

# **Climate Campus – a Dutch Approach to Climate Resilience**

**Renate POSTMA and Liesbeth RIJSDIJK, Netherlands**

**Key words:** Climate Adaptation, Governance, Citizen Science

## **SUMMARY**

The complex challenge of climate adaptation in vulnerable deltas demands innovative collaboration to get it implemented at all levels by all actors. The Climate Campus Foundation connects (network) partners, ideas, projects and budgets on the basis of common goals and shared interests to strengthen innovation and implementation power. The development of new and ingenious solutions and talent makes climate adaptation more affordable and generates new economy.

Even more important is connecting the professionals to local communities. They can be of significant importance to each other. Citizen science can play a key role. Collecting and use of data go hand in hand with involving communities in climate adaptation.

In our IJssel-Vecht demonstration delta we are implementing citizen science in several projects. It is a start of a new approach to collaborate with local communities.

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## 1. A VULNERABLE DELTA

### 1.1 A history steeped in water

At present, half of the world's population lives in deltas, and in coastal or river areas, and this percentage is expected to rise to even seventy percent in 2050. All over the world, deltas are economic hubs, but they are also vulnerable. Given the predicted deteriorating changes in climate (rising sea levels, more extreme weather conditions, more drainage into rivers), the vulnerability of deltas is more relevant than ever before in history.

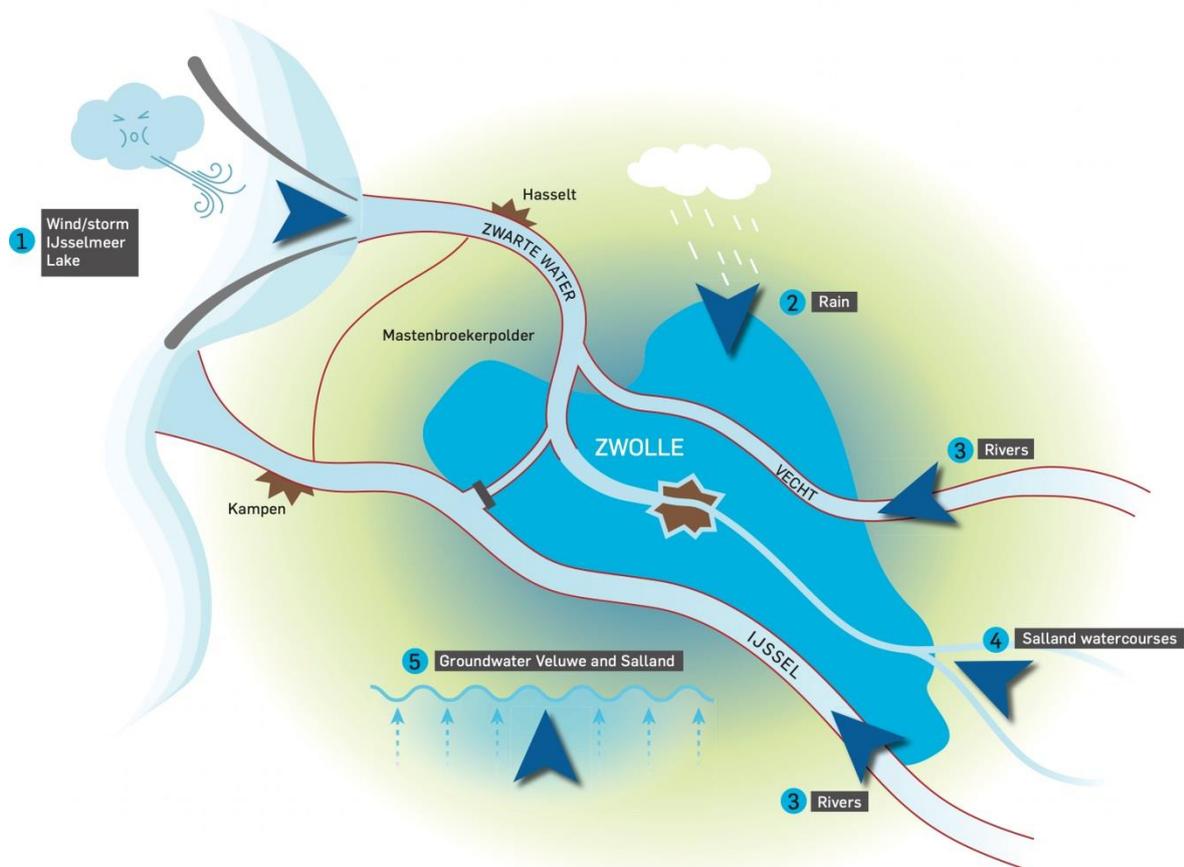
Zwolle, Kampen en Zwartewaterland all lie in the delta of the rivers IJssel and Vecht, in the northern part of the Dutch delta. People have been living with water here for centuries. It all started with building on the high dry ground, the sand ridges. In fact, that is where the name Zwolle comes from. A Suolle is an area of high ground that stays dry during flooding.

Water is a cornerstone of our identity and mindset. Living with water, working together on water: it is traditionally in our genes. We have had to battle together to keep our feet dry, but at the same time, water brought us wealth. Historically, we are a unified society. This DNA has turned Zwolle into an economically flourishing city in the delta of the IJssel and Vecht.

In hydrological terms, our delta is complex and dynamic. The city of Zwolle is surrounded by water on five sides:

1. From the IJsselmeer lake, openly connected to Zwolle's canals, meaning that Zwolle city centre is situated outside the flood dykes
2. Through the international rivers IJssel and Vecht alongside Zwolle
3. From the watercourses of the Salland hinterland which drain through the city centre
4. From the groundwater from the Veluwe that surfaces in the IJssel-Vecht delta
5. And of course, from above, in the form of torrential showers

The versatility of our delta leads to a great diversity of climate adaptation issues, including drinking water supply, water safety and flooding, city climate and ensuring sustainability of the agricultural sector. The IJssel-Vechtdelta is a compact delta enclosing almost all climate adaptation challenges. It's a 'hotspot' in the national Delta programme.



## 1.2 New delta works

We have worked, throughout the ages, to keep our delta liveable, and we still do. Just in the last 15 years, for example, we implemented important projects such as the four Ruimte voor de Rivier (Room for the River) projects in our region and installed an inflatable rubber dam at Ramspol.

Bearing in mind the changing climate, the traditional, large-scale approach of 'building flood dykes and pumping' alone offers insufficient protection against climate change in the long term. For example, how can we absorb torrential showers, limit the consequences of flooding, combat heat stress, make the water chain sustainable and many more such questions? The answer is to take a lot of small-scale measures, in addition to the large-scale approach in and around the city, in order to cleverly structure the city and the surrounding countryside. This might involve diverting rainwater from the sewers, adding greenery or protecting vital amenities (drinking water abstraction, energy network, hospitals) for example. Solutions are needed at every level, from rain barrels to inflatable rubber dams. In fact, you will find the new delta works in and around the city.

## 2. CLIMATE CAMPUS

### 2.1 Main idea

Building on our history and identity, we need to work together again to get climate adaptation implemented at all levels. We need water professionals and government but also the local citizens, entrepreneurs, housing associations, social institutions, etc. If only because half of the city is privately owned. We need new knowledge, solutions and talent as well. By shaping this collaboration in a clever way, we can generate economy at the same time.

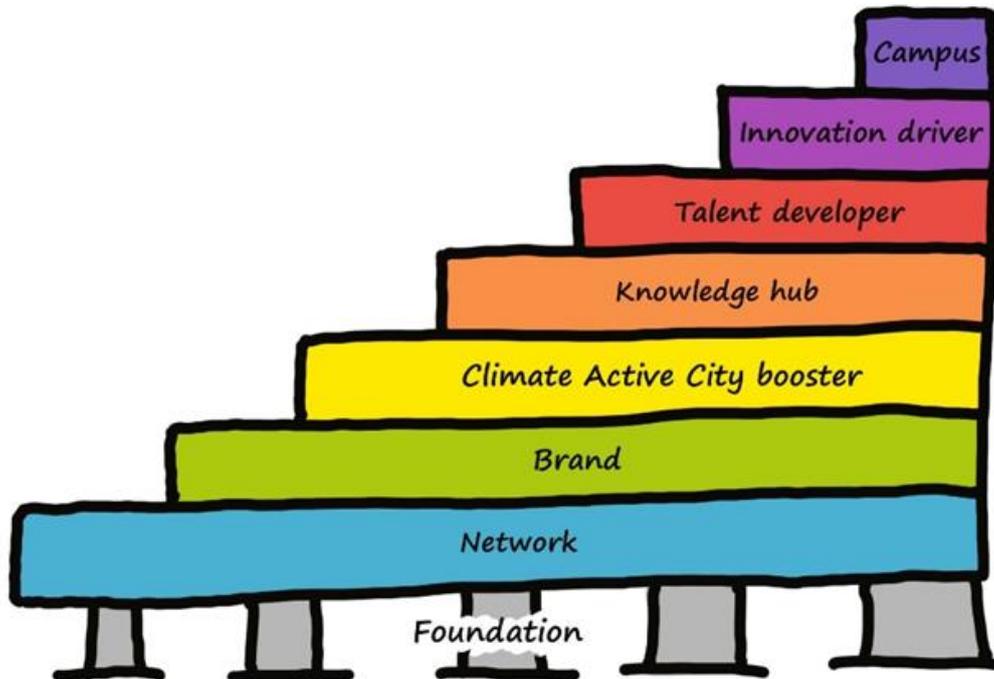
As one of the frontrunner regions, facing the complex challenge of climate adaptation, we started an innovative collaboration: Climate Campus. Climate Campus is a network of over forty organisations: government, educational and knowledge institutes, entrepreneurs and NGOs. Partners work together in an innovative way to adapt the IJssel-Vechtdelta to climate change. Climate Campus aims to accelerate climate adaptation and stimulate new economy. The aim is to further develop a demonstration delta for climate adaptation of international significance.

The network is supported by a foundation (board and office team) that facilitates partners to connect and strengthen the innovation and implementation power. The Climate Campus foundation serves the collaboration by the network partners. It serves to build the brand of the demonstration delta, exchange knowledge, develop talent, innovation and business by bringing together interests, knowhow and resources to develop new knowledge and align implementation.

Based on our seven building blocks we build:

1. The network of partners as it forms the basis of Climate Campus
2. Climate Campus as a brand of this region (demonstration delta); a brand partners want to belong to
3. Climate Campus as a booster of Climate Active City, the bottom-up movement
4. Climate Campus as a (new) knowledge hub
5. Climate Campus as a developer of (new) talent
6. Climate Campus as a driving force for innovation
7. Climate Campus as a physical location

## Building blocks of Climate Campus



### 2.2 Unique elements

#### 2.1.1 Common goals and shared interests

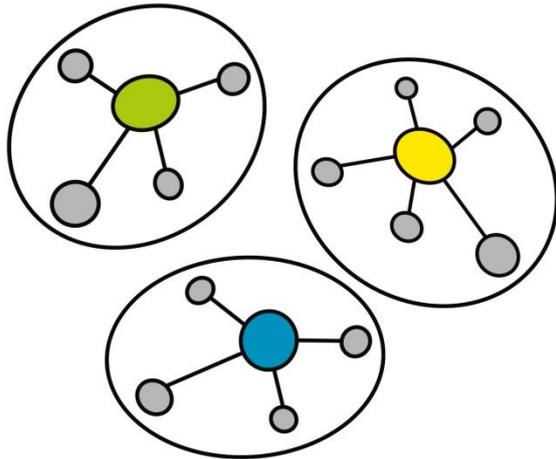
This Climate Campus concept contains two unique elements. The first element is connecting partners, ideas, projects and budgets on the basis of common goals and shared interests. Of course, collaboration in itself is nothing new. But usually collaboration is focussed and scoped to fit only the goals, role and responsibility of individual organisations.

A very simple, but illustrative example:

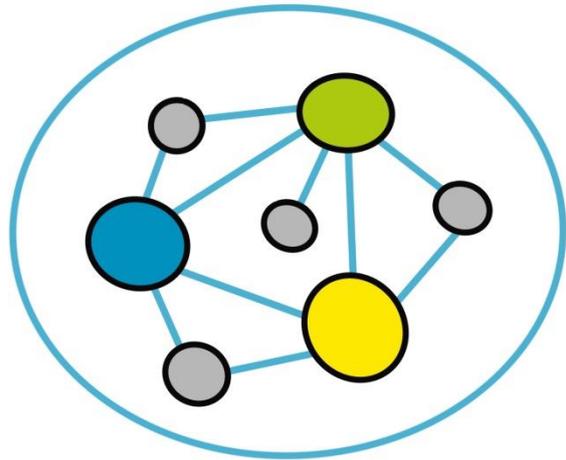
In case of extreme rainfall, a sports field can function as a storage of excess water if some extra measures are taken. In general, a developer or owner of a sports field will not pay for these measures. From climate adaptation perspective, budgets will not be invested in the development of sports fields. Only when you bring together interests, responsibilities and budgets, you will design and develop a sports field that can temporarily store excess water. In the end you have an ingenious solution that saves public money.

Although combining these kinds of interests is the obvious thing to do, the actual practice is different. That is why the Climate Campus Foundation stimulates and facilitates partners in collaboration based on common goals and shared interests.

*Focused collaboration based on the role and goals of an individual organisation*

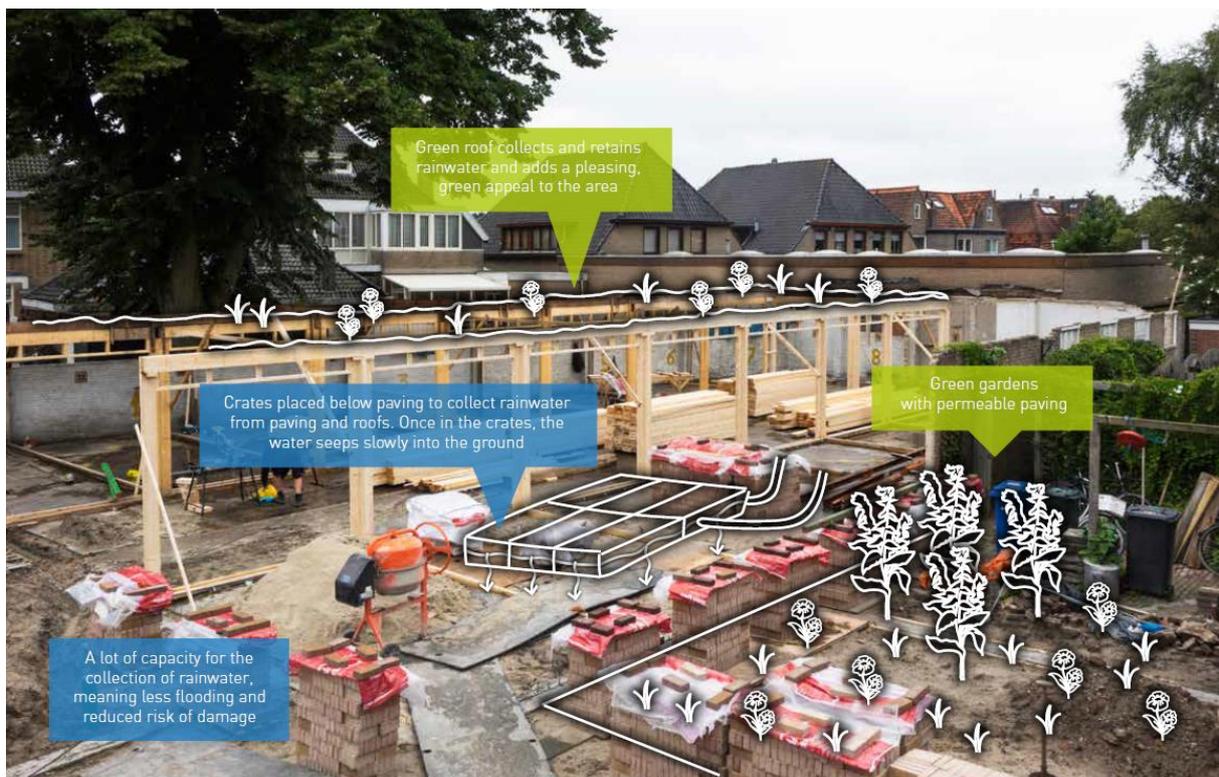


*Network collaboration based on common goals and shared interests*



### 2.2.2 In practice: Seringenstraat Zwolle

In the Seringenstraat in Zwolle a collaboration between residents, government, education and businesses resulted in a win-win situation. It started with a soil remediation, demanding that part of the street and gardens had to be dug up. Traditionally the department of soil remediation would stick to its task to clean up contaminated soil.



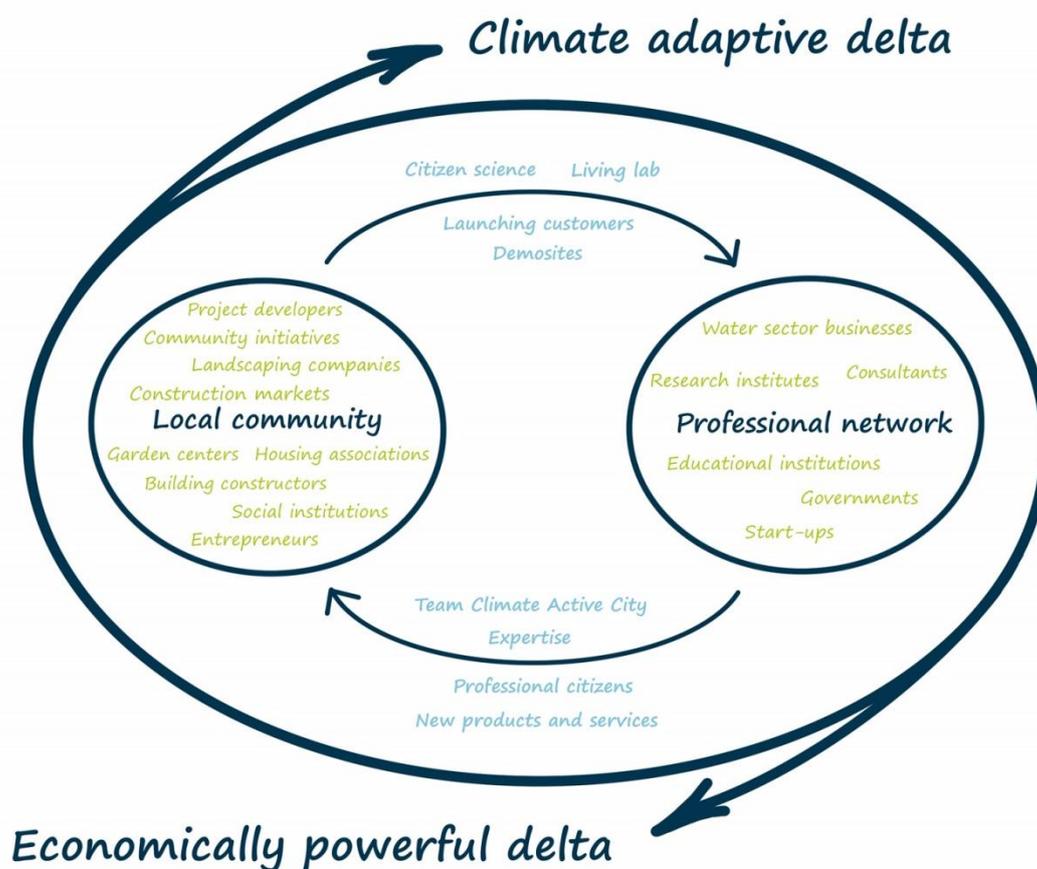
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However, a few “connectors” saw an opportunity to fill the excavation with infiltration boxes to solve the water nuisance situations that regularly occurred. They started a process that resulted in climate adaptive gardens by disconnecting rainwater flow to the sewers, installing green roofs and constructing façade gardens. Residents also installed solar panels. And a novel idea was introduced: the rainwater fence. Students at Groene Welle contributed to the design, a local landscape gardener helped the residents with the work and government (municipality, water authority) offered advice and helped with funding.

### 2.2.3 Connecting the professional world to the community

The most important key to the acceleration of climate adaptation, however, is in connecting the professional (water) world to the local community. The professional world develops solutions, earnings models etc. The community has to work with them, is the end-user and expert by experience, has a finger on the pulse and knows what is needed. Climate Campus connects the professionals to the local community to strengthen innovation and implementation power.




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### 3. BEST PRACTISES

As part of Climate Campus, we have a team “Climate Active City” that boosts the bottom-up movement. In the context of land and water management however we will show three examples of collaboration of professionals and local communities based on three elements: collecting and use of data, citizen science and involving communities in climate adaptation.

Citizen science is a simple concept whereby we share our individual knowledge of the world around us in order to co-create change for the better. Enterprises all over the world utilize interactive mapping to spread ideas and share data on issues, because no one knows their neighbourhood better than the people who live there. When residents are more aware of the changes caused by the climate in their immediate environment, they are more motivated to adapt.

#### 3.1 SensHagen

One of our best practices is “Senshagen”. In Senshagen, a scientific sensor network in the gardens of citizens generates local climate data and involves citizens in climate adaptation actions at local level.

With citizen science in mind, the SensHagen project was started in the Stadshagen district: a project for, by and with residents of the district. SensHagen aims to give residents more insight into climate change and involve them in the effects of climate change. The municipality of Zwolle is collaborating with National Institute for Public Health and the Environment (RIVM) and the Royal Netherlands Meteorological Institute (KNMI) in this project. Sensors from the RIVM and KNMI are installed throughout the district, in the gardens of its residents. They actively participate in reading the measurements, which provides better insight into the climate.

Residents can adopt sensors. They are installed on or near homes and measure, among other things, particulates, precipitation and temperature. They can then use the digital platform ‘Smart Zwolle Hub’ to view the data generated by such a sensor at home. The hub was developed by Esri Nederland. This smart platform not only collects and shares data; project participants can also exchange experiences and work together.

In addition to installing the sensors, the Youth Sensor Network was also launched at the De Zevensprong Dalton school. The school has a sensor that measures things like wind speed, temperature, precipitation and sound. The aim of the Youth Sensor Network is to introduce children to technology and the changing climate in their own living environment.



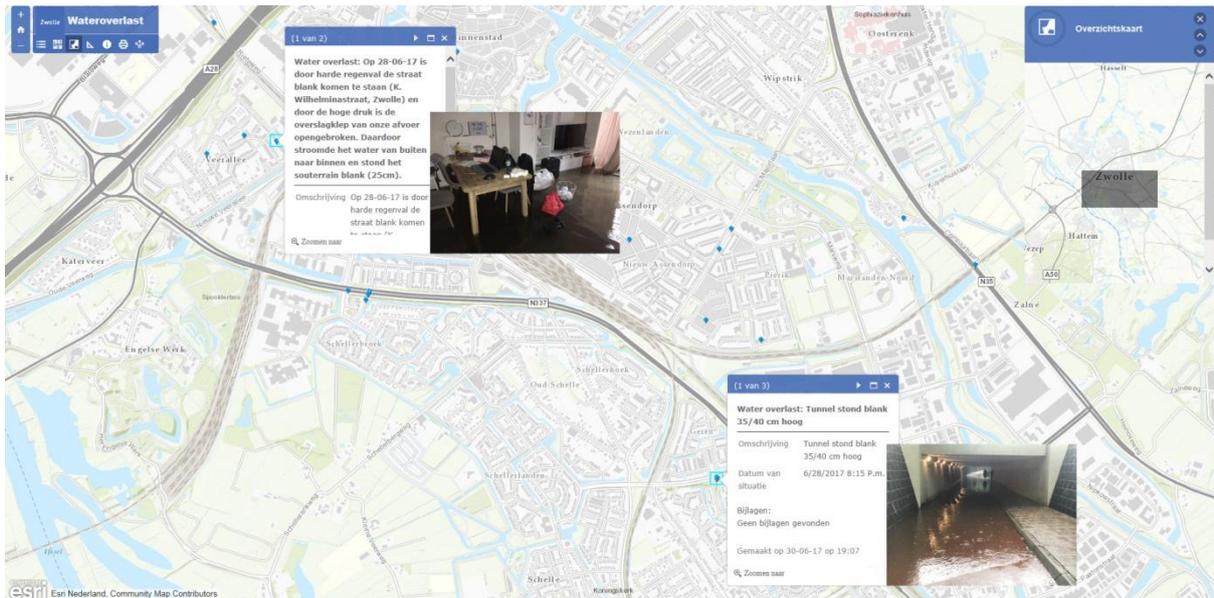
### 3.2 Mapping wet feet

Zwolle, June 2017: heavy rainfall up to 80 mm rain in 12 hours. The municipality launches the wet feet map via (social) media: “Report flooding and put it on the map with a photo”. More than 70 inhabitants responded, giving the municipality an even better insight into the bottlenecks in the city.

Among other climate impacts, the urban area of Zwolle is more likely to experience heavy downpours. Three years ago, the ring road of Zwolle was flooded due to extreme rainfall. And on Wednesday, June 28, 2017, Zwolle experienced a cloudburst of 60 to 80 mm within a short period of time. To better understand the consequences of extreme rainfall in its environment, the municipality of Zwolle and the Drents Overijsselse Delta water authority launched a web-based geoportal to map “wet feet” in Zwolle. People and businesses experiencing flooding in Zwolle can report this in the geoportal called “nattevoetenkaart” (wet feet map).

Both local authorities are looking for locations in Zwolle where water has been on the streets for a long time or has flowed into homes/ business premises. By means of crowdsourcing, data is collected with the help of a large group of people. It facilitates the outreach to citizens who are affected by cloudbursts. At the same time this growing database is used to get a better

picture of locations in the city that are sensitive to extreme rainfall. Also, it helps to validate flood simulations and urban drainage calculations.



### 3.3 Sim Zwolle

Within the Interreg NSR project CATCH we are developing an interactive application for climate adaptation in the digital twin city of Zwolle. This is a virtual representation of the city that encompasses and integrates all the available data. In this twin city we are developing a design for a "SIM-Zwolle" serious game. The ambition is to simulate extreme weather events such as heavy rain, prolonged heat and drought in the digital twin city - the virtual twin city of Zwolle in which all data from the municipal systems are integrated. These extreme weather events form the setting of a serious game that is also meant to be played by residents.

When residents play the game, they are triggered to solve all kinds of problems around the extreme weather conditions in their street. The mission in the game is to maximize the sponge effect of their habitat - their home, garden, street and neighbourhood. By sponging up their neighbourhood, residents also ensure that sufficient water and cooling options become available in times of heat and drought. As a resident, you thereby depend on your neighbours. To score high in the game you have to work together with others in the street and neighbourhood. The design for this serious game is now being developed within the CATCH project as well.

A special aspect of SIM Zwolle is that the design includes how the input of residents during the game can "feed" the digital twin city with relevant data. Can we design the game in such a way that residents measure and enter their own data in the virtual city? That can be anything, nitrogen in the air, height of thresholds and ridge heights of roofs, the amount of water in cellars and on the street, etc. With this form of Citizen Science, a more complete picture of

Zwolle can be created so that more effective policy can be developed. This serious game can therefore be very relevant for the future, also for other municipalities and governments.



Where the Catch Interreg pilots of other cities in the North Sea region are working on measures in the public space, the city of Zwolle chooses to test innovative measures, such as community building through serious gaming. That is why the pilot started with developing a community building strategy. The perspective of community building as an important steppingstone towards building a water sensitive city is highly relevant to all (midsize) cities, as community building is part of all pilots in the CATCH project. Therefore, the Zwolle pilot aims to be an inspiring example for all the partners in the CATCH project.

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