



Infrastructure and Networks



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 [infrastructure and Networks](#).

Infrastructure and Networks

The aim of the programme is to develop new knowledge needed for building robust climate adaptation strategies for the infrastructure networks in the Netherlands. Our focus is on transport, energy and water networks at the national level and in two economic hotspot regions: the Rotterdam/Rijnmond and Amsterdam/Schiphol areas.

Context

Climate change places new demands on infrastructure, due to rising sea and ground water levels, increased intensity of rain showers and drought periods. In cases of extreme weather or flooding, our infrastructure has to remain available to maintain a minimum level of accessibility, or even higher quality levels in case of emergency situations. The consequences of disregarding the effects of climate change can be severe and include congestion, service interruption or system breakdown. The worst case scenario is a systemic crisis due to self-reinforcing effects of failures in interconnected infrastructures.

These risks of climate change can be reduced by improving the functional and technical designs of our networks and reviewing and strengthening our approach towards asset management. Currently, however, our knowledge is still limited of the expected impacts of climate change and the actions required for remedying possible future problems. Before we can formulate a solid climate adaptation strategy for infrastructure, research is needed.



Research questions

The programme takes a systemic approach from three disciplinary angles: technology, economics and policy analysis. Our research goals are:

- To establish how climate change will affect infrastructures; we focus on the physical effects on subsoil behaviour and infrastructure components such as roads, tunnels, water services and power cables
- To construct models to simulate the effects on the operation of infrastructures, their reliability, availability, capacity and socio-economic productivity.

The evaluation and prediction models constructed in the project will be applied for a number of hotspot infrastructure networks to evaluate policies, strategies and governance schemes for adaptation of infrastructure components, asset management or network design. Simulation is used to assess whether these measures make our economic hot-spots robust and resilient to climate change and to explore what change of institutional structures, governance and decision making may be required.

The Work packages

WP1

Platform: to integrate and valorise the knowledge from WP's 2 to 4 using a systems model and a platform for researchers and practitioners

WP2

Effects on physical infrastructure as a result of climate change, looking into the impact of climate change on construction integrity and quality

WP3

Network robustness, looking at the performance risks in networks and solutions to improve network robustness, as well as asset management and regulatory policies

WP4

Socio-economic effects of climate change, focusing on mainports and urban networks, and identifying flexibility oriented planning approaches

Liaisons

We work together with the following European, Australian, Japanese and American scientific research institutions:

- Center for Sustainable Systems, University of Michigan, USA
- CSIRO, Australia
- Fraunhofer Institute for Systems and Innovation Research ISI
- Louvain School of Management, FUCam, Mons, Belgium
- MIT and United States Geological Survey, USA
- Purdue University School of Aeronautics & Astronautics, USA
- Southern Cross University, Tweed Heads, Australia
- Swedish Geotechnical Institute
- Tottori University and Arid Land Research Center, Japan



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Stakeholders

- Ministry of Transport, Waterways and Public Works
- ProRail
- Waternet

Working with Hotspots

- Hotspot Rotterdam region

Consortium partners



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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