

Climate-resilient urban development Zwolle region

A Delta Futures Lab thematic working group with the 4TU Centre for Resilience Engineering

Introduction

Do you want your thesis or the thesis you supervise to have societal impact? To engage in transdisciplinary research and collaboration? Work with other students, University staff and practitioners? Make Zwolle climate-resilient? In this Delta Futures Lab with the 4TU Centre for Resilience Engineering (4TU.RE Centre), bachelor and master students, scientists and professionals engage in, mission-oriented research to design solutions for a climate-resilient Zwolle.

The Zwolle region, the old delta of the IJssel-Vecht in the former “Zuider Zee”, represents the Netherlands in small. High and dry sandy soils, river landscapes with cities and peat meadows, and polders below sea level. All connected through the water system. A water system that is changing because of climate change and increasing spatial demand for urbanization, housing, energy and mobility. Changes that put pressure on spatial functions and planning. The Zwolle region has the ambition to become a delta of the future: a climate-resilient, attractive and economically prosperous. With climate change and a resilient water system as main drivers for designing the landscape of the future, interdisciplinary solutions are key.

The challenge

Zwolle’s water system will change drastically in the future because of climate change. It is crucial to get a better understanding of what spatial, architectural and governance solutions are needed in the coming 10 to 20 years to achieve a climate-resilient Zwolle in the long run (2100). Research in the thematic working group is guided by the main research question:

How do spatial developments and investments in the upcoming 10 to 20 years in the Zwolle region interact with a changing water system in the long run (2100)?

The Delta Futures lab aims to unite education, research and practice in innovative projects. It provides a multidisciplinary network for students who have the ambition to become interdisciplinary leaders in spatial design, engineering and governance of deltas. Collaboration between students, societal stakeholders and University staff takes place in thematic working groups. In the past year, groups were organized around challenges such as the Limburg 2021 floods, Urban Climate Adaptation, and the Rhine Estuary-Drechtsteden under sea level rise. In the 2022-2023 academic years, the 4TU.RE Centre, the municipality of Zwolle and regional water authority Drents Overijsselse Delta (WDODelta) organize a Thematic Working group that focuses on to achieving climate-resilient urban development in Zwolle region.

For the academic year 2022-2023, we are looking for mission-oriented, enthusiastic students that want to contribute to the delta of the future! We also look for companies and University staff who would like to supervise these students. While supervisors may take active part in activities organized by the thematic working group, they are not obliged or expected to do so

The following two thematic subquestions guide the central research question:

1. *What future scenarios are thinkable for Zwolle's water system regionally and nationally in 2100 in conjunction with other spatial topics such as housing, economy, recreation, mobility, energy and agriculture?*

Examples of subjects:

- How does climate change affect the water management in the region of Zwolle? (Including the IJsselmeer, river runoff distribution and water management nationally)
- How does sea level rising influence the IJsselmeer? What consequences does this have for the region Zwolle?
- How can we connect regional and national models to predict future flooding risks?
- What is the spatial impact of future scenarios of the different spatial topics? (i.e. developing future scenario maps)
- How do trends of i.e. housing, economy, recreation, mobility, energy and agriculture influence Zwolle's future water system?

2. *How do we achieve climate-resilient future scenarios for Zwolle's water system in interaction with other spatial topics? What are climate proof solutions that can be implemented in the upcoming 10/20 years?*

Examples of subjects:

- How can the region of Zwolle become an example for housing in vulnerable delta's globally?
- How can housing, infrastructure and parks become an integrated part of the water system?
- How can local solutions to local problems add to a robust water system?
- How do actor interactions need to be redesigned to achieve a climate resilient Zwolle region?
- What urban design and architectural solutions can be developed to achieve climate adapted urban development in the Zwolle region?

Resilience and impact

Within the two themes, students are challenged to develop research that fits their interests. Generally speaking, the research can follow one of the three resilience 4TU.RE research lines: (1) resilience thinking and design, (2) measuring and quantification, (3) resilience coordination and governance. See: <https://www.4tu.nl/resilience/DeSIRE/our-desire-challenges/>

The Delta Futures lab Zwolle aims for practical output that provides actors with action perspectives and actionable recommendations. Examples of products of the thematic working group include, but are not limited to:

- Interactive maps displaying future scenarios of different spatial topics
- Governance toolbox for a climate resilient Zwolle region
- Climate resilient spatial and architectural designs

Your involvement and organization

What do we offer?

- (online) Lectures on the state-of-the-art and state of the future developments of deltas.
- A network of highly qualified researchers and professionals to support your design and research activities.
- A community of students that will form the future generation of delta leaders.
- Individual and group coaching by experts from academia, government and consultancy.

- Opportunity to work on collective output, integrating different disciplines in project work.
- Two coaches: Jan Gruppen (regional water authority WDODelta) and Emma Gerritsen (municipality of Zwolle)
- Direct contact with four universities: Beau Warbroek (UTwente), Martine Rutten (TU Delft), Bert Bruins (WUR) and Gamze Dane (TUE)

Thematic working group

The Delta Future Lab is organized in a thematic working group, which features:

- Students from all disciplines and backgrounds are welcome (hogeschool, university), as well as PhD and PDeng.
- Meetings every two/three weeks with the coaches and other students (field trips, workshops, excursions)
- Each student has their own University supervisor and (if applicable) company supervisor
- Participants exchange data, information, contacts, methods and aim for joint communication, dissemination, valorisation, collaboration with societal stakeholder

Examples previous thesis projects

Perspectief rivierengebied 2100

Several parties have contributed to a design-based research project that mapped out the challenges, opportunities and future perspectives of the rivers area. First, it includes a historical perspective that focuses on cultural identity and spatial characteristics for every river. Second, a design-based exploration of themes like the energy transition and urbanization is presented. Lastly, several integral visions of the future rivers area in 2100 are shown. You can view the full report here: [Werkboek-Ontwerplaboratorium-Rivieren-2018-website.pdf \(onzeijssel.nl\)](http://www.onzeijssel.nl/Werkboek-Ontwerplaboratorium-Rivieren-2018-website.pdf)

Schetsboek Water & Ruimte Herfte

The municipality of Zwolle, the province of Overijssel and WDOD have collaborated in several design sessions to answer the question how the area Herfte can contribute to the water safety issues of the Vecht and the Sallandse Weteringen. This resulted in multiple variants of potential water system measures. These measures were spatially explored which gave rise to 4 innovative spatial models that took design and living with water and climate adaptation as point of departure.

Interested in the Delta Futures Lab Zwolle?

For more information, reach out to:

- *Municipality of Zwolle*: Emma Gerritsen, E.Gerritsen@zwolle.nl
- *Regional Water Authority WDODelta*: Jan Gruppen, JanGruppen@wdodelta.nl
- *TU Delft*: Martine Rutten, M.M.Rutten@tudelft.nl
- *Wageningen University & Research*: Bert Bruins, bert.bruins@wur.nl
- *TU Eindhoven*: Gamze Dane, g.z.dane@tue.nl
- *University of Twente*: Beau Warbroek, w.d.b.warbroek@utwente.nl

More information about the Delta Futures lab

Visit: www.deltafutureslab.org