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ADAPTATION TO CLIMATE CHANGE

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Serious Gaming successfully engages citizens in climate adaptation action

The “Garden Battle” and a mobile Escape Room inspire water-sensitive behaviour in the Netherlands

The pilot project in Zwolle, later extended to the entire region, uses serious gaming to raise awareness and inspire climate-adaptive community building. Residents participated in interactive activities, including a mobile escape room and/or the “Garden Battle” challenge.

Key Learnings

- **Lasting impact**: For instance, the Garden Battle serious gaming initiative has catalysed a local community focused on climate-adaptive measures within the neighbourhood.
- **Strengthen collaboration and engagement**: Partnering with stakeholders across Information and Communication Technologies, gaming, game operations, communication, behavioural science, and local residents is crucial. This collaboration fosters the creation of enjoyable games that promote dialogue on climate adaptation. Regional partnerships have also facilitated the adoption of these games by other municipalities, increasing awareness about climate change and local actions.
- **Climate adaptation as a business opportunity**: The project demonstrates how climate adaptation initiatives can spur business opportunities for diverse companies.
- **Using social media**: Effective social media campaigns have enabled outreach to over 74,000 local residents.

About the region

Zwolle, the capital of the Overijssel province in the Netherlands, spans approximately 119 km² and is home to around 133,000 residents. Nestled in a low-lying region, the city is defined by its flat landscape and an extensive network of waterways, including the IJssel, Vecht, Westerveldse Aa, and Zwarte Water rivers, as well as the canals of Salland. This geographical setting makes Zwolle particularly vulnerable to climate-related challenges, such as flooding from heavy rainfall and rising water levels.

Climate Hazards

Flooding, Sea Level Rise, Water Scarcity

Sector

ICT, Water Management

Key system

Water Management

Health and Wellbeing

Figure 1: Zwolle and partners in the Interreg CATCH project. Image Credit: CATCH project.

Climate Threats

Zwolle is located on the Zwarte Water River and the Vecht River in Overijssel and is connected to the river IJssel via the Zwolle-IJssel canal. This water system forms part of the IJssel-Vecht Delta in the management area of the Drents Overijsselse Delta Water Board. Due to its location in the IJssel-Vecht delta, Zwolle is particularly vulnerable to climate change, especially regarding water safety and flooding, as Zwolle has to deal with water inflow from five directions, as shown in Figure 2:

1. From the IJsselmeer, the largest lake in the Netherlands, directly communicating with the city canals: extra water in the IJsselmeer means higher water levels in the city canals and more difficulties with drainage in the direction of the IJsselmeer.
2. Via increasingly frequent and violent downpours, in which streets become flooded, tunnels fill up, sewers overflow, facilities fail, water enters buildings, and Zwolle becomes inaccessible.

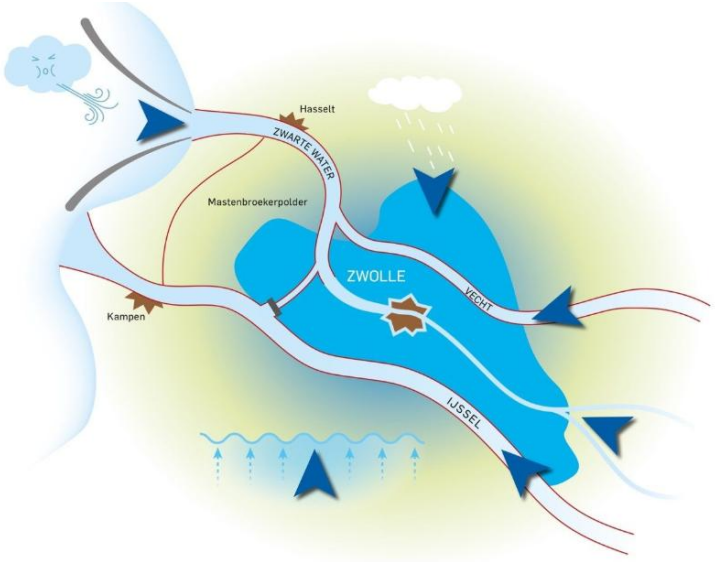

Figure 2: Zwolle has to deal with water supply from five directions. Image Credit: CATCH project.

3. Peak discharges from the IJssel and Vecht rivers are steadily increasing. The city of Zwolle must be protected against this discharge. However, due to more extended periods of drought, Zwolle also has to deal with low water levels more frequently.
4. From waterways coming from the hinterland and draining via the city centre: the expectation is that, in the future, it will not be possible to manage such quantities of water.
5. Via groundwater that rises or falls (more than at present) due to too much or too little water in the delta. This can cause damage to older structures with wooden floors and/or foundations and green areas.

Serious Gaming to Inspire Water-Sensitive Behaviour

The city developed a long-term climate adaptation strategy in response to Zwolle's climate threats. The approach integrates adaptation measures at all levels, from significant interventions like dikes undertaken by local authorities to small measures like rain barrels at the resident level. An essential component of the climate adaptation strategy is community building. It is a particularly important measure at the local and household levels in the journey to becoming a water-sensitive city. The Community Building Strategy directs and structures activities supported by gaming experiences such as serious games developed in the CATCH project: The Garden Battle and a mobile Climate Escape room, “Adapt or BTrapped”.

The serious games have had a lasting impact as they have animated people to green their gardens – also citizens who hadn’t been familiar with climate adaptation actions, or open to climate adaptation initiatives before the serious gaming project started. The digital format enabled reaching many people and facilitated their participation. Citizens who weren’t interested in participating in physical neighbourhood meetings could still participate digitally in the climate adaptation actions.

A digital Garden Battle for adapting to a real-world environment

Zwolle was eager to develop a serious game using a digital twin city, which enabled the citizens to find their gardens in a 2D simulation of the game and citizen science. The Garden Battle challenges residents to adapt their virtual gardens and neighbourhoods to climate change. A map depicts each garden in Zwolle, enabling the recognition of every house. The simulation allows the citizens to create their climate-adapted gardens in a virtual space. At the start, the animated garden is a clear space, where the players can select different features, such as trees, to adapt the garden to climate hazards, cooling the space and increasing the water retention capacity. The better adapted the garden is, the more points the player gets. Additional features, like heavy rains, demonstrate real-world events in the virtual space and the garden’s potential adaptation capacity. They also enable a reflection on the personal climate change adaptation efforts.

A social media campaign on Facebook invited residents of Wipstrik and Stadshagen – two neighbourhoods in Zwolle – to test and play the game. Adults, in particular, participated in the serious game. The player with the most points in the neighbourhood wins the game.

> *“I didn’t expect to win at all, so I’m pleasantly surprised! In my garden design I have used many different trees, plants and bushes. I also looked at plants with flowers, to attract bees and butterflies to my garden.”,*
>
> *Garden Battle first prize winner*

Entrepreneurs from the Climate Campus network supplied prizes for the winners and displayed their products in the game. For example, the companies provided rainwater fences and vouchers for shopping at the local garden centre to explore the game's economic potential. The first prize was a garden makeover from a landscaper. Rainwater fences are fences that can store water in tanks. After the design phase from 2017 to 2020, the project team added extra options to the game, such as designing public spaces by April 2021. In June 2021, the council opened the Garden Battle for participants across the city, meaning all residents could play the game for one month.

Figure 3: One of the posts used in the social media campaign. Image Credit: CATCH project.

Mobile escape room "Adapt or BTrapped"

Initially, trainees from the regional water authority developed the concept of a mobile climate escape room that can be brought to different neighbourhoods to raise awareness among residents about climate change and what they can do in their gardens or streets. This formed the starting point for a student assignment from various educational organisations in Zwolle to design and build a climate escape room in a trailer. The Great Escape company advised the students on developing an escape room. After a year of hard work and testing the prototype, the students finalised the mobile climate escape room, called "Adapt or BTrapped". The project invited two neighbourhoods in Zwolle to play.

Entering the escape room, residents step into a future set in 2050, impacted by climate change. To escape, they need to solve puzzles in which climate adaptation measures are the key. After escaping, the residents are invited to share their experiences and join a city dialogue moderated by The Great Escape. In this dialogue, the residents shared whether they recognised the adaptation measures in the game and if they have implemented such measures themselves, for example, in their gardens, along the streets, and/or in

their neighbourhood. The dialogue aimed to give a good feeling about implementing climate adaptation measures and show that people are already taking action, and it is not difficult to do more.

After the student assignment, the project team continued working with The Great Escape and the network partners to use the escape room in the Zwolle region and across the Netherlands. The escape room has been active for five years, and the project has rented it out to different municipalities across the province. As some municipalities couldn't afford the total hiring costs, the province has taken over part of the fees. Since the beginning, various events have used the escape room each year, with approximately 10 to 20 applications each year. The escape room has even crossed the German and Belgian borders a few times. The Great Escape developed and launched a more mature version of the game in 2024, The Time Jump, and is updating the first one in 2025.

Figure 4: Local residents playing in the escape room. Image Credits: CATCH project.

"The escape room was one of the first interventions from our community building strategy, and it is very nice to see that it works for our residents. They are captured by playing the game, and as a result, it feels natural to discuss climate adaptation measures with them.",

Annemiek Wiegman, CATCH project leader

Summary

The pilot of the city of Zwolle raises awareness and inspires climate-adaptive community building among residents through serious gaming. Two serious games – a mobile escape room and “Garden Battle” – explore climate adaptation actions at a neighbourhood level. Collaborations with partners from various fields, such as ICT, gaming, game operation, communication, behavioural science, and residents, supported the development and implementation of these games. The collaborations serve to create a game that people enjoy playing and also communicate positively about the serious topic of climate change adaptation. Regional collaboration also ensured that other municipalities adopted the games, raising awareness about climate change and empowering residents to act in their communities.

Further information

The work presented in this adaptation story is part of the Interreg CATCH project.

- Zwolle, Interreg VB North Sea Region Programme

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