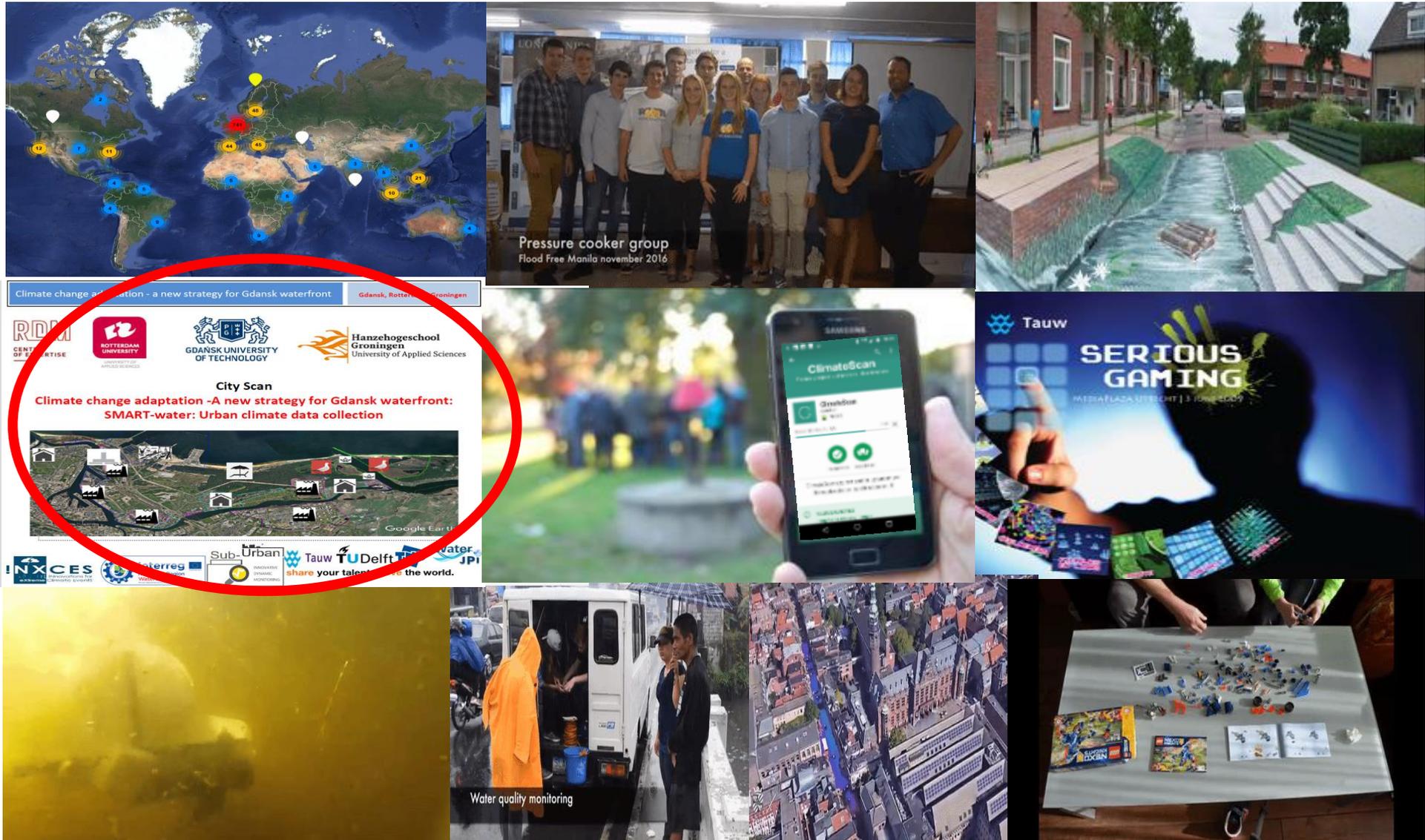
**Websites**  
No websites added

**Contribute**  
✔ Edit this project



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# international knowledge exchange tools (Erasmus): experience: interactive, V+A (augmented) reality, serious gaming, ...

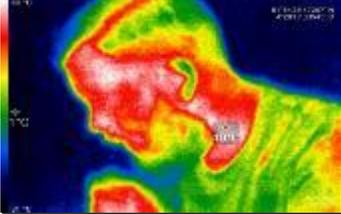


# Cityscan:

**The City Climate Scan methodology:** to measure, map, scan and assess different parameters that provide insight into the vulnerability of urban areas and neighborhoods.

For the Rotterdam City Climate Scan (September 2017), the following challenges were selected: **risk of flooding, heat stress, water quality (micro-pollutants and plastic waste) and air quality.**

5/22/2018

Challenge	Method	Results
<b>Urban floods</b> 	Mapping floodings and infiltration capacity measurements with infiltrometer test	<ul style="list-style-type: none"> <li>Measurements on infiltration capacity (see next paragraph)</li> <li>map with measurements <a href="http://www.climatescan.nl">www.climatescan.nl</a>, figure 1 and 2</li> </ul>
<b>Hittestress</b> 	Dynamic and static measurements of temperature on several surfaces in the urban dense area with heatcameras and sensors	<ul style="list-style-type: none"> <li>Map with heatstress in the urban dense and green areas in the city</li> </ul>
<b>urban waterquality micro-pollutants</b> 	apps and teststrips and underwaterdrones with camera's and sensors	<ul style="list-style-type: none"> <li>maps with results of grab samples of nutrients in urban water</li> <li>3D-scans of waterquality with continuous sensors with indication of pollutant sources</li> </ul>
<b>urban waterquality macro-pollutants; plastic waste</b> 	'square method' the type and amount of plastic waste is determined at 1m <sup>2</sup>	<ul style="list-style-type: none"> <li>detailed insight in waste per m<sup>2</sup></li> <li>optimized method to be used at projects in Ambon (Indonesia) and Cebu City (Philippines)</li> </ul>



## VAKARTIKELEN

### INTERNATIONALE CITY CLIMATESCAN ROTTERDAM: ONDERZOEKSRESULTATEN KLIMAATADAPTATIE

*Geschreven door Floris Boogaard (Hanzehogeschool Groningen, Hogeschool Rotterdam, Tauw), Rick Helkoop, Kaj van de Sandt, Tijmen den Oudendammer (Hogeschool Rotterdam), Arjen Oostra (gemeente Rotterdam), op 25 januari 2018.*

De 'internationale city climatescan' is een nieuwe methode om bewustwording te creëren over klimaatadaptatie. Hierbij worden de huidige status van klimaatadaptatie in een stad en de ambitie voor de komende jaren vastgelegd. De climatescan heeft veel waardevolle informatie opgeleverd en zal daarom in de nabije toekomst worden ingezet.



# Video impression

- <https://www.youtube.com/watch?v=S2rLYT48Vrs>



Impression city climatescan Rotterdam

22-5-2018

Ken

124 weergaven

1 0 DELEN

ive the world.

# Airquality

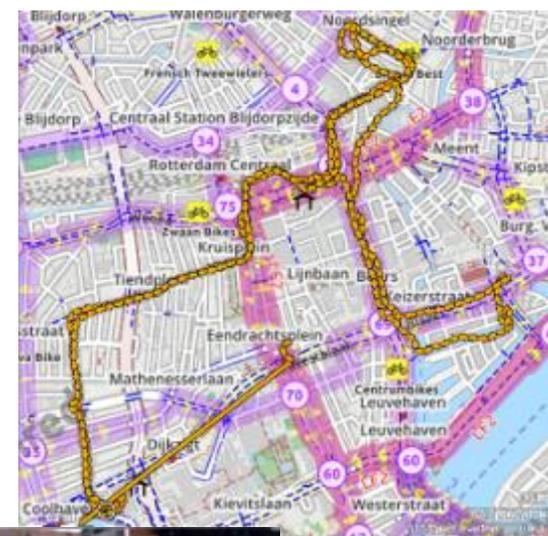
## Method



- SENSA BOX**
- 1x Måler (GPS tracking & GSM telekommunikation)
  - 4x 4-lagers (180 ADC)
  - NO<sub>x</sub> (4 Senzor NO<sub>2</sub>-AA37 & NO<sub>2</sub>-EA37)
  - NO<sub>2</sub> (4 Senzor NO<sub>2</sub>-AA37)
  - CO<sub>2</sub> (Senzor CO<sub>2</sub>-AA37)
  - O<sub>3</sub> (Senzor O<sub>3</sub>-AA37)
  - Temp. 1 (AM2301 5x12-02)
  - Axels (2x motoriserade axlar med 1000 rpm motorer)
  - 3000 mAh Li-Ion batteri
  - Modul för justering av sensornas vinkel
  - Sensorkabel
  - Värnande skydd för sensorn
  - Matningskabel till en extern LED



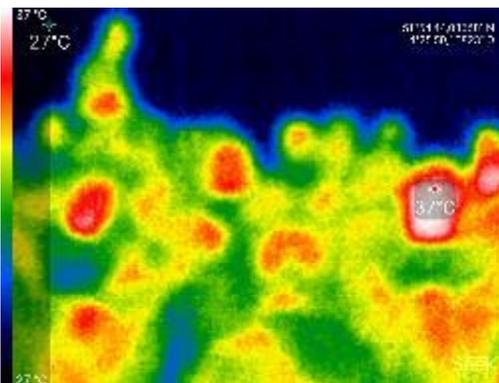
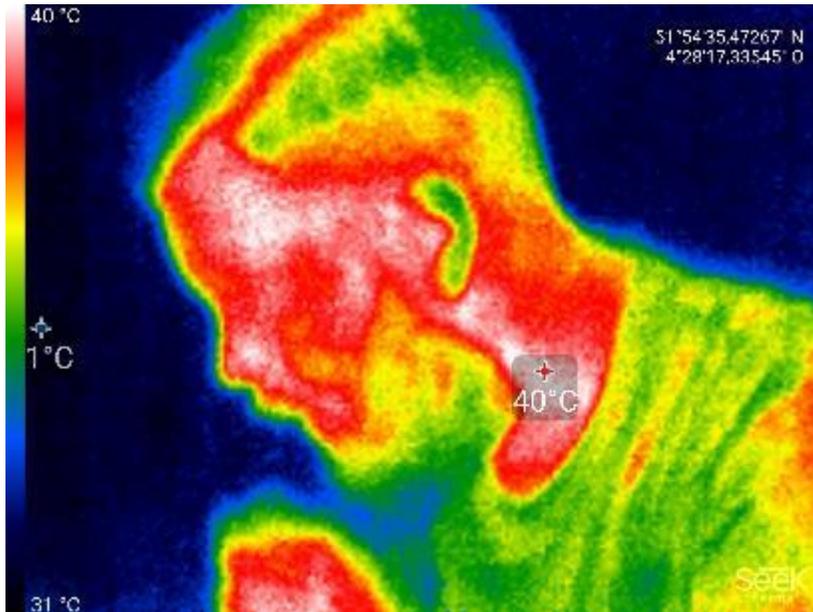
## Results



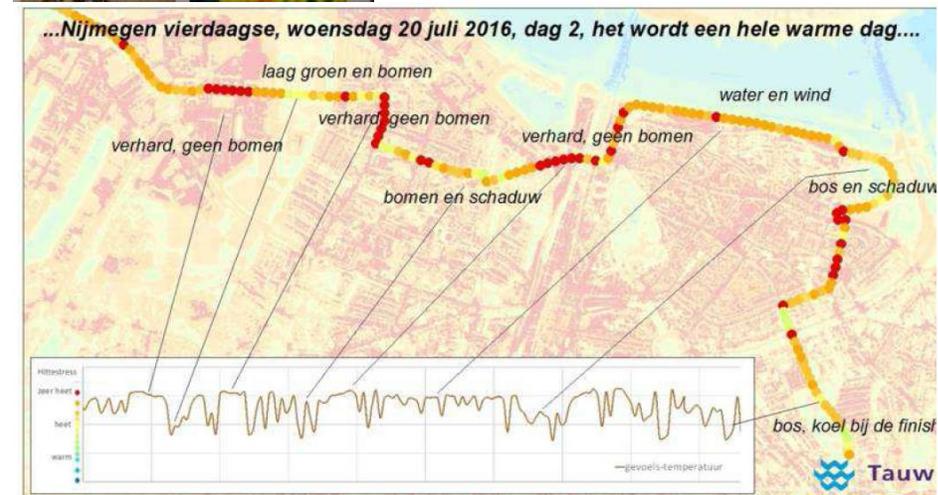
world.

# heatstress

## Method



## Results



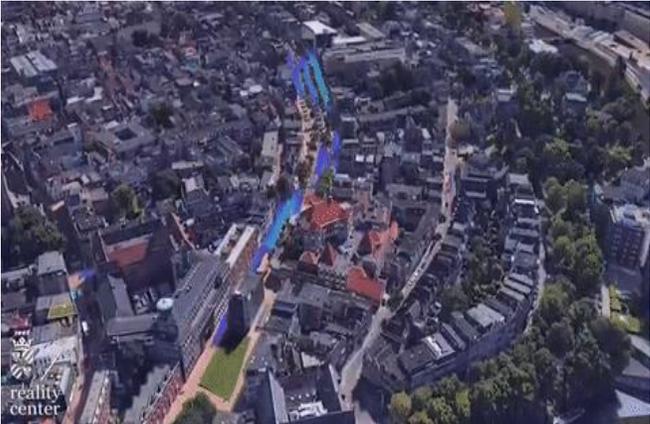
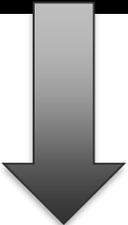
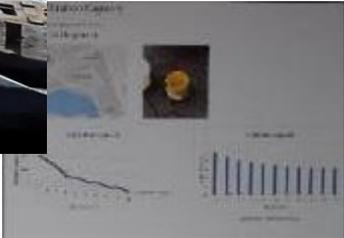
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# Floodmodels: infiltration capacity

## Method



## Results



The Infiltration Capacity of urban spaces were measured at multiple locations in the city. The open green spaces show a 3-6 higher infiltration rate that paved areas. From detailed flood maps and flood models, locations have been selected to implement green and blue measures BMPs.

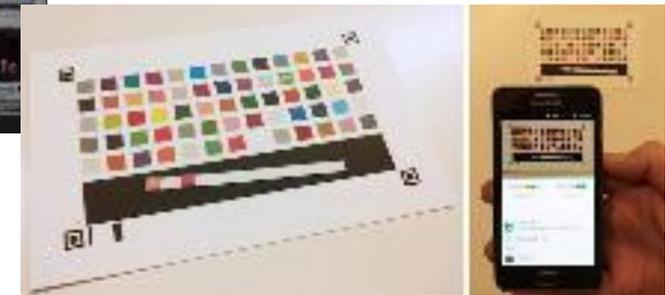
talent. **move** the world.

# Waterquality

## Method



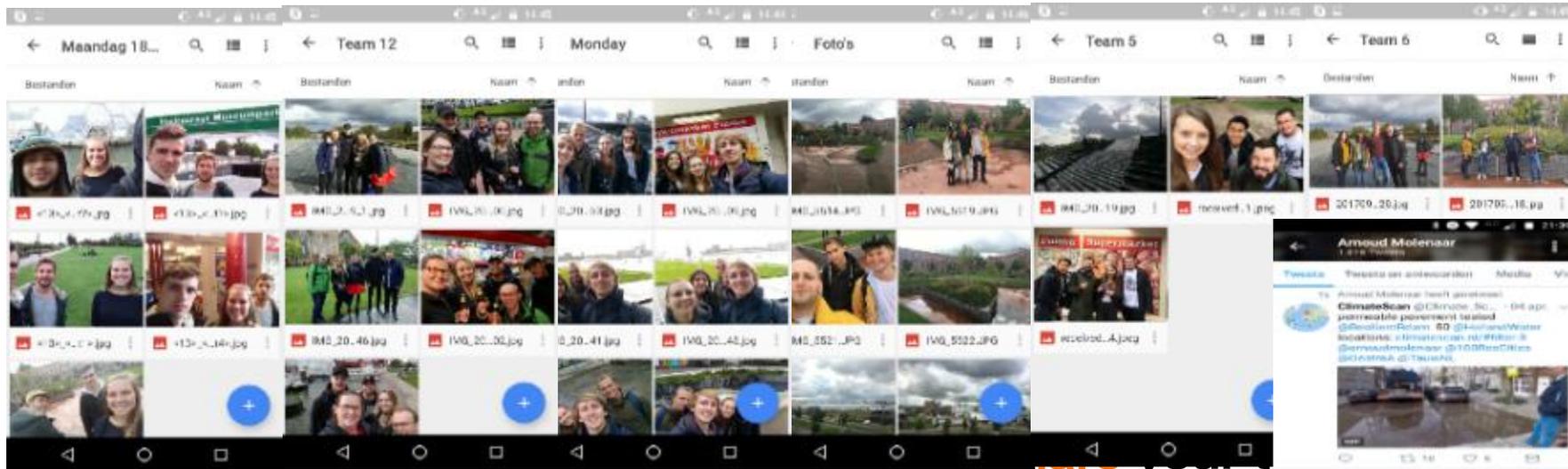
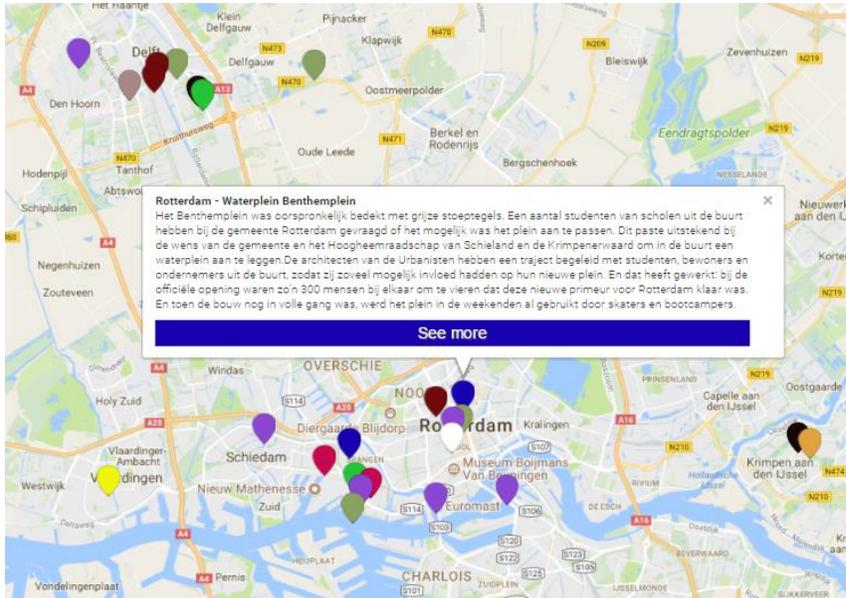
## Results



Parameters that were assessed in Rotterdam are: urban water quality (several parameters such as: nutrients, ph, conductivity, temperature, turbidity, oxygen), and waste pollution (plastic waste).

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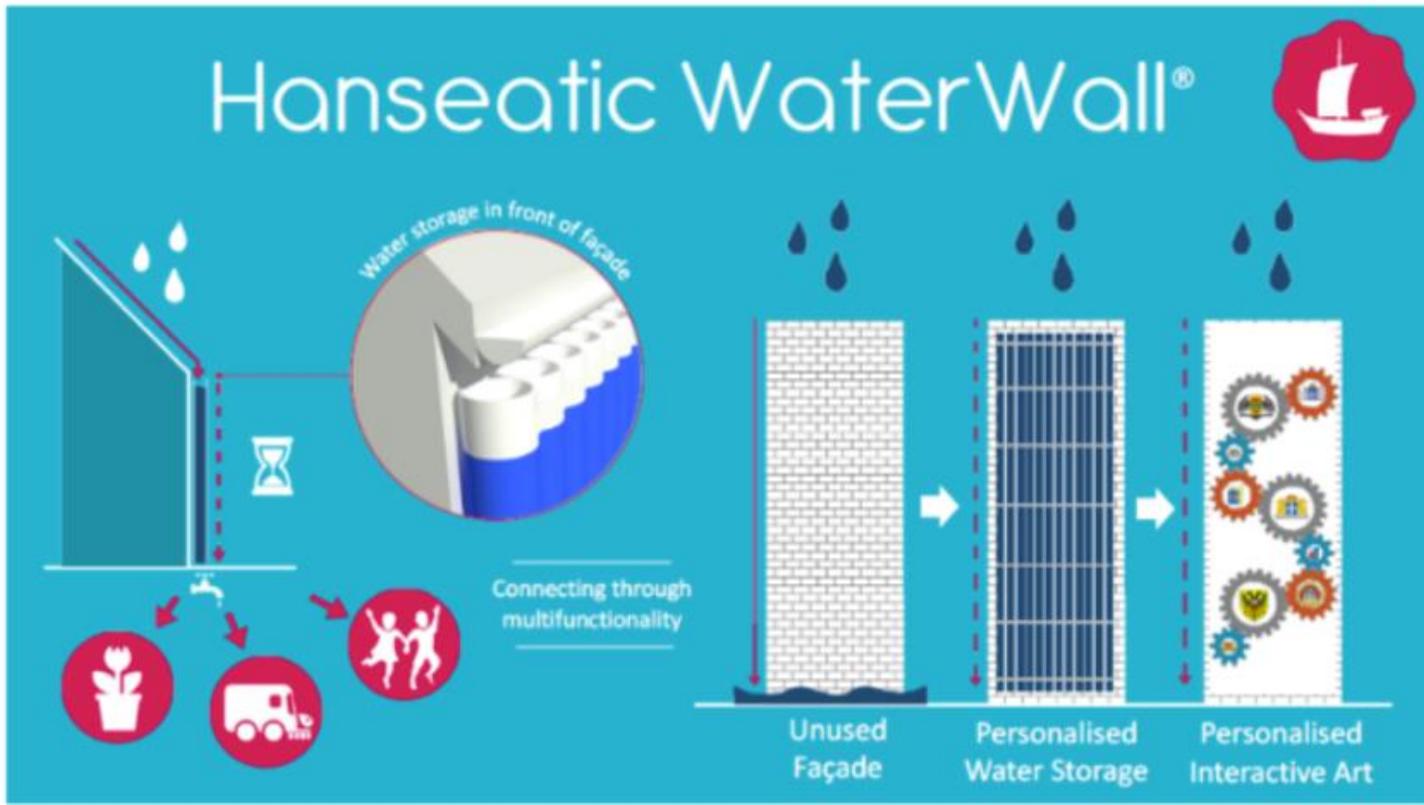
# Map BMPs



re world.

# Results of other challenges

## An Innovative Climate Adaptation Measure: The Hanseatic WaterWall



## The hanseatic city challenge

Other categories (Diversen)



### Description

Hanseatic City Challenge How can we best protect the Hanseatic Towns against climate change effects? That is the question at the heart of the Hanseatic City Challenge. The first Hanseatic City Challenge is taking off! As pre-event of and during the International Hanseatic days in Kampen, student teams will work out a challenge during a two day pressure cooker event. This challenge is about how to deal with the effects of climate change in their Hanseatic city.

### Downloads

No downloads added

### Websites

- [de nieuwe hanze unite](#)
- [the hanseatic city challenge](#)
- [the hanse days general info](#)
- [editie Zon magazine nr 5 'water connects'](#)
- [hanze: Groningen in Finale](#)

### Images



### Contribute

Get the project

### Videos



# Challenges in urban climate change

## Help out with your knowledge



Floodings



waterquality



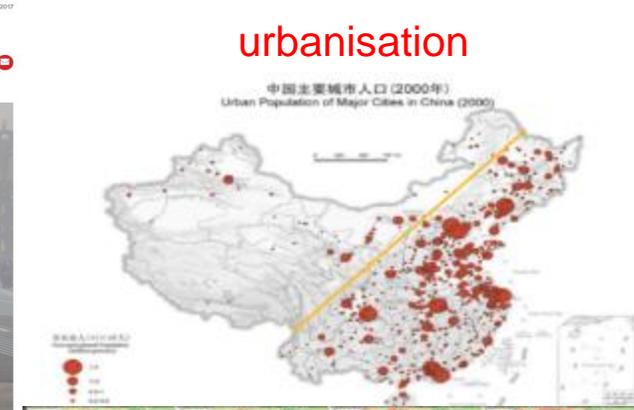
Heatstress



Floodings



Airquality



urbanisation

world.

# International triple helix Cityscan:

The City Climate Scan method was tested in different cities around the globe with groups of young professionals and stakeholders in rapid urban appraisals. (Philippines, Indonesia, Taiwan, ...)



## Join us....



**Research results of a new governance method in climate adaptation; the international City Climate Scan**

Floris Boogaard<sup>1</sup>, Rick Heikoop<sup>2</sup>, Michael Bosscher<sup>1</sup>, Olof Akkerman<sup>1</sup>

<sup>1</sup>Hanze University of Applied Science, Spatial Transformation, Groningen, Netherlands  
<sup>2</sup>University of applied science Rousefford, The Netherlands

### Summary

Cities are becoming increasingly vulnerable to climate change and there is an urgent need to become more resilient. This research involves the development of the City Climate Scan methodology to measure, map, scan and assess different parameters that provide insight into the vulnerability of urban systems and stakeholders. The research involved the



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# Messages to take home

- Think positive
- We share challenges lets share solutions
- Climate adaptive strategy: A<sup>3</sup>
- Cost effective multifunctional long term urban planning
- Use international knowledge exchange tools
- Join. More info?

# THANK YOU...

## see more?

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

[twitter.com/Climate\\_Scan](https://twitter.com/Climate_Scan)

**ANY QUESTIONS?**



floris boogaard  
@FlorisBoogaard Volgt jou

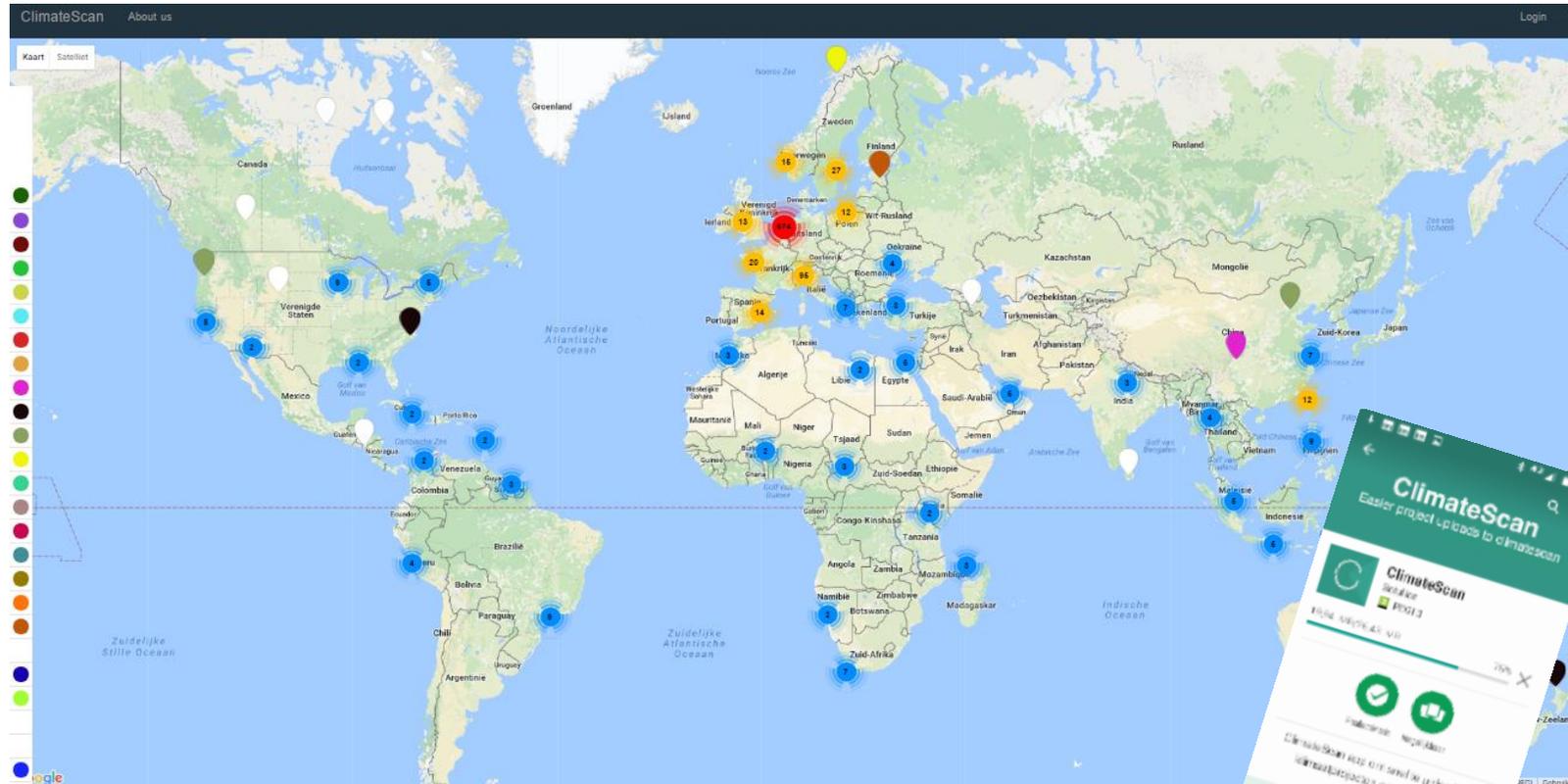
Sustainable watermanagement  
consultant, professor applied science,  
researcher, Life is what you make it...



**dr.ir. F (Floris) Boogaard PhD**  
**professor spatial transformations:**  
**[Floris@noorderruimte.nl](mailto:Floris@noorderruimte.nl)**  
**[+31651556826](tel:+31651556826)**

**share your talent. move the world.**

# Thank you



Suggestions: [floris@noorderruimte.nl](mailto:floris@noorderruimte.nl)

use/register (free participation and scientific

results): [www.climatescan.nl](http://www.climatescan.nl)

Follow: [https://twitter.com/Climate\\_Scan](https://twitter.com/Climate_Scan)



LinkedIn Account Type

facebook

Zoeken

the world.



# Green roofs

(source: [www.climatescan.nl](http://www.climatescan.nl))



# Swales/ bioretention

(source: [www.climatescan.nl](http://www.climatescan.nl))

## Malmö, sweden with constructed wetlands in gully free area

Hollow gully free roads (Dutch: kolkloze wijk)



Created at 22 Nov 2014

### Description

Malmö, Sweden with constructed wetlands in gully free area

### Downloads

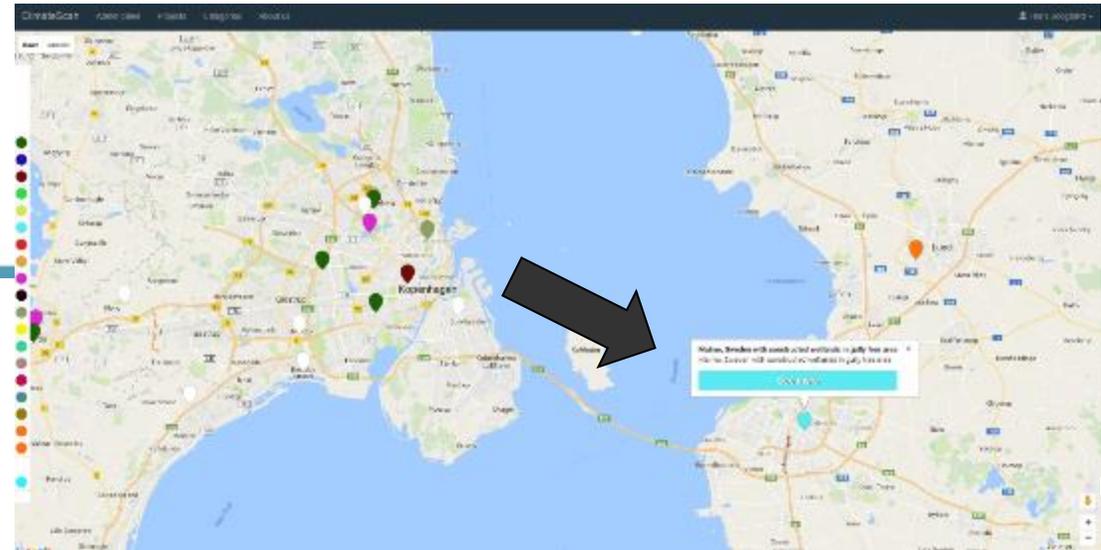
No downloads added

### Websites

### Images



### Videos



world.

# Ekostaden Augustenborg

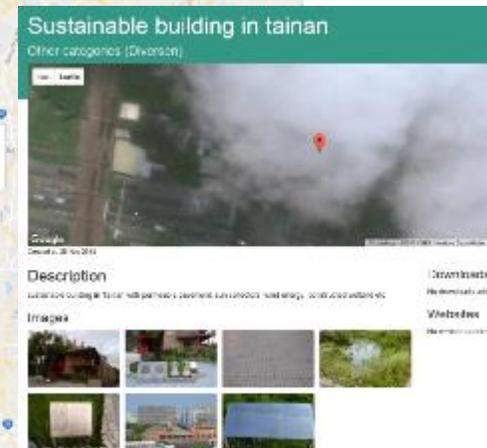
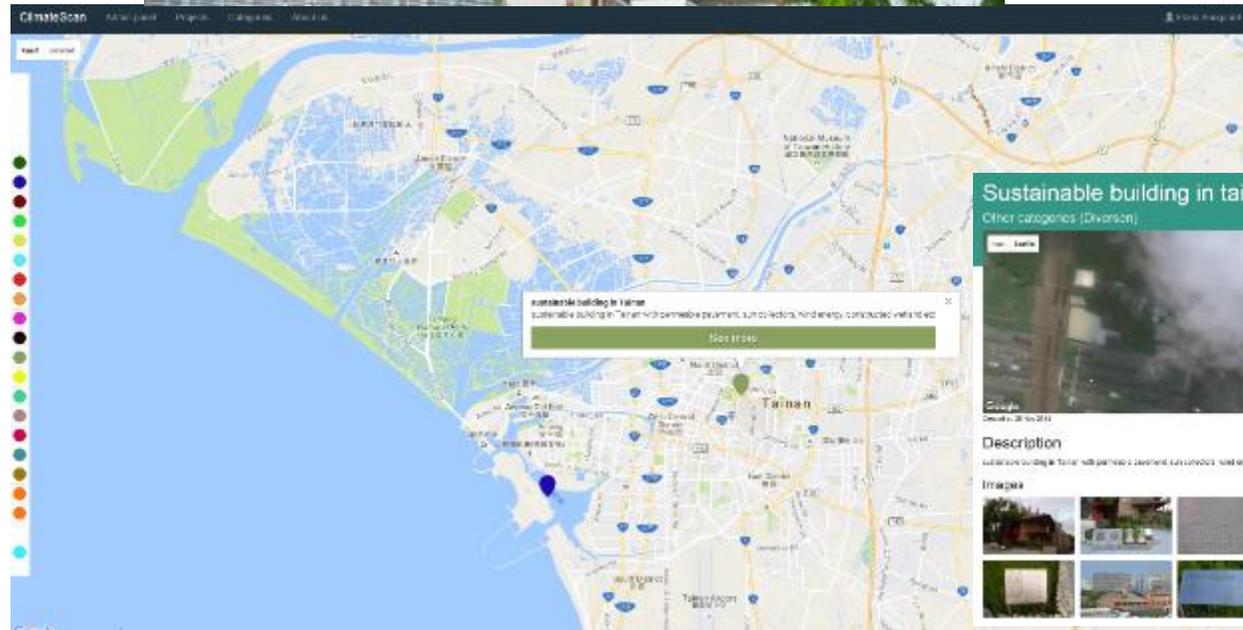


# multifunctioneel



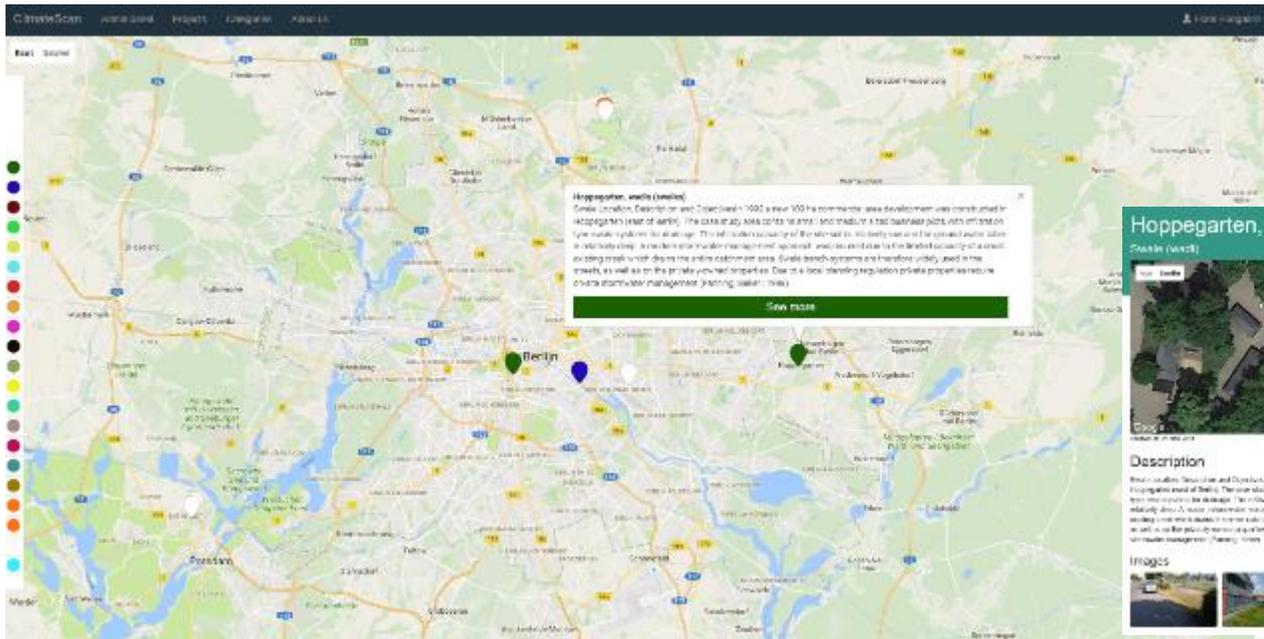
## ‘sustainable building Azie’

- Solarpanels
- Wind energy
- Phytoremediation
- PP
- .....



- Kosteneffectief (aanleg en beheer)
- Hoog rendement
- Minimaal beheer
- Lange levensduur
- Minimaal ruimtegebruik
- Multifunctioneel
- Duurzaam (materiaal gebruik)
- Esthetisch
- (Inter-)nationale ervaring
- Innovatief/creatief
- Flexibel, modulair
- Informatief
- Educatief
- Sociale adhesie
- .... Wat wel?

# Vintage SuDS



**Hoppegarten, wadis (swales)**

Swales (wadis)

**Description**

These swales, built in the mid 1990s, are 100 to 200 m between and consist of a series of small, shallow, vegetated channels that collect and filter runoff from the surrounding area. The swales are designed to be self-cleaning and to have a high capacity for water storage. They are also designed to be aesthetically pleasing and to provide a high level of biodiversity. The swales are a key feature of the Hoppegarten development and are a good example of how swales can be used in residential areas.

**Downloads**

Download the map and other data

**Images**

- Kosteneffectief (aanleg en beheer)
- Hoog rendement
- Minimaal beheer
- Lange levensduur
- Minimaal ruimtegebruik
- Multifunctioneel
- Duurzaam (materiaal gebruik)
- Participatie
- Esthetisch
- (Inter-)nationale ervaring
- Innovatief/creatief
- Flexibel, modulair
- Informatief
- Educatief
- Sociale adhesie
- ...

# Waterstorage, purification and infiltration Holland: Purmerend

← → ↻ 🏠 <https://www.climateScan.nl/projects/1/detail>

ClimateScan About us

## Wadi purmerend

(bio) swale (Wadi)



Created at 21 Nov 2014

### Description

De wadi in Purmerend zijn in 2014 (ca 10 jaar na aanleg) onderworpen aan praktijktoetsen om het hydraulisch en milieutechnisch functioneren te bepalen.

### Samenvatting (Dutch description)

### Images



### Videos

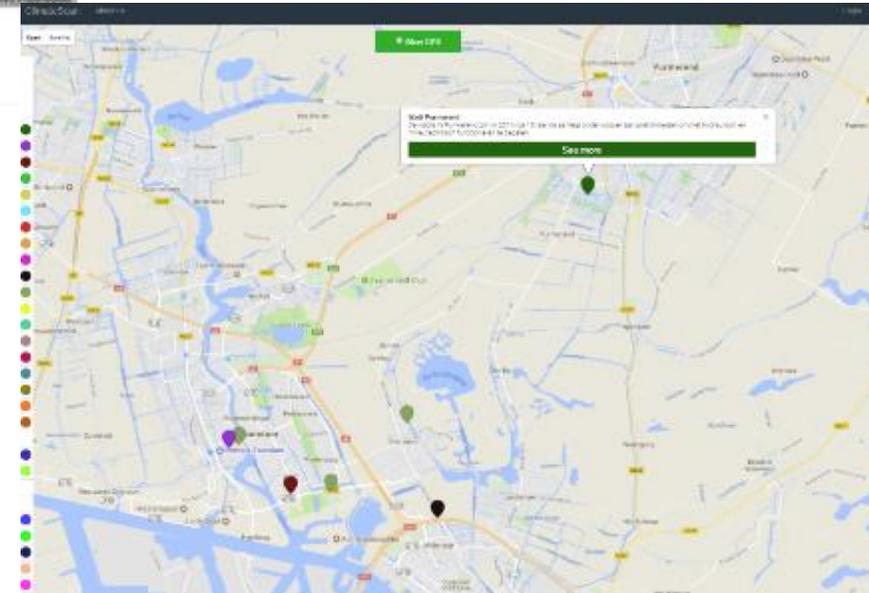


### Downloads

[artikel](#)

### Websites

No websites added





# Floating green

Floating urbanisation (Drijvend bouwen)



Created at: 19 Sep 2017

## Description

Fg

## Downloads

No downloads added

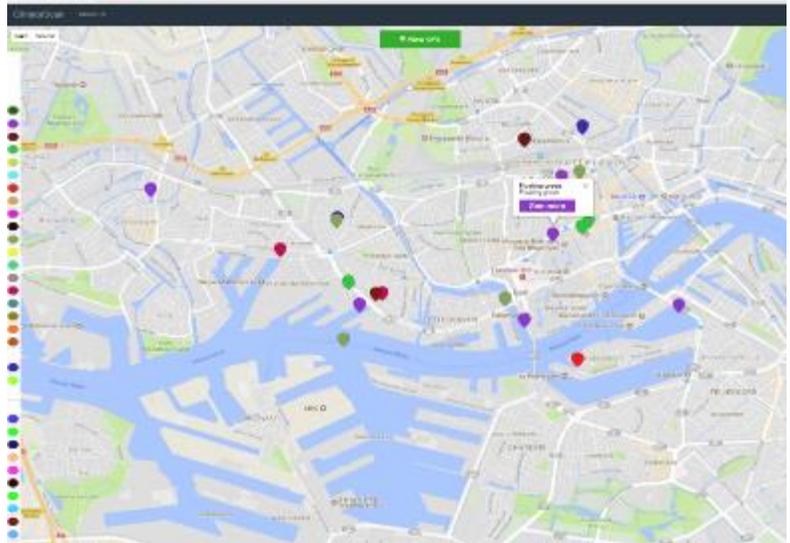
## Websites

No websites added

## Samenvatting (Dutch description)

Floating green

## Images



# Climate adaptation 2.0



In manila zijn diverse drijvende woningen gebouwd  
Floating urbanisation (Drijvend bouwen)

Google

Gebruik op 27 Jun 2014

Description  
looking for a cheap and fast floating house in Manila

Images

Videos

Downloads  
16/12/14 with 4/1/14

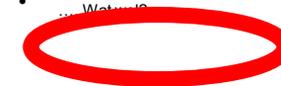
Websites  
10 websites about

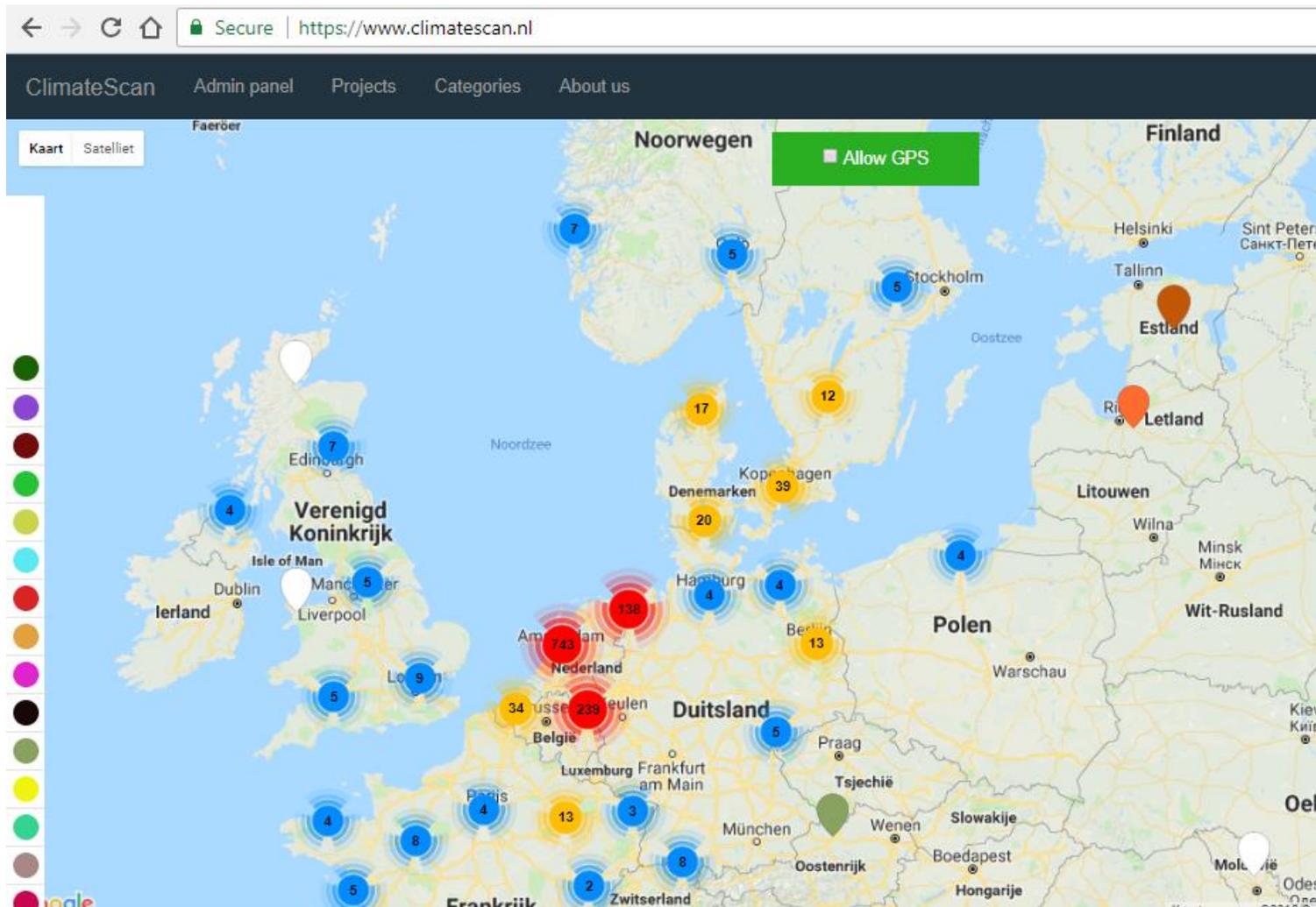
Google Maps interface showing a map of Manila, Philippines, with several red location pins indicating the locations of floating houses. The map includes a sidebar with a color-coded legend and a search bar.

Waterhuishouding & Waterbouw

## Weinig invloed op ecosysteme onder drijvende objecten

- Kosteneffectief (aanleg en beheer)
- Hoog rendement
- Minimaal beheer
- Lange levensduur
- Minimaal ruimtegebruik
- Multifunctioneel
- Duurzaam (materiaal gebruik)
- Participatie
- Esthetisch
- (Inter-)nationale ervaring
- Innovatief/creatief
- Flexibel, modulair
- Informatief
- Educatief
- Sociale adhesie
- ... Waterbouw





# Internationaal voorbeeld: Flooding?

Major flooding in Beijing after the heaviest rain storm in 60 years

< 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 MORE... >



# Budget: Quick wins

Major flooding in Beijing after the heaviest rain storm in 60 years

- 01
- 02
- 03
- 04
- 05
- 06
- 07
- 08
- 09
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- MORE...



BEIJING 北京

TONGZHOU 通州

**TRANSIT-ORIENTED DEVELOPMENT & SMART MICRO CITY**  
公交导向的城市在中国与荷兰的发展

RESEARCH BY DESIGN ON TONGZHOU NEW BEIJING EAST STATION AREA & QINGHE RIVER  
北京清河火车站的设计性研究

Towards2020: Developing a Smart-Dutch approach for Sustainable Urbanization  
项目2020: 中国可持续城市发展工作坊

Urban planning and transit-oriented development research. The text discusses the importance of transit-oriented development (TOD) in creating sustainable, walkable communities. It highlights the role of public transportation in reducing car dependency and improving urban quality of life. The images show various urban planning concepts, including transit stations, pedestrian paths, and green spaces.

# Web-based international knowledge exchange tool on urban resilience and climate proofing cities: [www.climatescan.nl](http://www.climatescan.nl)

*F. Boogaard*<sup>1</sup>, *J. Tipping*<sup>1</sup>, *T. Muthanna*<sup>2</sup>, *A. Duffy*<sup>3</sup>, *B. Bendall*<sup>4</sup>, *J. Kluck*<sup>5</sup>

<sup>1</sup>

*Hanze University of Applied Science, Spatial transformation, Groningen, Netherlands*

<sup>2</sup>

*NTNU, Department of Civil and Environmental Engineering, Trondheim, Norway*

<sup>3</sup>

*Abertay university, Urban Water Technology Centre, Dundee, United Kingdom*

<sup>4</sup>

*The River Trust, water governance, Cornwall, United Kingdom*

<sup>5</sup>

*University of applied science Amsterdam, water, Amsterdam, Netherlands*



# Conclusions climatescan

- Results:
  - >2000 projects and >5000 users
- Most impact/interaction with social media
  - Twitter, facebook, instagram
- Most appreciated:
  - Free/Open source
  - Manage your own categories/BMPs
- Threats:
  - No coordination/international format
- Most used for:
  - Workshops, international field visits, EU projects (literature, dissemination)
    - also: contests, benchmark, vintage SUDS

## Next steps (changes for cooperation)

- Updates
  - Format, App
- Analyse data
  - Most viewed projects
- Setting up climatescan community
  - Enable contact between users
- New International projects 'wp dissemination'
- Suggestions/ cooperation: [floris@noorderruimte.nl](mailto:floris@noorderruimte.nl)
  - use/register (free participation and scientific results):  
[www.climatescan.nl](http://www.climatescan.nl)
  - Follow: [https://twitter.com/Climate\\_Scan](https://twitter.com/Climate_Scan)

# Example triple helix project RECONNECT: competitive and innovative project featuring 36 international partners, 16 international advisors, 44 letters of support, 10 Demonstration sites in Europe, 4 European and 12 International Collaborators.

Budget: 14,5 kEUR

RECONNECT aims to contribute to European reference framework on Nature Based Solutions (NBS) by demonstrating, referencing and upscaling large scale NBS and by stimulating a new culture for 'land use planning' that links the reduction of risks with local and regional development objectives in a sustainable way. To do that, RECONNECT draws upon the network of carefully selected Demonstrators and Collaborators that cover a range of local conditions, geographic characteristics, governance structures and social/cultural settings to successfully upscale NBS throughout Europe and Internationally. The RECONNECT consortium is a transdisciplinary partnership between researchers, industry partners (SMEs and large consultancies) and responsible agencies at the local and watershed/regional level dedicated to achieve the desired outcomes of the project.

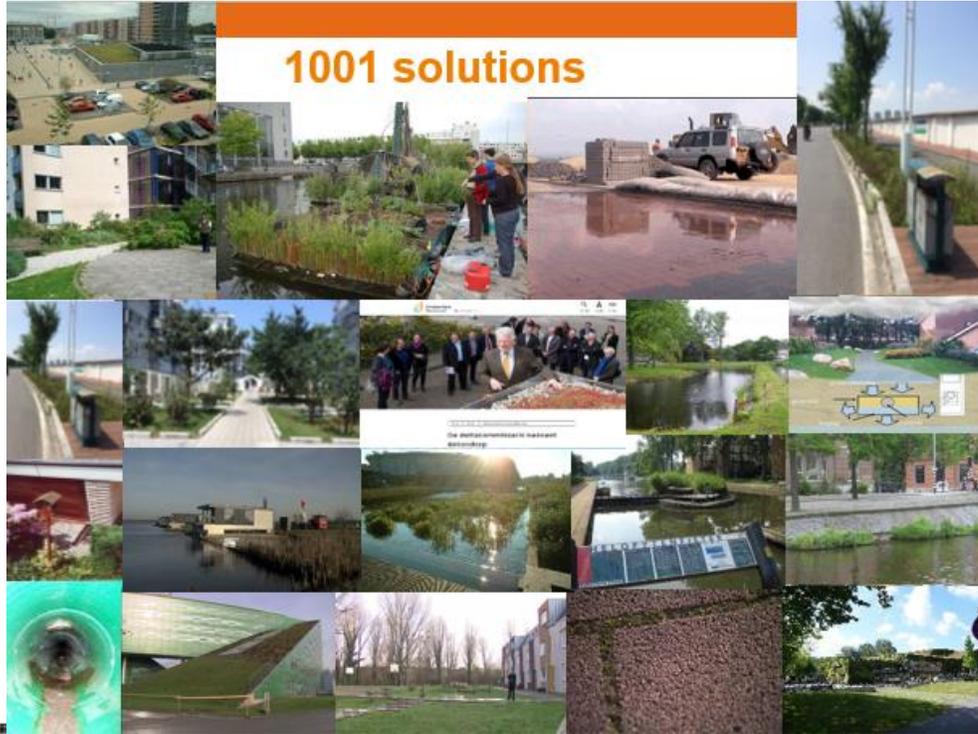
## Enclosure Partners

- 1  
STICHTING IHE DELFT  
Netherlands
- 2  
TECHNISCHE UNIVERSITAET  
HAMBURG-HARBURG  
Germany
- 3  
**TAUW BV**  
**Netherlands**
- 4  
INTERNATIONAL WATER ASSOCIATION  
United Kingdom
- 5  
EUROSENSE BELFOTOP N.V.  
Belgium
- 6  
NATIONAL CHENG KUNG UNIVERSITY  
Taiwan
- 7  
UNIVERSITAET INNSBRUCK  
Austria
- 8  
DANMARKS TEKNISKE UNIVERSITET  
Denmark
- 9  
FREIE UND HANSESTADT HAMBURG  
Germany
- 10  
Agència Catalana de l'Aigua  
Spain
- 11  
Hydrometeorological Innovative Solutions  
Spain

- 12  
THE UNIVERSITY OF EXETER  
United Kingdom
- 13  
MONASH UNIVERSITY SUNWAY CAMPUS  
MALAYSIA SDN BHD  
Malaysia
- 14  
HYDROLOGIC RESEARCH BV  
Netherlands
- 15  
GISIG GEOGRAPHICAL INFORMATION SYSTEMS  
INTERNATIONAL GROUP ASSOCIAZIONE  
Italy
- 16  
EUROPEJSKIE REGIONALNE CENTRUM EKOHYDROLOGII  
POLSKIEJ AKADEMII NAUK  
Poland
- 17  
Regionalny Zarzad Gospodarki Wodnej w Warszawie  
Poland
- 18  
Amphi International ApS  
Denmark
- 19  
FACULTY OF CIVIL ENGINEERING  
Serbia
- 20  
PRONING DHI d.o.o.  
Croatia
- 21  
HYDRO AND AGRO INFORMATICS INSTITUTE  
Thailand
- 22  
Black Sea - Danube Association for Research and Development  
Bulgaria
- 23  
Inter Act industrial automation B.V.  
Netherlands
- 24  
UNIVERSITE DE NICE SOPHIA ANTIPOLIS  
France
- 25  
RAMBOLL DANMARK A/S  
Denmark
- 26  
ARHUS KOMMUNE  
Denmark
- 27  
Ente Parco di Portofino  
Italy
- 28  
CONSIGLIO NAZIONALE DELLE RICERCHE  
Italy
- 29  
ODENSE KOMMUNE  
Denmark
- 30  
Regional administration Varna  
Bulgaria
- 31  
ERASMUS UNIVERSITEIT ROTTERDAM  
Netherlands
- 32  
Preduzece za projektovanje, inzenjering i konsalting  
IWA CONSALT DOO, Beograd(Vracar)  
Serbia
- 33  
HELMHOLTZ-ZENTRUM FUER UMWEL  
TFORSCHUNG GMBH - UFZ  
Germany
- 34  
Instituto Tecnologico de Aeronautica  
Brazil
- 35  
HOFOR AS  
Denmark
- 36  
HAFENCITY UNIVERSITAT HAMBURG  
Germany

share your talent. move the world.

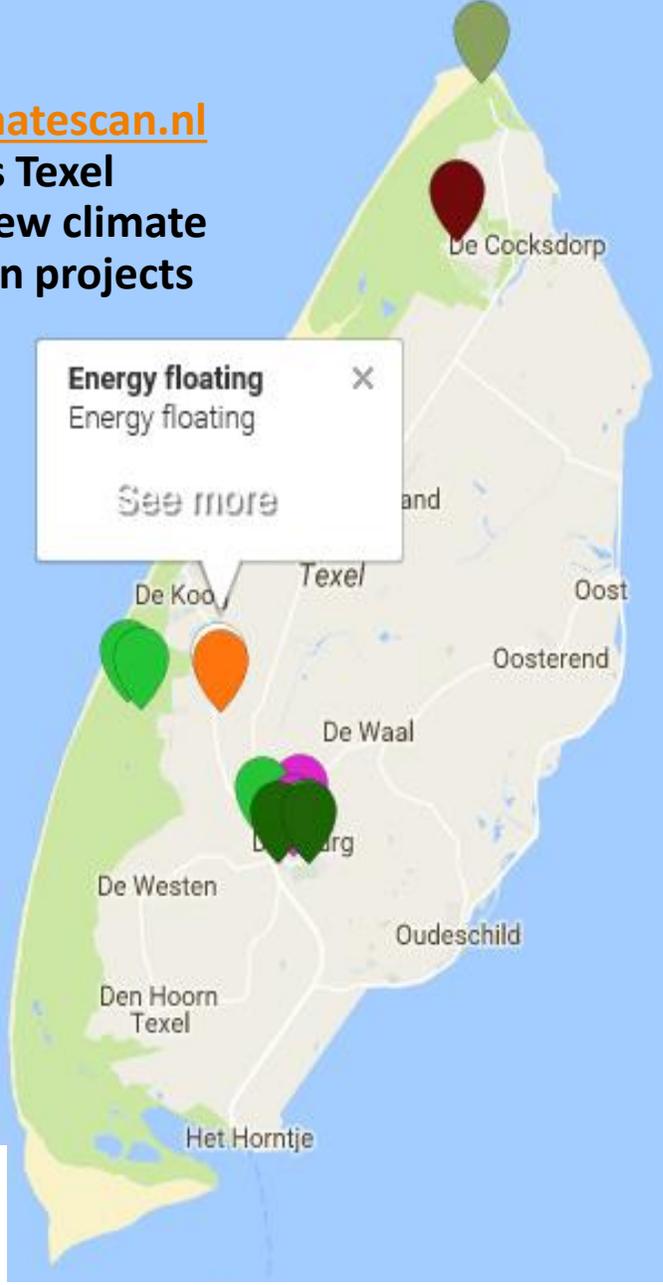
# 1001 eco based solutions



share your t

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

welcomes Texel  
with 10 new climate  
adaptation projects



# Floating solar panels



# swales



**BEST IN EUROPE**  
The European destinations you need to see in 2016



**Gemeente Texel**



## INXCES: Network & Dissemination

INXCES develops new innovative technological methods for risk assessment and mitigation of extreme hydroclimatic events and optimization of urban water-dependent ecosystem services. The overall objectives of INXCES is to develop new innovative technological methods for risk assessment and mitigation of extreme hydroclimatic events and optimization of urban water-dependent ecosystem services at the catchment level, for a spectrum of rainfall events. It is widely acknowledged that extreme events such as floods and droughts are an increasing challenge, particularly in urban areas.

Dissemination and communications of INXCES findings has been conducted both on social media through Twitter and Facebook, through the INXCES website and the regular news updates, and in academic and end-users communities through participation in conferences. Half way through the project INXCES has been presented at a wide range of conferences attended by diverse audiences. The results from INXCES have been published in 12 peer-reviewed journal papers.

### QuickScan Tool

#### Floodmodel Bergen



#### Heatstress Bucharest



### BMPs on [www.climatescan.nl](http://www.climatescan.nl)



### Practice and Full Scale testing

INXCES exchanges knowledge on full scale testing of BMPs information routes and capabilities across the project team and country boundaries.



#### Hanseatic WaterWall®



### Dissemination



INXCES Contact info:  
Principal Investigator (PI): Tone M. Muthanna ([tone.muthanna@ntnu.no](mailto:tone.muthanna@ntnu.no))  
Floris Boogaard, Professor Spatial Transformations, Hanze University of Applied Sciences ([www.hanze.nl](http://www.hanze.nl))  
Michael Bosscher, researcher at Hanze University of Applied Science



# The need for INXCES

## INnovations for eXtreme Climatic Events

***INXCES is a result of COST, the partners are:***

Technical University of Civil Engineering of Bucharest (UTCB-CCIAS)

the Norwegian University of Science and Technology (NTNU)

[University of Applied Sciences Groningen \(HUAS\)](#)

Lulea University of Technology (LTU)

the Geological Survey of Norway (NGU)

relevant workpackages:

- \* technological innovations and tools
- \* Dissimination and Outreach

- [Twitter: INnovationXCES](#)
- [Facebook: INnovationXCES](#)
- [Research Gate: INXCES](#)



### Activities



LULEA (SWEDEN)



BUCHAREST  
(ROMANIA)



BERGEN (NORWAY)



GRONINGEN (THE  
NETHERLANDS)



**share your talent. move the world.**



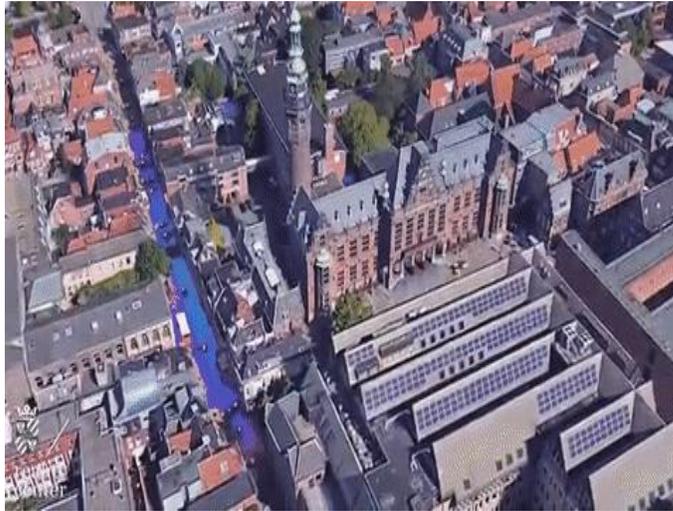
- Flooding
- Heatstress
- Drought
- Damage (cost)
- Subsidence
- Pollution
- Waterquality
- (im)mobility
- Opinion (social media)
- .... etc



- Mapping**
- Flooding
  - Heat
  - mobility
  - Air quality
  - ...

**e world.**

# Several other functions



Climate stresstest



City scans



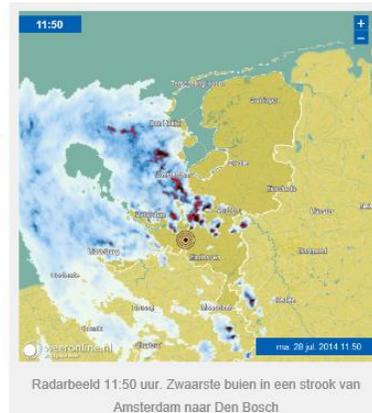
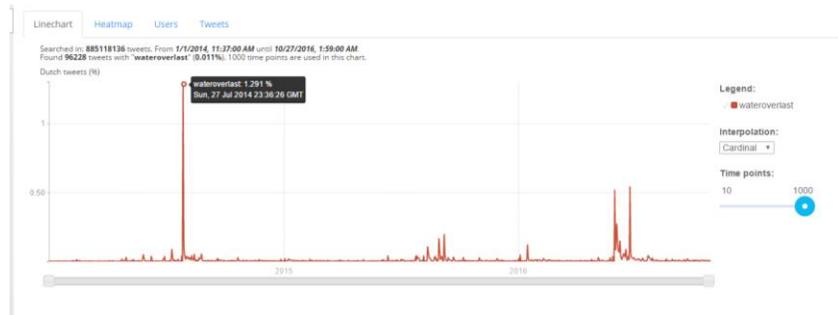
workshops



Quiz re world.

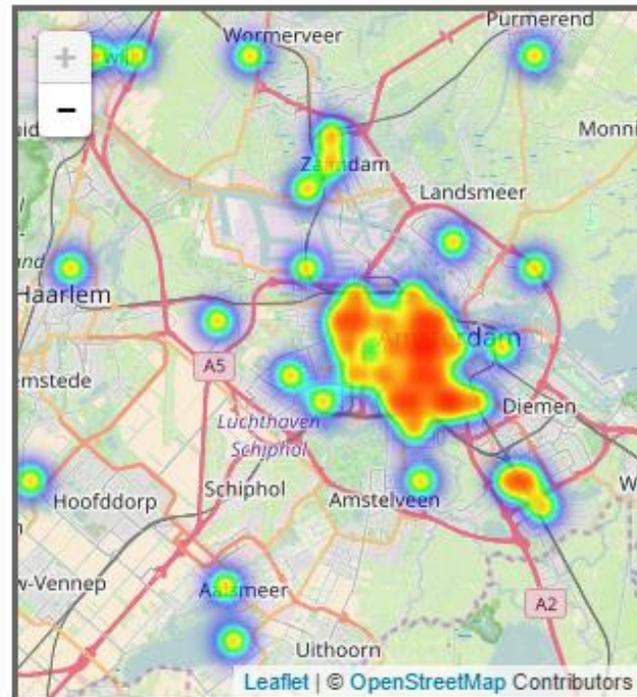
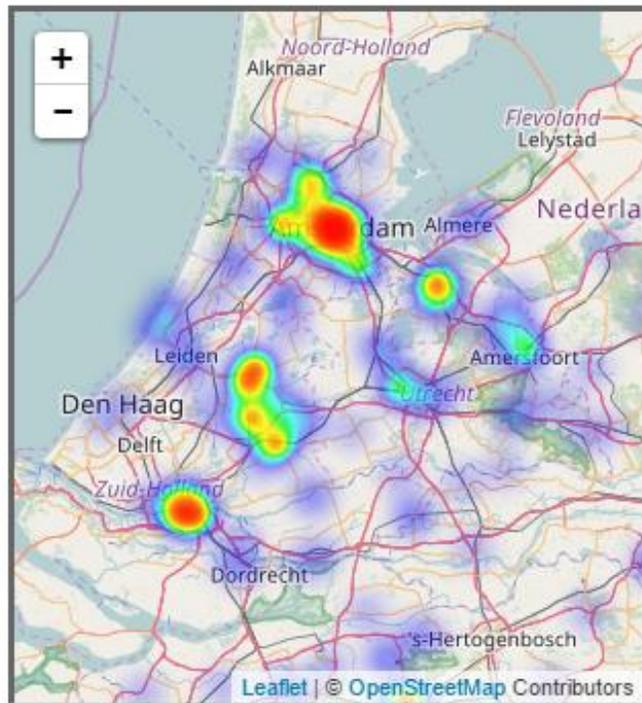
# Using social media for calibration of models

- 27 juli 2014 'flooding'



Searched in: 3117646 tweets. From 7/26/2014, 11:37:00 AM  
 Found 14429 tweets with "wateroverlast" (0.463%)

Searched in: 3117646 tweets. From 7/26/2014, 11:37:00 AM  
 Found 14429 tweets with "wateroverlast" (0.463%)



Zware regenval. Oplossingen liggen in een computermodel, groene dagen en minder werkstrafpauzes.

**Zo voorkomen we wateroverlast**

Na het wegweken van de buien zit de vloed tussen de 10 en 15 centimeter. De analyse in Amsterdam geeft veel nieuwe inzichten. Er zijn grote verbeteringen te maken. In sommige gevallen biedt het regenwater een speciale plaats te bieden, op andere locaties juist overlast. Voors straten en openbaarvervoer kunnen eromheen worden ontworpen zodat het water niet snel weg kan door bijvoorbeeld verkeerstruimpels en binnuren stilstaan. Het water kan water niet weggevoerd in de vorm van dalen, groeven of putten. Het water kan water niet weggevoerd in de vorm van dalen, groeven of putten. Het water kan water niet weggevoerd in de vorm van dalen, groeven of putten.

De zware regenval van maandag 27 juli zorgde voor wateroverlast in Amsterdam. Het water stond op straat en in de metro. De zware regenval van maandag 27 juli zorgde voor wateroverlast in Amsterdam. Het water stond op straat en in de metro.

Na we weten dat het water op straat komt, moet het weggevoerd worden. Het water moet weggevoerd worden. Het water moet weggevoerd worden.

# National climate adaptation



## Analysis

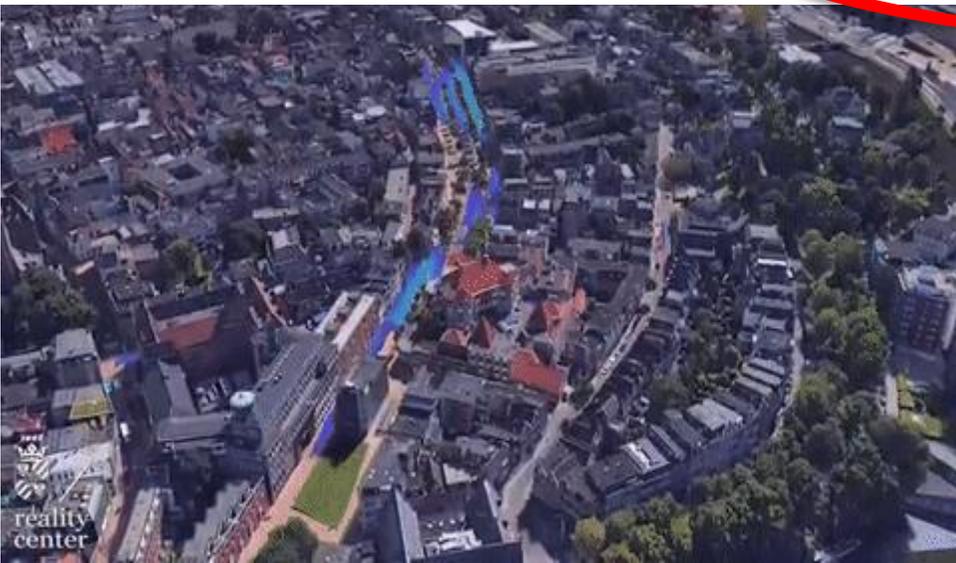
Analysing your area

## Ambition

Formulating your ambition

## Action

Policy and implementation



world.

# Dissimination: Fieldtrips

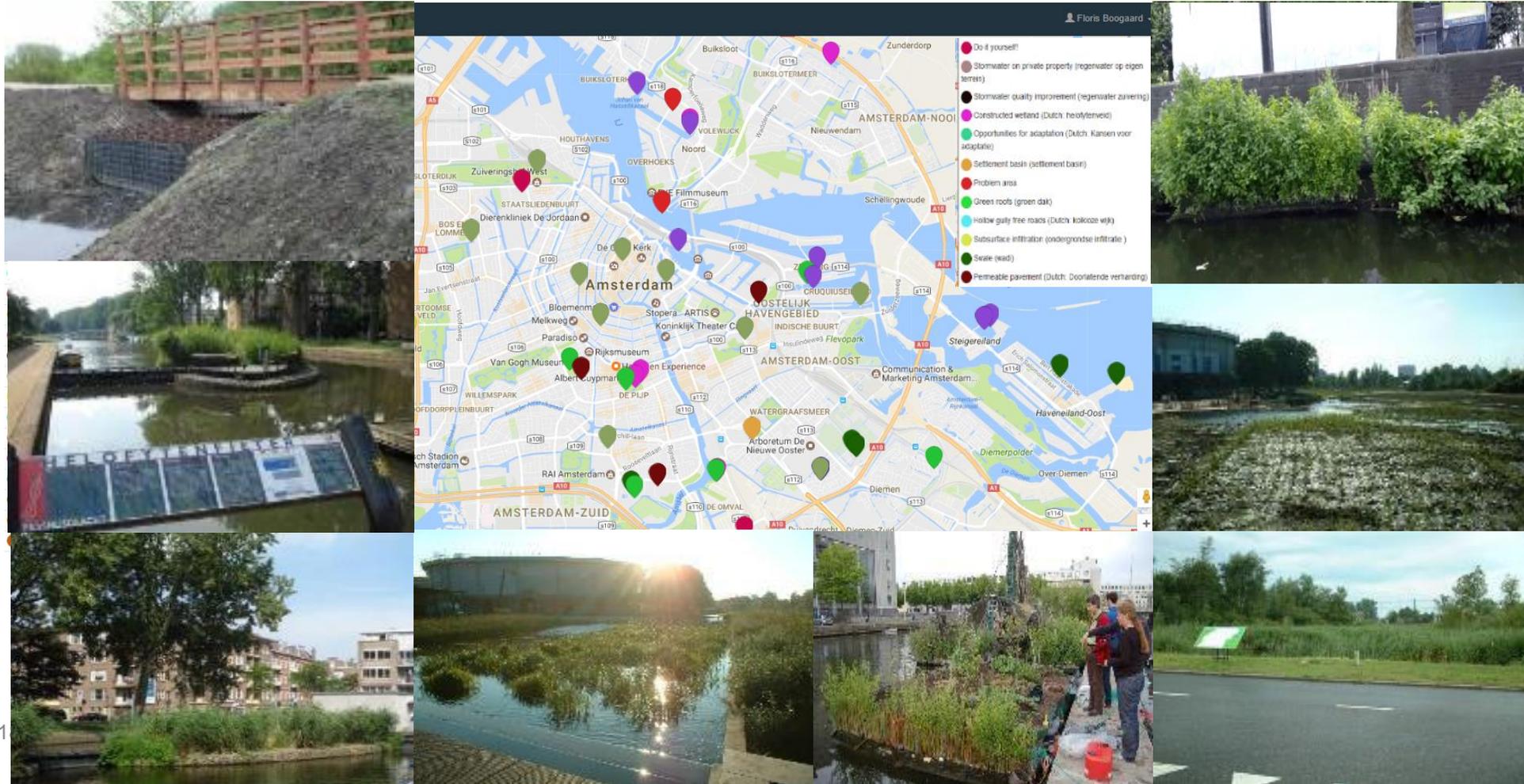
*The webtool has been used during international fieldtrips with participants from countries such as Denmark, Australia, UK, Sweden, Norway and USA.*

## Wetlands Amsterdam

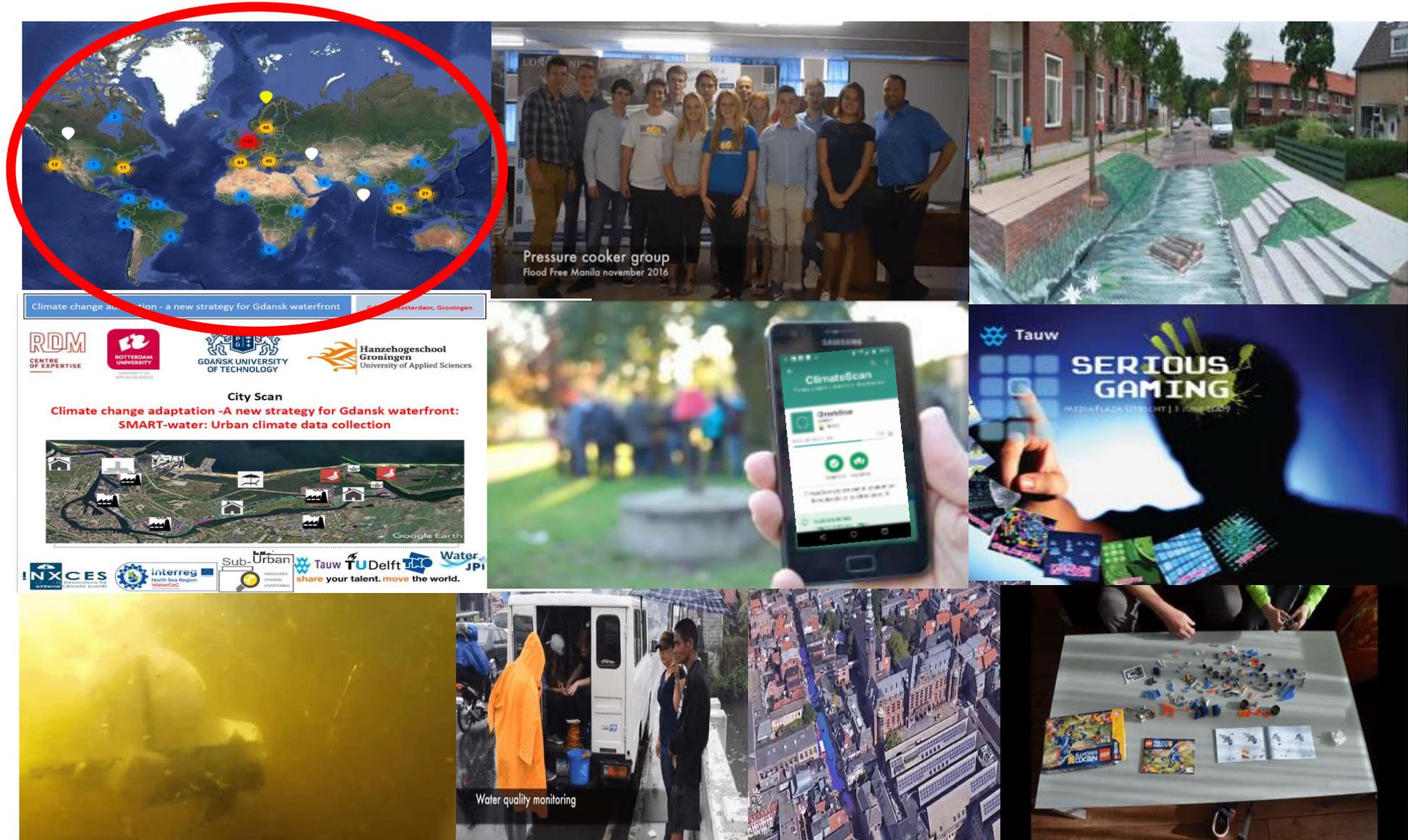
The Rivers Trust @theriverstrust · 23 u  
A fantastic video by Dan from @YorkDalesRT of our trip around constructed wetlands in Amsterdam  
[youtu.be/Sf10mngUttc](https://youtu.be/Sf10mngUttc) #WaterCOG

Vertalen uit het Engels

**Constructed Wetlands in Amsterdam**  
Constructed wetlands in Amsterdam for WaterCOG transnational workshop in Amsterdam For more information check out: [www.climatecan.nl](http://www.climatecan.nl) <https://...>  
[youtube.com](https://www.youtube.com)



# international knowledge exchange tools (Erasmus): experience: interactive, V+A (augmented) reality, serious gaming, ...



# National climate adaptation



## Analysis

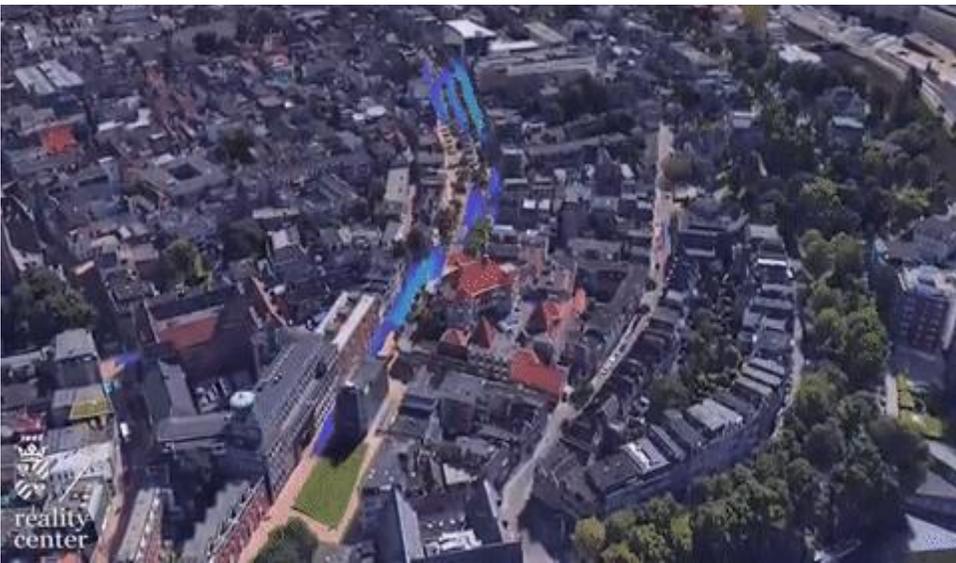
Analysing your area

## Ambition

Formulating your ambition

## Action

Policy and implementation



world.

# Waterbergende rotonde

Watersquare (waterplein)



Created at: 01 Aug 2017

## Description

Vanuit een 1D/2D analyse is in dit gebied 3000 m<sup>3</sup> waterberging benodigd voor het gemiddeld geroleerde Oude Dorp van Hulzen. Het laaggelegen gebied heeft een notoir water op straatprobleem, dat hiermee sterk verminderd. De ondergrondse berging onder de nieuwe rotonde is een oplossing voor een hydraulisch knelpunt en een mooi voorbeeld van meervoudig ruimtegebruik. Bij hevige regen stort er 800m<sup>3</sup> water in de bak over uit het gemiddelde stelsel. De bovengrondse berging komt nu beschikbaar voor berging van extreme buien op het maaiveld. Daarnaast zijn in het gebied verschillende andere maatregelen uitgevoerd. Zoals verlaagde berm en een wadi. De kelder loop onder vrijvalle leeg naar een pompgebied uit een naastliggend rioleringsgebied. Hier tussen is een flottergestuurde klepregeling met debietbegrenzer aangebracht. Daarnaast is er een flexibele overstortdrempel toegepast om de berging in het stelsel te optimaliseren in relatie tot water op straat problemen.

## Images



## Videos



## Downloads

No downloads added

## Websites

[Infographic waterbergende rotonde](#)

[Hulzenklimaatbewust](#)

## Contribute

[Edit this project](#)

# Top views on www.climatescan.nl

## Goot- en kolkloze klinkerweg, westerbouwlanden te nieuweleusen

Hollow gully free roads (Dutch: kolkloze wijk)

Kaart Satelliet



Google  
Created at: 23 Apr 2017

### Description

In de nieuwbouwwijk Westerbouwlanden wordt hemelwater zichtbaar afgevoerd over de weg. Deze weg heeft geen goot, geen kolken maar ligt alleen iets hol. (Bovendien zijn het water vrij naar het groen en oppervlaktewater stroomt.)

### Images



### Videos



### Downloads

No downloads added

### Websites

No websites added

### Contribute

✔ Add this project

## Green infiltration zone/ rainwatergarden amsterdam (bio) swale (Wadi)

Kaart Satelliet



Google  
Created at: 25 Dec 2016

### Description

Een primuur voor Amsterdam: een waterbergende groenstrook, die nu 86.000 liter en straks zelfs 130.000 liter water kan opvangen, en er zo voor zorgt dat bewoners geen wateroverlast hebben bij hoosbuien. Vandaag opent wemouder Ludo Klok de groenstrook in een woonwijk op de Zuidas. Het is de eerste in zijn soort in Nederland. Wethouder Ludo Klok (D66): "We zien dat het steeds vaker hard regent, en dat leidt tot wateroverlast zoals ondergelopen kelders. Deze groenstrook ziet er simpel uit, maar zorgt ervoor dat de kelders in deze buurt niet meer onderlopen. Een prachtig initiatief, helemaal omdat het relatief weinig kost." Omdat de groenstrook 38 centimeter lager ligt dan de omgeving, kan hij regenwater opvangen van de wegen en de daken in de buurt. De groenstrook kan bij een hoosbui zelfs even in een beek veranderen. Het water blijft maximaal 24 uur in de berging en daarna stroomt het langzaam weg naar het oppervlaktewater en infiltreert het in de bodem. Als bij een zware bui de strook dreigt te overstromen, spoort het via een overstort het riool in. Dit voorkomt dat het water de huizen in stroomt. Het unieke aan de strook is dat het opvangen van water wordt gecombineerd met een hoogwaardige inrichting van het groen. De groenstrook is geplant met planten die tegen veel water kunnen en het heel jaar groen zijn. De planten kunnen zelfs een tijdje onder water staan. De gemeente en Watermet willen deze groenstrook op meerdere plekken in de stad aanleggen. De waterbergende groenstrook wordt vanmiddag om vier uur officieel geopend. Hij ligt op de Zuidelijke Varendweg, op de kruising met de Geesterlandstraat. De opening is openbaar.

### Images



### Videos



### Downloads

No downloads added

### Websites

Waterbergende groenstrook voor droge voeten op de Zuidas  
rainproof: Infiltratiestroken met bovengrondse opslag  
Waterbergende groenstrook voor droge voeten op de Zuidas  
rainproof: Infiltratiestroken met bovengrondse opslag

### Contribute

✔ Add this project



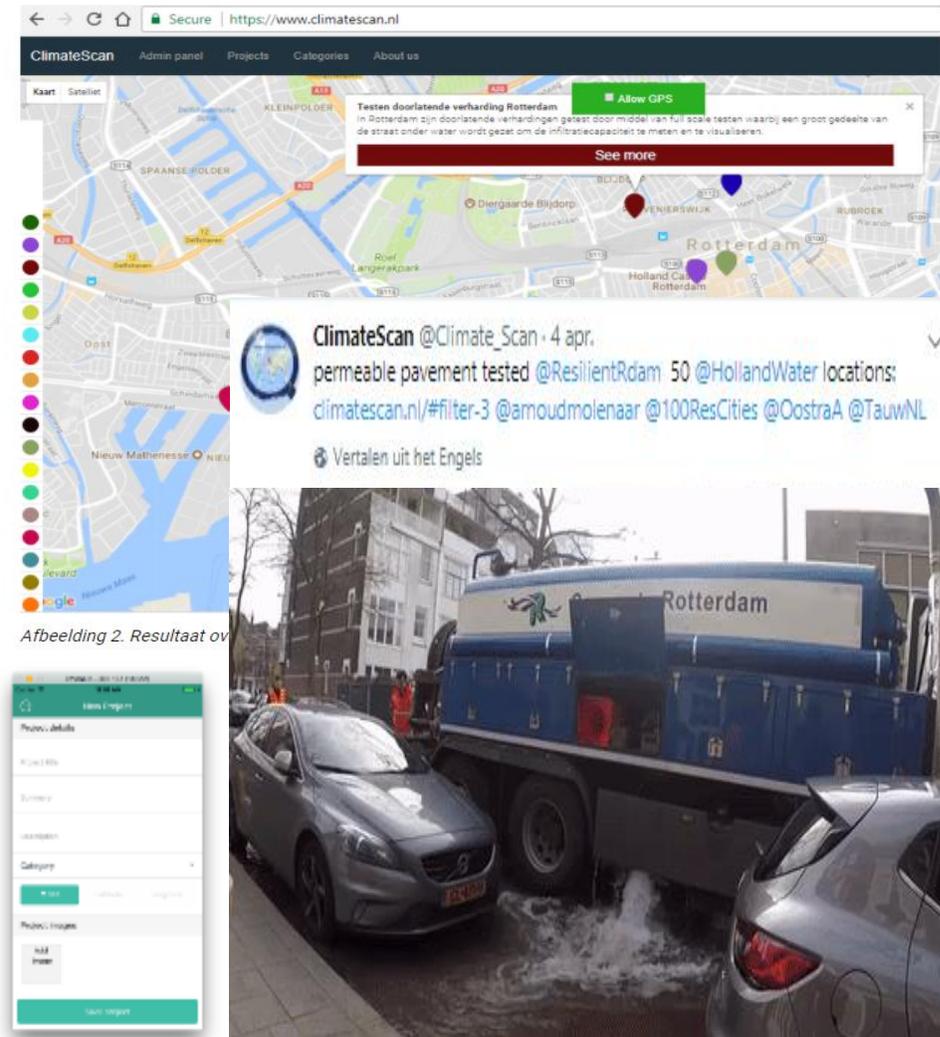
he world.

# Map BMPs

More than 25 climate adaptation Best management practices (BMPs) mapped on [www.climatescan.nl](https://www.climatescan.nl).

Some of the BMP's have been tested: infiltration rates permeable pavements considered very low.

The discussion of this and other results in the triple helix consortium has led to a detailed strategy for the city to be more resilient.



Afbeelding 2. Resultaat ov