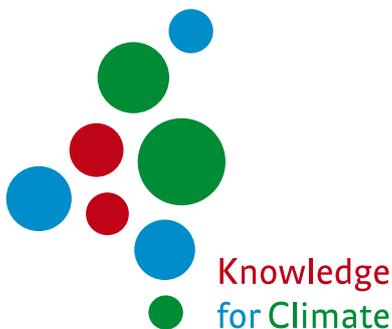


Climate Proof Cities



Knowledge for Climate

Knowledge for Climate is a research programme for the development of knowledge and services that makes it possible to climate proof the Netherlands. Governmental organisations (central government, provinces, municipalities and water boards) and businesses actively participate in the research programme. Knowledge for Climate focuses on eight areas, called hotspots: Mainport Schiphol, Haaglanden region, Rotterdam region, Major rivers, South-West Netherlands Delta, Shallow waters and peat meadow areas, Dry rural areas and the Wadden Sea region. An important part of the programme is the Knowledge Transfer. We cooperate with Universities in other parts of the world and stimulate Knowledge transfer within Delta areas through the Delta Alliance.

The programme works with eight consortia doing research on eight themes, one of them being [Climate Proof Cities](#).

Climate Proof Cities

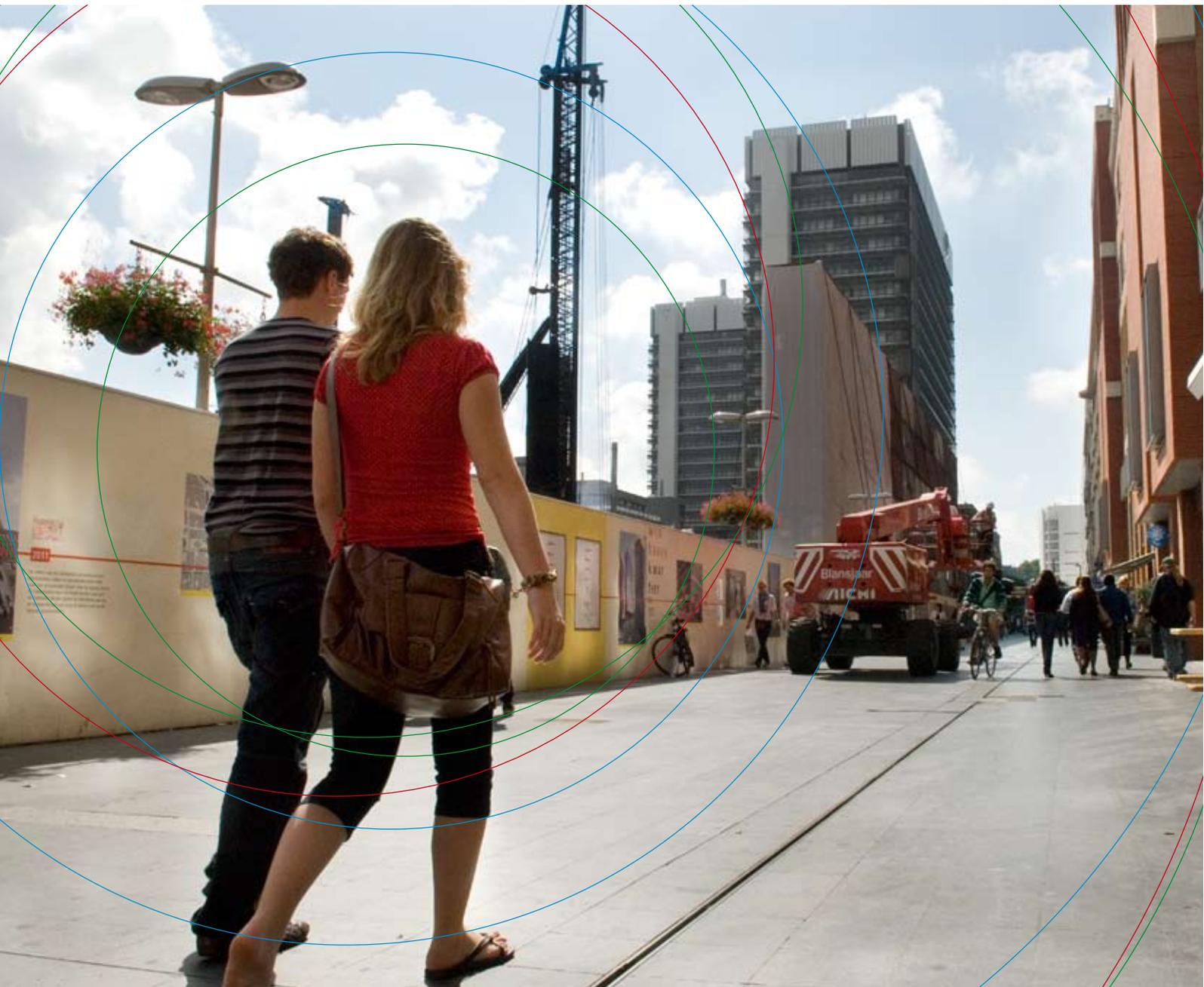
As dynamic systems where most people live and work, cities are vulnerable to the consequences of climate change: increased risk of flooding, droughts and heat waves. Adaptation of urban patterns, public space and water systems, and construction of houses and buildings is essential to keep cities pleasant to live in over the years and to protect them from social dislocation and discomfort. How to make cities climate proof?

Goal

This research programme aims at strengthening the adaptive capacity and reducing the vulnerability of the urban system against climate change and to develop strategies and policy instruments for adapting our cities and buildings.

Research questions

- How and to which extent do Dutch cities influence the local climate themselves?
- How vulnerable are Dutch cities to climate change and what will be the impacts of future climate change?
- Which measures and strategies are available to improve the adaptive capacity of cities?
- How to implement adaptive measures in urban areas?
- What are the costs and benefits of climate adaptation policies?



Integrated approach

Climate Proof Cities provides the unique opportunity to address the major aspects of climate adaptation in cities in a systematic way. It will provide integrated knowledge on the whole chain from urban climate and climate change impacts in cities, to the governance needed for implementing adaptation measures. Research will take the larger system of the urban environment into account that is governed by three boundary conditions: the amount of global climate change we will face, the environmental, social and economic dynamics and complexity of urban development, and urban governance.

Case studies

In each of the work packages a multi-scale approach is used and attention will be paid to issues at different scale levels: buildings, neighbourhoods, cities and metropolitan areas. In practice this will be realized by executing research in five cross-cutting case studies that are based on a set of policy questions for a particular scale level. These policy questions are translated into research projects at carefully selected locations in close cooperation with various Dutch cities among which Rotterdam, The Hague, Amsterdam, Tilburg and Arnhem/Nijmegen.

The case study of climate resilient and sustainable **street and buildings** will investigate impact and adaptation options at the level of buildings (indoor environment and building envelope), building surroundings (e.g. green, water) and the relation to user behaviour. The street and buildings scales are ideal in looking for combinations between adaptation and climate mitigation solutions (related to energy consumption).

Key questions at neighbourhood level are: What is the vulnerability of **neighbourhoods** to climate change and what measures are there to take? A wide variety of pre-war and post-war neighbourhoods in The Hague, Amsterdam, Rotterdam and Tilburg are selected in this case study. Projects on observation, simulations and various adaptation measures (green, water storage solutions, building configuration etc.) are combined in order to provide effective solutions for climate proof neighbourhoods. Research on governance focuses mainly on large scale renovation processes.

WP1

Urban climate system: Understanding weather, air quality and climate phenomena from mesoscale to microscale by observations and modeling

WP2

Impact, sensitivity and vulnerability: Potential impact of climate change and the sensitivity and vulnerability of the urban environment and its people

WP3

Adaptation measures and strategies: Options for climate robustness of cities, neighbourhoods and buildings, and their efficacy

WP4

Governance and adaptive capacity: Incorporation of climate adaptation into existing spatial planning processes

WP5

Integration: Integrated assessment of adaptation strategies

Business parks require specific technical and design solutions for climate adaptation and mitigation (e.g. residual heat, energy and water systems). Many business parks in the Netherlands are in need for restructuring and new industrial estates are emerging. The case study on business parks will investigate adaptation options, the cost recovery involved and effective management structures for climate proof and sustainable business parks.

In some periods climate change leads to water surplus in urban areas, while there is a shortage of water at other moments. The key question in the case study about **integral water management** is how to create smart solutions to balance between storing and discharging water at the different scales of the urban water system. Furthermore, the possibilities of water use in relation to retention and storage are explored (e.g. cooling), taking into account water quality and public health.

The case study on **climate buffers** and city regions studies the influence of the surroundings of a city at the urban climate. How can the city region act as a climate buffer, in terms of cooling and water storage? Measurements and simulation of climate parameters are used in order to get a better understanding of the regional influences on the urban heat island effect in Rotterdam and The Hague for example. Results include design specifications for climate buffers to support spatial planning processes in metropolitan areas.

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[climateproofcities](http://climateproofcities.nl)

Foreign research partners

- University of Manchester
- Albert-Ludwigs-Universität, Freiburg
- Universität Kassel

Hotspots / Stakeholders

- Hotspot Rotterdam region
- Hotspot Haaglanden region
- Amsterdam
- Brabantstad/Tilburg
- Arnhem/Nijmegen/Tiel region
- STOWA (Applied Water Research)

Consortiumpartners



Universiteit Utrecht



Radboud University Nijmegen



UNIVERSITY OF AMSTERDAM



To develop the scientific and applied knowledge required for climate-proofing the Netherlands and to create a sustainable knowledge infrastructure for managing climate change

Consortia Knowledge for Climate

- Climate Proof Flood Risk Management
- Climate Proof Fresh Water Supply
- Climate Adaptation for Rural Areas
- Climate Proof Cities
- Infrastructure and Networks
- High-quality Climate Projections
- Governance of Adaptation
- Decision Support Tools

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