WaterLab

Hydrology as a Hobby

Activate to **Educate** about **Water**

WATERLAB
www.onderzoekwater.nl

Hoogheemraadschap van Delfland

United Nations Educational, Scientific and Cultural Organization

IHE DELFT
Institute for Water Education
in partnership with UNESCO

VPdelta
DUTCH WATER INNOVATIONS

TU Delft


CITIZEN SCIENCE

Definition of Citizen Science

"Citizen Science refers to the general public engagement in scientific research activities when citizens actively contribute to science either with their intellectual effort or surrounding knowledge or with their tools and resources."

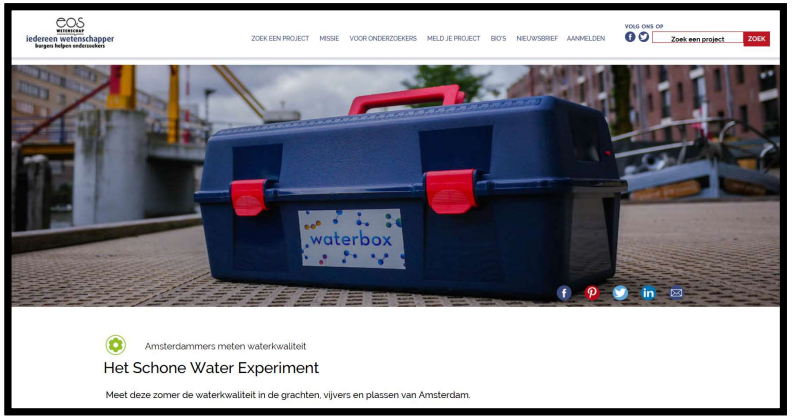
- European Commission White paper

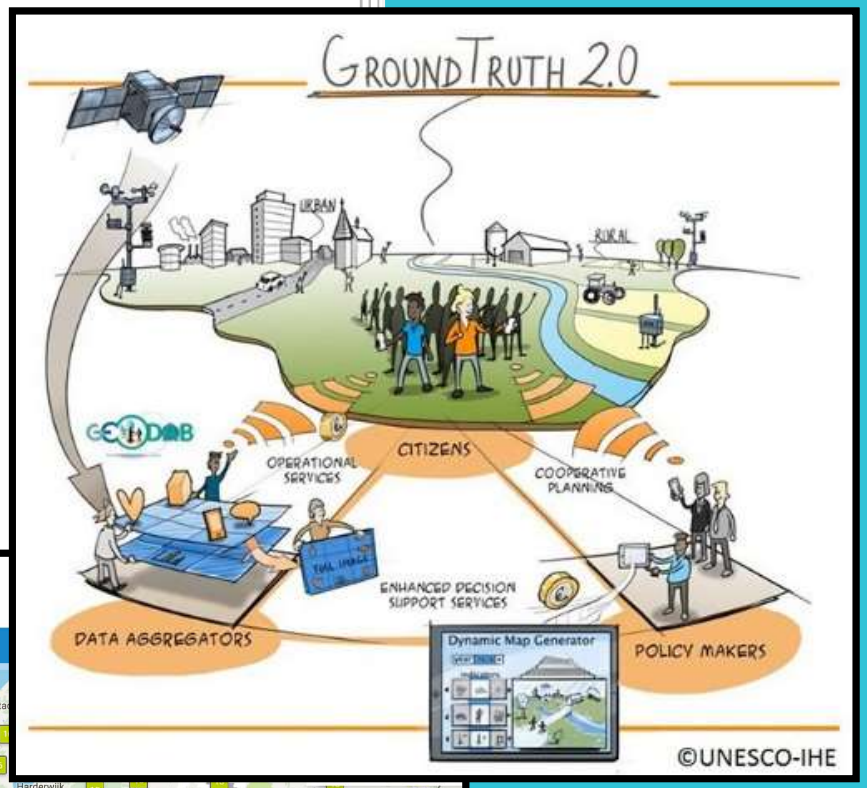
Successful examples

- Iedereenwetenschapper.nl (everybodyscientist.nl)
- Vlinderstichting (Butterfly…)
- Yearly bird counting

Water related examples

- Amsterdam measures water quality
- GroundTruth
- KNMI
  - Manual measurements
  - WOW-KNMI





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How to get and keep citizens involved in mobile crowd sensing for water management? A review of key success factors and motivational aspects

Martine Rutten,[1*] Ellen Minkman[1,3] and Maarten van der Sanden[2]

Rutten et al. WIREs Water 2017, e1218. doi: 10.1002/wat2.1218

Concerns

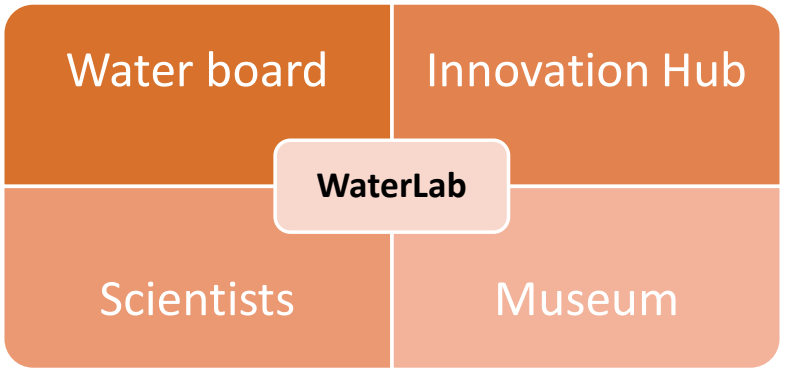
- Data quality
- Citizen involvement
- How to set up

Why

Large potential for

- Data collection
- Awareness raising

Inspiration for us



How

- In-situ testing of innovations
- Our field is the public domain

What

Give practical guidance;

how to set up monitoring programs

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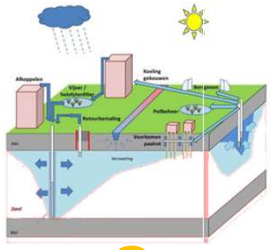
Consortium partners

Smart Cities – to tackle urban problems



?

Water board | Innovation Hub

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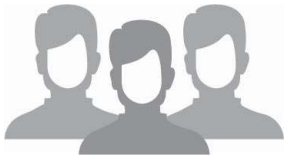
Scientists | Museum

Citizen Science projects



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Facilitating CS projects

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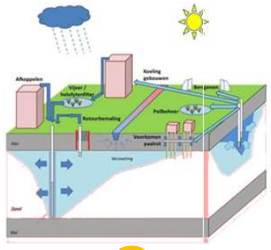
New innovations are key



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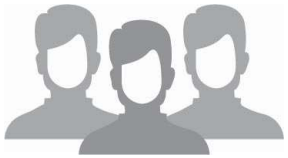
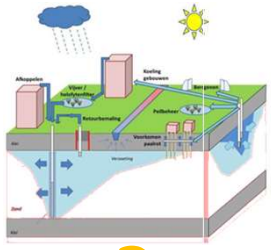
Scientists | Museum

Innovative tools

Citizen Science projects



Using technology and innovative systems



Data processing

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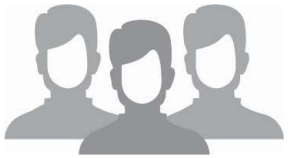
Innovative tools

Citizen Science projects



Data are processed and analyzed

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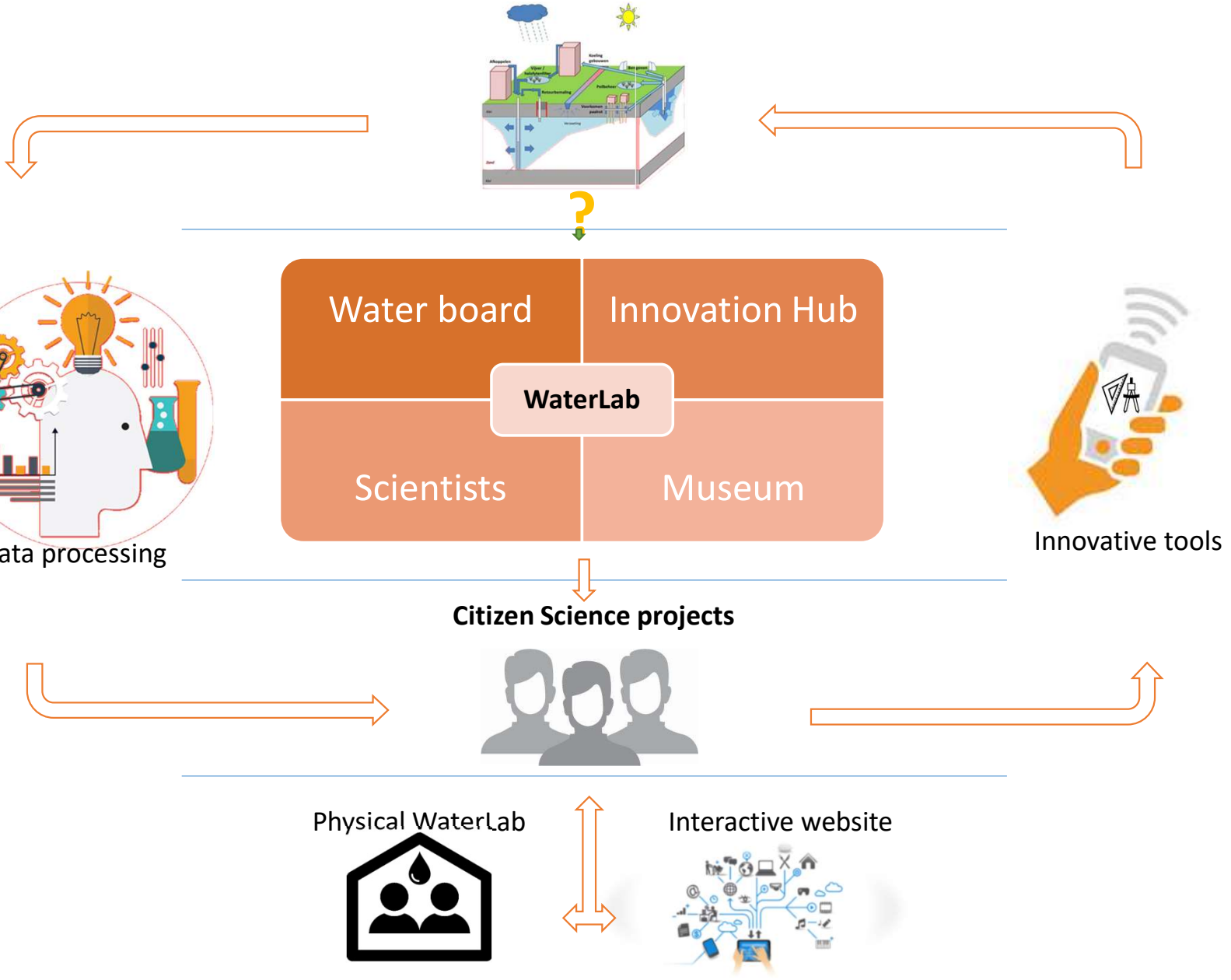
Processed data is key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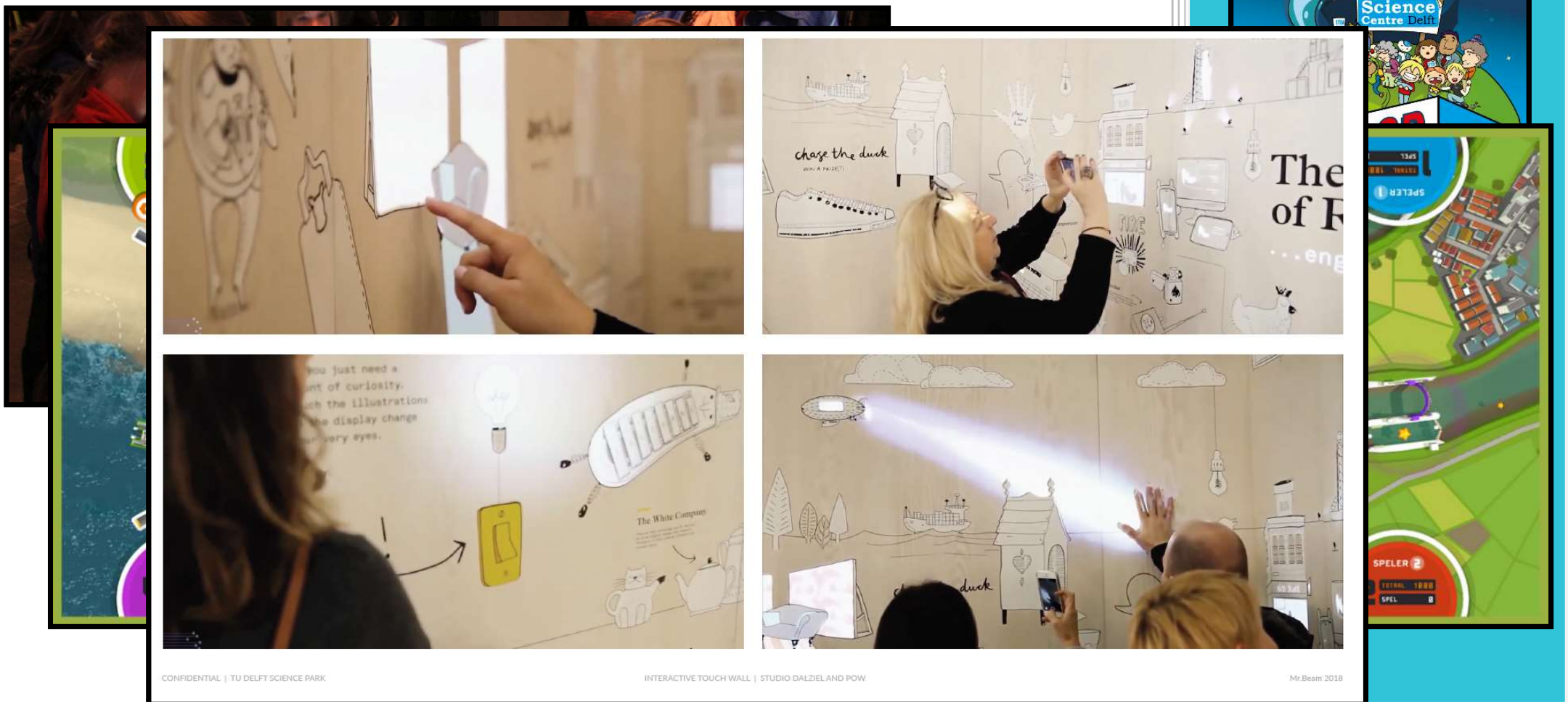
Innovation Hub
WaterLab
Scientists
Museum
Data processing
Innovative tools
Citizen Science projects
Physical WaterLab
Interactive website
WaterLab
Learning environment

Science Centre Delft – Physical space



SC Delft – Online environment

www.onderzoekwater.nl

Projecten

Je kunt hier de lopende projecten vinden waar je je op dit moment voor kunt aanmelden. Daar kun je vinden hoe het onderzoek precies uitgevoerd wordt, wat jouw rol is en hoe je een goede bijdrage kunt leveren. Na het aanmelden, ontvang je meer informatie over het verwerken en doorgeven van de data. Daarna kun je in de praktijk aan de slag als onderzoeker!

De samenwerking tussen burgers, instanties en wetenschappers leidt tot oplossingen waar iedereen profijt van heeft!

Het WaterLab heeft verschillende instellingen/onderzoekers geholpen om van hun vraagstuk een citizen science project te maken. Hieronder zijn de lopende projecten te zien:

Contact

waterlab-sc@tudelft.nl

Project 1: Waterkwaliteit in Europa

In dit onderzoek is zwemwater uit heel Europa verzameld om uit te zoeken waar er genen in het water opgelost zitten.

Project 2: Check de Stadsvergroening!

In dit onderzoek gaat gekeken worden om wateroverlast tegen te gaan door meer groen de stad in te halen.

Citizen Science to reach goals

- Test & demonstrate water-innovations
- Increase Water Awareness
- Answer (scientific) water-related questions together with the public
- Familiarize citizens with science & technology
- Connect the public with water challenges

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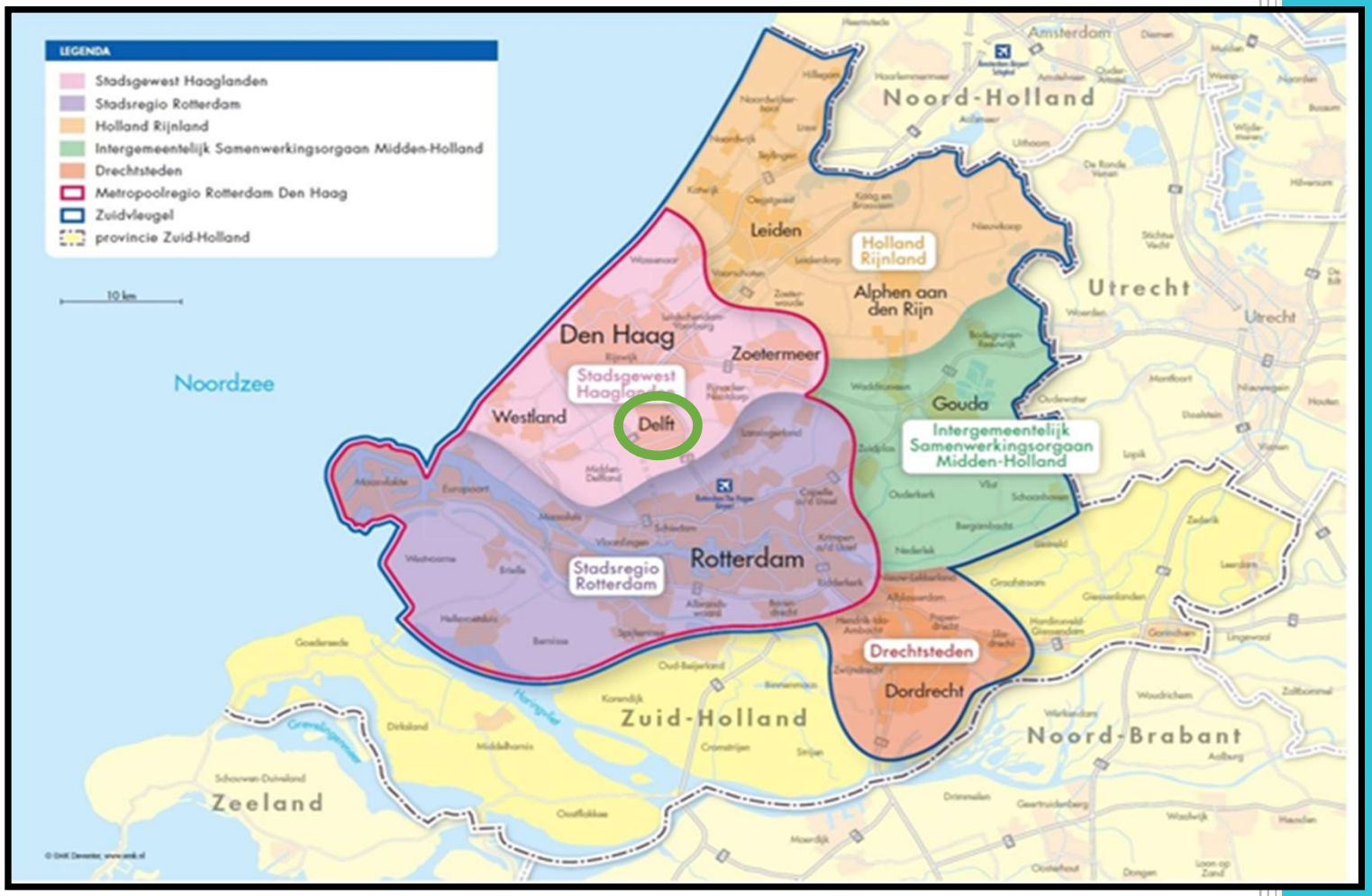
Focus area



Lessons learned (and confirmed in pilot)

1. Scientific outcome
2. Citizens receive feedback
3. Hold on to key success factors in project

AT PROJECT FORMULATION

- Define:
  - Goals (19)
  - Time span
  - Hypothesis (6)
- Understand citizen motivations and barriers (7) (18)
- Recognition of citizen science by end-users (7)
- Acknowledge limitations (17) (2) (19)
- Connect local projects (16)
- Identify stakeholders (5) (17)
- Involve local interests (16) (2)
- Sense of ownership (2)
- Be aware of power relations (2)
- Design of:
  - Method (6) (17) (18)
  - Data collection (18)
  - Validation (6) (18)

Additional for MCS

- Keep general device capacity in mind (11)
- Balance privacy and data trustworthiness (20)

START

- Strategy for recruitments (5) (6) (16) (7) (17) (19)
  - Use free media
  - Targeted media
  - Emphasis contribution
- Training and clear task description (5) (7) (19)
- Address motivations (16)
- Match volunteers, scientists and tasks (16)
  - Small building blocks (16)
- Assumptions explicit (6)
- Community of citizens (16) (19)
- Organise a pilot (5)

Additional for MCS

-

DURING

- Retain participants (5)
  - Address changing motivation over time (6) (16)
  - Increase level of tasks (16)
  - Have a helpdesk (5)
  - Community of citizens (5) (16)
- Involve citizens in analysis and interpretation (7)
- New strategies based on outcomes (5)
- Organise evaluations
- Feedback on (5) (6)
  - (real time) data (16) (7) (17)
  - results
  - impact
- Collect meta-data (18)

Additional for MCS

-

Rutten et al. WIREs Water 2017, e1218. doi: 10.1002/wat2.1218

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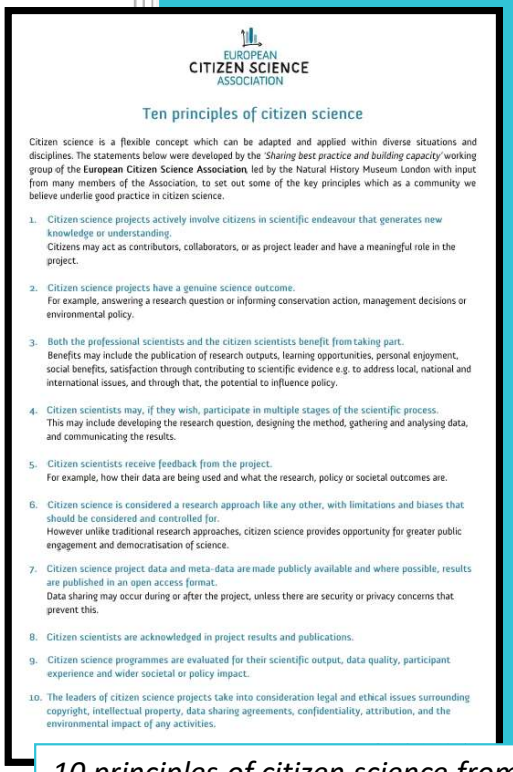

EUROPEAN CITIZEN SCIENCE ASSOCIATION

Ten principles of citizen science

Citizen science is a flexible concept which can be adapted and applied within diverse situations and disciplines. The statements below were developed by the *'Sharing best practice and building capacity'* working group of the **European Citizen Science Association**, led by the Natural History Museum London with input from many members of the Association, to set out some of the key principles which as a community we believe underlie good practice in citizen science.

1. Citizen science projects actively involve citizens in scientific endeavour that generates new knowledge or understanding.
   Citizens may act as contributors, collaborators, or as project leader and have a meaningful role in the project.
2. Citizen science projects have a genuine science outcome.
   For example, answering a research question or informing conservation action, management decisions or environmental policy.
3. Both the professional scientists and the citizen scientists benefit from taking part.
   Benefits may include the publication of research outputs, learning opportunities, personal enjoyment, social benefits, satisfaction through contributing to scientific evidence e.g. to address local, national and international issues, and through that, the potential to influence policy.
4. Citizen scientists may, if they wish, participate in multiple stages of the scientific process.
   This may include developing the research question, designing the method, gathering and analysing data, and communicating the results.
5. Citizen scientists receive feedback from the project.
   For example, how their data are being used and what the research, policy or societal outcomes are.
6. Citizen science is considered a research approach like any other, with limitations and biases that should be considered and controlled for.
   However unlike traditional research approaches, citizen science provides opportunity for greater public engagement and democratisation of science.
7. Citizen science project data and meta-data are made publicly available and where possible, results are published in an open access format.
   Data sharing may occur during or after the project, unless there are security or privacy concerns that prevent this.
8. Citizen scientists are acknowledged in project results and publications.
9. Citizen science programmes are evaluated for their scientific output, data quality, participant experience and wider societal or policy impact.
10. The leaders of citizen science projects take into consideration legal and ethical issues surrounding copyright, intellectual property, data sharing agreements, confidentiality, attribution, and the environmental impact of any activities.

10 principles of citizen science from ESCA

Learning as we go

Citizen science as a method will be researched & tested:

- Data quality
- Citizen involvement
- Etc.

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Citizen Scientists

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Used by Science

They call it Citizen Science

Where we can add to science too

Or where we all are just a tool?

I will not be used by Science

They call it Citizen Science

We do research since we're no fool

Solving issues with you is cool

I will not be used by Science

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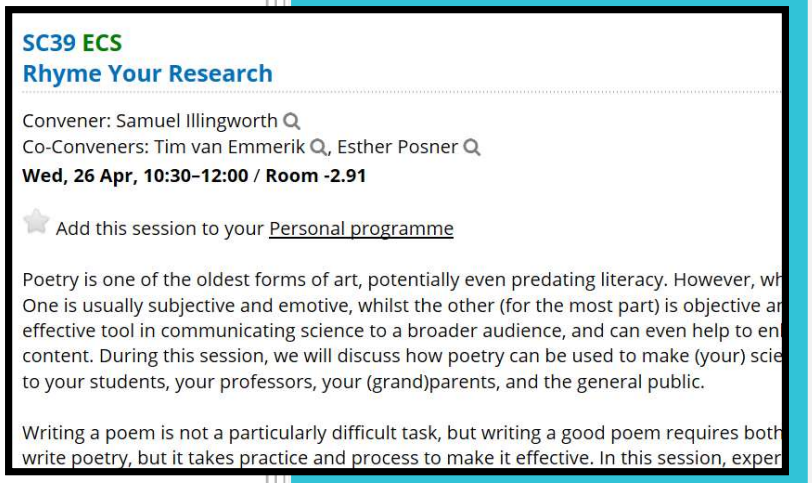


SC39 ECS

Rhyme Your Research

Convener: Samuel Illingworth

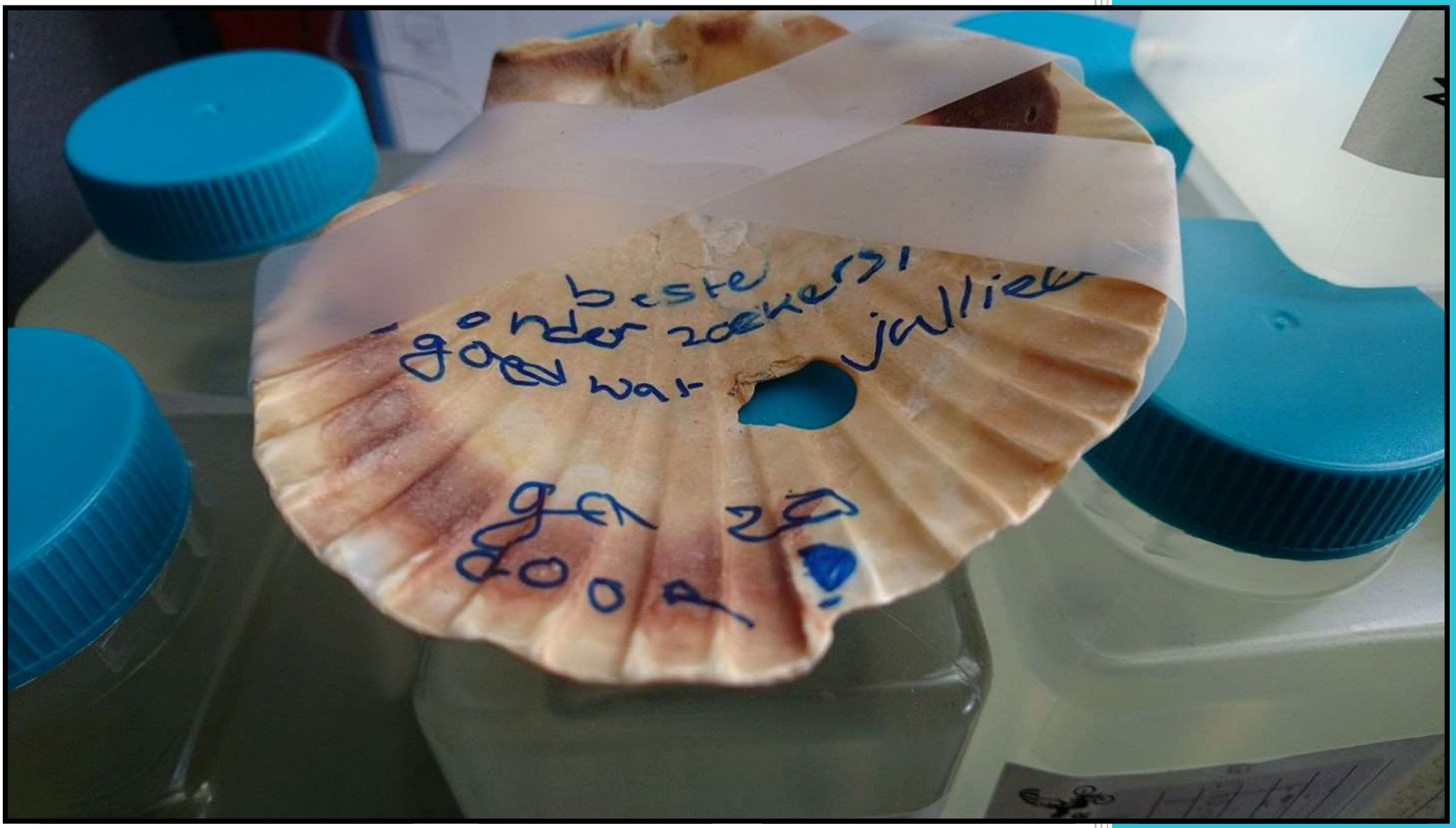
Co-Conveners: Tim van Emmerik, Esther Posner

Wed, 26 Apr, 10:30–12:00 / Room -2.91

Add this session to your Personal programme

Poetry is one of the oldest forms of art, potentially even predating literacy. However, wh
One is usually subjective and emotive, whilst the other (for the most part) is objective ar
effective tool in communicating science to a broader audience, and can even help to en
content. During this session, we will discuss how poetry can be used to make (your) scie
to your students, your professors, your (grand)parents, and the general public.

Writing a poem is not a particularly difficult task, but writing a good poem requires both
write poetry, but it takes practice and process to make it effective. In this session, exper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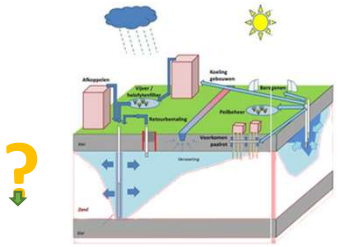
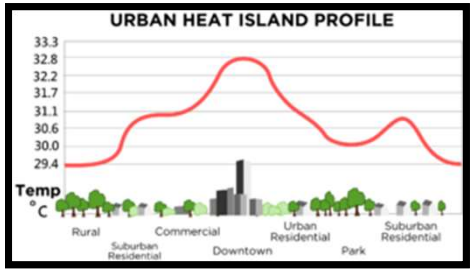
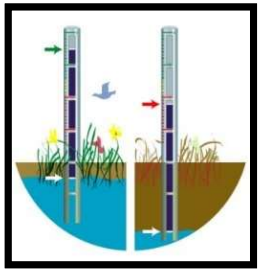
Starting in June

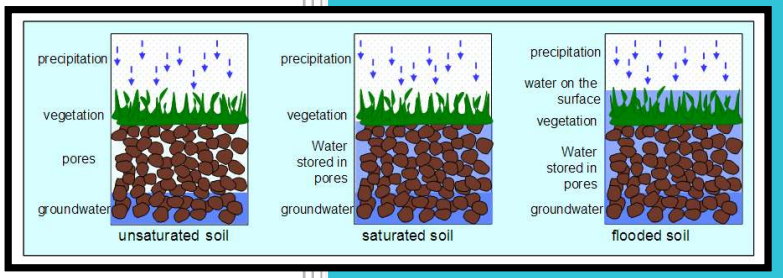


Leading request from an engineering company

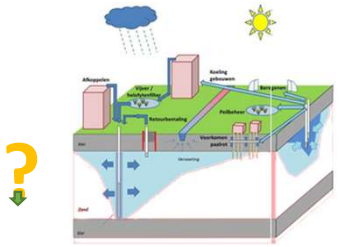
“Check what effect green measures have on water storage and perception of environment.”







Starting in June



First project with schools

1. ***Create a teaching module***
    1. ***Together with teachers***
    2. ***Getting feedback on what is (and isn't) possible***
2. ***Ensure validation of data***
    1. ***Student from Rotterdam Applied Sciences research***
    2. ***Still looking for a way to evaluate 'water awareness' increase***

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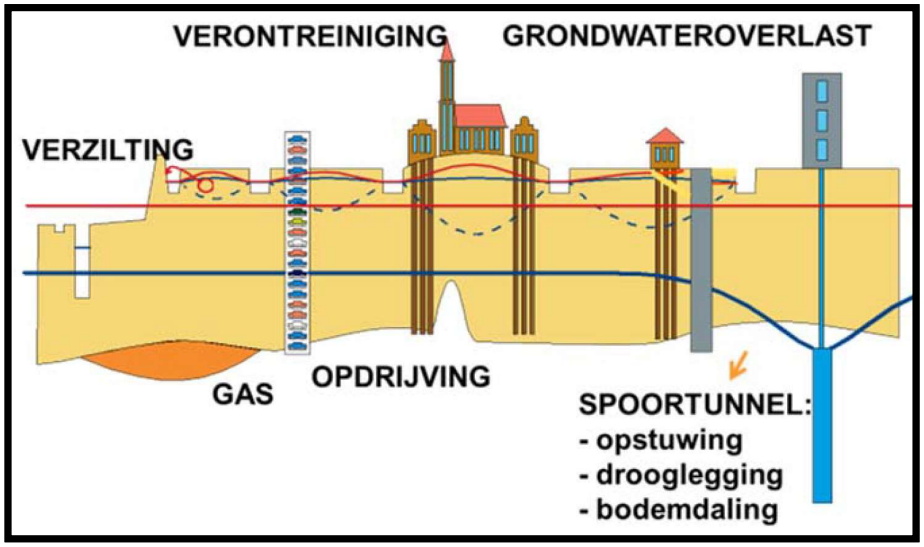
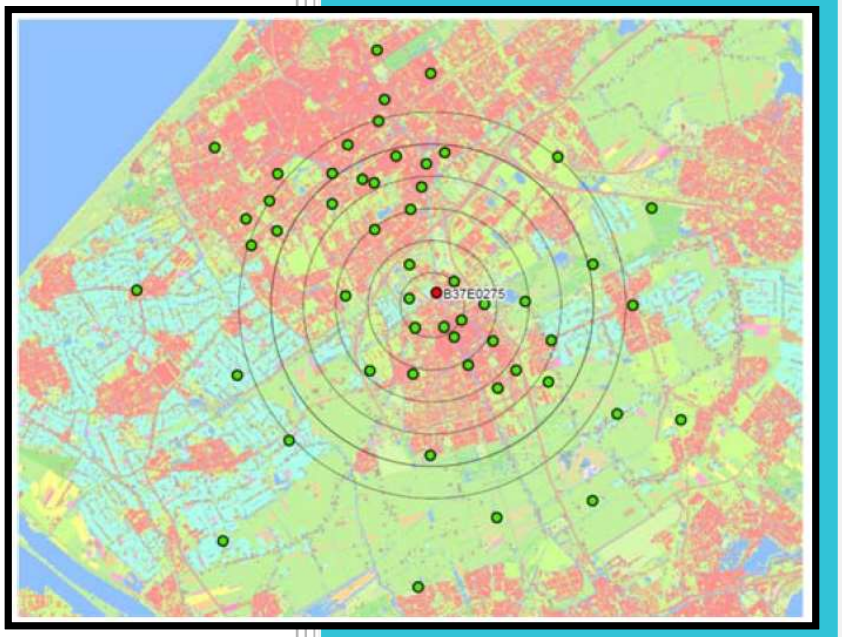
Coming (perhaps)…

Leading request from the municipality of Delft

"What is the groundwater level at your house in Delft, an what negative effects does it have?"





Contact

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Valorisation program Delta Technology and Water
http://www.vpdelta.nl/nl/proeftuinen

www.tudelft.nl/sciencecentre/waterlab

www.onderzoekwater.nl

Water Resources / Water Management group
Department of Civil Engineering and Geosciences
Delft University of Technology

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