Knowledge for Climate

Towards a vision for a climate-proof Wadden Area

Midterm report Hotspot Wadden Sea

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a climate-proof Wadden Area

This report was drawn up for the Knowledge for Climate Midterm Review on 4 October 2012 and is intended for internal use only. We therefore request all readers neither to disseminate the text nor to make reference to it. Any queries or comments can be sent to:
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1. Introduction

The Wadden Sea is listed as a UNESCO World Heritage site. The interests of the Wadden Sea are many and diverse and have been the subject of heated discussion for many years now, and the aspect of climate resilience is crucial if the Wadden Sea is to survive. A 'submerged' Wadden Sea is of use to a few people only. And although we anticipate that climate change and the rise in sea level will only be a real threat in the longer term – over 50 to 200 years – the time has already come to think about measures, and if necessary even take measures now that will raise the level of climate resilience. The vested interests and administrative complexity that is characteristic of this area make it essential to start up the decision-making process on these measures in good time; not only to protect the values and interests as well as possible, but also to further utilise the potential of the Wadden Sea.

Knowledge for Climate has set itself the goal of investigating how the Wadden Sea can be made climate proof. The first part of this short report gives an account of the period between 2008 and 2012. The second part explains how we can work towards a vision for a 'Climate-proof Wadden Area' during the period 2012 - 2014.

2. Organisation of the KfC Hotspot Wadden Sea (2008-2012)

The Hotspot Wadden Sea (HSWZ) is one of the hotspots of the Knowledge for Climate research programme. In the first tranche an investigative study was carried out into what the most important knowledge questions are for the Wadden Area (see box 1). The conclusion of this internal report is that a great deal of knowledge is already available, that a great deal of research is already being carried out, and that there is a particular need to know how it can be brought into practice. In other words, there is mainly a need for governance research, suggest the researchers.

For the second tranche, the HSWZ hotspot team (see stakeholders Box 1) chose to focus on Water Safety (Theme 1)[1], Rural Areas (Theme 3)[2] and Governance (Theme 7)[3]. Despite the conclusions of the aforementioned report from the first tranche, it was evident that it was difficult to unearth research questions and obtain commitment and co-financing for governance research despite all the efforts made by the research consortium. One significant explanation might be found in the presence of the Wadden Academy, which had just been founded at the time, and the Delta Programme that had meanwhile been announced. Policy-makers and administrators apparently preferred to keep their powder dry for the Delta Programme with regard to governance issues, especially the issues the Delta sub-programme Wadden Area wants to tackle. The hope that the latter would go hand in hand with financing possibilities was very

[1] http://knowledgeforclimate.climateresearchnetherlands.nl/iclimateproofloodrisk
[2] http://knowledgeforclimate.climateresearchnetherlands.nl/climateadaptationforruralareas
[3] http://knowledgeforclimate.climateresearchnetherlands.nl/governanceofadaptation

much in vain. Moreover, the Wadden Academy had meanwhile been established; an academy with its own governance agenda. In other words, there was little reason for KfC to focus heavily on the Wadden Area.

Box 1: Project 'Need to know or Nice to know?' (HSWZ04)

Context / societal problem
At the start of Knowledge for Climate it was apparent that there was a specific need for a Wadden Sea Climate Adaptation Knowledge Agenda. That Knowledge Agenda has clearly demonstrated which projects can – and indeed must – be developed and/or supported.

What is known already, and what isn't?
There is inadequate insight into the aspect of water safety in the area. More insight is needed into the natural processes that ensure that the Wadden Area grows along with the rise in sea level and the effect of mud flat formations on the safety of the sea defence dykes. Is there sufficient administrative resolve to take up the issue of climate adaptation for the area? This relates to the interweave of so-called green (nature) and blue (water) functions in the northern coastal zone with the task of storing water. The Wadden Sea is one of the most studied areas in the Netherlands. Nevertheless, during the project it also appeared that many aspects relating to the effects of climate change on area processes in both the qualitative and quantitative sense are known. Much of this knowledge is set out in the documents that underlie the Wadden Academy Knowledge Agenda.

Key questions
How to arrive at appropriate adaptation measures in the greater Wadden region?

Research
Some of the observed gaps in knowledge have meanwhile been included in national research projects organised during the second tranche of Knowledge for Climate.

Involved stakeholders
Wadden Academy, Van Hall/Larenstein, the Provincial Authority of Fryslân, the Provincial Authority of Groningen and the water boards.

What is the result, and for whom?
The main knowledge gaps have been or will be identified in the knowledge agenda. This is important for the aforementioned stakeholders.

In consultation with the persons involved the decision was taken in 2010 to discontinue the KfC Hotspot team Wadden Sea given that there were already too many players becoming involved in the future of the Wadden Area. The joint conclusion was that with its relatively limited means, KfC could not take a hard line in an arena in which the Wadden Academy and the Delta Programme were in their initial stages.

From that moment on, interim coordination of the hotspot was taken care of by the Knowledge for Climate programme office. At programme level, KfC sought contact with that same Wadden Academy and Delta sub-programme. The discussions between these three parties resulted in the decision that KfC and the Sub-programme would organise a 'Water & Climate' session at the international Wadden Sea Symposium that will be organised by the Wadden Academy on 20 November 2012 in Leeuwarden (see Box 2). This session given at the international symposium will be used to further develop a research vision on a climate-proof Wadden Area. KfC will facilitate that process.

Box 2: 13th International Scientific Wadden Sea Symposium 21 - 23 November 2012
Programme Theme 1 'Climate and Water' (21 Nov.) – hosted by KfC & DPW

13.40 – 13.45 Jaap Jepma: welcome and outline of theme 1
13.45 – 14.05 Speed presentations of selected posters related to theme 1
14.05 – 14.45 Keynote Climate and Water
Policy relevant scientific developments since the Ministerial Conference Sylt 2010 – Prof. Hans von Storch, Institute for Coastal Research of the Helmholtz-Zentrum Geesthacht
14.45 – 15.05 Case study 1
Adaptation to climate change in the Wadden Sea. The Dutch approach – Prof. Pier Vellinga, National research programme Knowledge for Climate & Wageningen University
15.05 – 15.35 Coffee / tea break
15.35 – 15.55 Case study 2
Modelling the turbulent Wadden Sea; what's needed most? – Prof. Hans Burchard, Leibniz Institute for Baltic Sea Research Warnemünde
15.55 – 16.15 Case study 3
Regional sea level rise and the Wadden Sea – Dr. Mark van Koningsveld, Delft University of Technology
16.15 – 16.45 General discussion theme 1 with the audience
16.45 – 16.50 Jaap Jepma: conclusions theme Climate and Water

3. Developing the vision Climate-Proof Wadden Area (2012-2014)

Knowledge for Climate has set itself the goal to produce policy options for the hotspots that contribute to the climate resilience of these areas at the end of the research programme in 2014. We are not working towards these so-called options for regional adaptation strategies in the case of the Wadden Sea. It is not the intention that the KfC hampers the Delta Programme; the Delta Programme will also present its Delta Decisions in 2014. Moreover, the occurrence of all the research programmed by the Wadden Academy calls for a certain amount of discretion where new research in the Wadden Sea is concerned.

KfC's contribution to the climate resilience of the Wadden Area is fourfold:

1. *Research in the field of Water Safety (see Box 3 & 4), Rural Areas (see Box 5) and Governance (see Box 6) with case studies in the Wadden Area*
2. *Executing generic research and making it available for the Delta Programme and the Wadden Academy*
3. *Being available as a sparring-partner or knowledge broker*
4. *Formulating a vision 'Climate-proof Wadden Area'(see Box 7)*

Box 3 – Example: Project 'Kweldervorming Terschelling [Creating Mud Flats on Terschelling]' (KfC Consortium T1 Water Safety)

This report provides a foresight into the opportunities, limitations and questions concerned with mud flat restoration along the Wadden Dyke. A few mud flats which in the past were not dyked in but used as grazing land still remain in front of the Wadden Dyke. This area is designated as *Natura 2000 Vogel- en Habitatrichtlijngebied 'Wadden'*. Thanks to their function as wave breakers, mud flats can contribute to water safety. These mud flats are gradually eroding but interest is shown in restoring them. The foresight study was carried out under the authority of the Terschelling Council, Wetterskip Fryslân, the Provincial Authority of Fryslân and the Rural Areas Authority. Areas where there are still remains of mud flats, or where they were located earlier, would seem to be the most promising areas for creating mud flats because they are still shallow and there are also arguments for restoring the mud flats from a historico-cultural perspective.

Source: J.M. van Loon-Steensma, 2011. Kweldervorming langs de Terschellinger Waddendijk; Een verkenning naar kansen, beperkingen en vragen rond kweldervorming langs de Waddendijk e.o. van Terschelling. Wageningen, Alterra, Alterra Report 2172, 88 pp.; 39 figures; 4 tables; 39 refs.

Box 4 – Example: Project 'Innovative dykes in the Wadden Area' (KfC Consortium T1 Water Safety)

This report gives an overview of innovative dyke concepts. In close co-operation with representatives of the four Northern water boards this report was used to find out on which dyke stretches along the Wadden Sea innovative dyke concepts are feasible. Innovative dyke concepts can be cheaper, fit better in the landscape, present new opportunities for the Wadden Area, be more in line with the international status of the Wadden Sea as a major wildlife area, be more robust and therefore offer better protection from the effects of climate change. The report also outlined the building blocks for a method to determine the added value of innovative dyke concepts vis-à-vis the present dyke. This foresight study was carried out under the authority of the Delta Programme Wadden Area and is a step further in investigating appropriate water safety strategies in the Wadden area which, in addition to focusing on water safety, also focus on nature and spatial quality objectives.

Source: Source: Van Loon-Steensma, J.M., H.A. Schelfhout, N.M.L. Eernink and M.P.C.P. Paulissen, 2012. Verkenning Innovatieve Dijken in het Waddengebied; Een eerste verkenning naar mogelijkheden voor innovatieve dijken in het Waddengebied. Wageningen, Alterra, Alterra Report 2294, 104 pp.; 29 figures; 4 tables; 42 refs.

Box 5 – Example: Interactive workshop on climate changes on Texel
(KfC Consortium T3 Rural Areas & KfC Consortium T8 Tools)

As a consequence of the changing climate the water conditions on Texel will change
In the future. A workshop has been organised for 14 October to find out what the consequences of these changing conditions are for the agricultural sector. Knowledge for Climate and the Regional Water Board Hollands Noorderkwartier researchers invited several Texel farmers and market gardeners to take part in a debate on the future of agriculture and the associated future water management on the largest Wadden island.

Touchtables were used during the debate to show the conditions of current and future agriculture on an interactive map. The participants were able to use different maps, zoom in, and add information. This made the discussion more comprehensible and gave an unambiguous insight into the urgency of the local water problems. The consortium T3 Rural Areas worked here closely with the consortium T8 Tools, which is specialised in deploying touchtables and visualisations in policy processes.

The main conclusions of the debate were that fresh rain water must be retained for a longer period of time, and a study must be made into how purified sewage water can be reused. To be able to retain the water longer it is important that the flood-control dams are utilised better and the capacity for storing water is increased. Options such as saline cultivation and crop selection were also discussed. It was a very informative day that gave an insight into the physical options that are feasible for the water board and the farmers. How far the interactive tools added to the discussion and how such tools can be used with regard to spatial issues was also looked into.
This was done in collaboration with Knowledge for Climate Theme 8 researchers.

Box 6 – Example: Workshop Knowledge Assembly Wadden Sea (KfC Consortium T7 Governance)

The Workshop Knowledge Assembly Wadden Sea (ORAS02), which will be led by researchers of the consortium T7 Governance, is planned for the second half of 2012. This study will investigate the effects of knowledge in the regional adaptation strategies developed by Knowledge for Climate for the hotspots HSZW, HSZWD, and HSGR and for the decisions taken by the relevant Delta sub-programmes. The project will commence with an analysis in which the networks will be mapped out, as well as the reasons for either using or not using knowledge and contacts. Recommendations for improving the effect of Knowledge for Climate knowledge will be formulated on the basis of the analysis. A contribution will also be made towards developing and organising 1 to 4 workshops.

The first outlines of the vision Climate-proof Wadden Area KfC will produce in 2014 are beginning to take shape on the basis of current insights within KfC (see Box 7). In the midst of all the current studies into and on the Wadden Sea, KfC feels it is able to contribute to the discussion on the Wadden Sea as a whole with a view to the longer term and purely from an adaptation perspective. From that point of view, and the research results now known, it may be argued that climate resilience of the Wadden Area is best served in the longer term through a proactive adaptation strategy based on giving 'human support' to the natural dynamics of sediment management by specifically adding sediment from the North Sea and building with nature where dykes and water safety are concerned. The expectation is that such a joint 'point on the horizon' will best guarantee values, as well as additional income for all stakeholders. Nevertheless, experiences gained in the Wadden Sea show that the crux in this respect is that everyone is on the same track. The intended vision also attempts to provide handles in this respect.

Box 7 – Initial outline of the vision Climate-Proof Wadden Area: an outline

- Climate change is a potential threat to the Wadden Sea.
- What is needed to make the Wadden Sea climate proof?
- KfC and DPW work jointly on a vision for a sustainable and climate-proof Wadden Sea.
- Assumption: Climate has always changed and will continue to do so. Moreover, it is the essence of the Wadden Sea.
- Assumption: Climate change has incorporated an anthropogenic component, both from a mitigation and an adaptation perspective.
- Claim: A sustainable and climate proof Wadden Sea requires an effective and efficient lining-up of both the geophysical and human dynamics.
- Sediment is the basis of the dynamics of the Wadden Sea.
- Human behaviour should therefore support the Wadden Sea with artificial nourishment through sediment and building with nature.
- Doing so, dynamically, demands reducing the volume of 'concrete/hard' structures and increase the area of 'soft structures.'
- Living with the dynamics of the Wadden Sea requires a pro-active and long-term sediment management.
- Advantage: no urgency.
- Chance: starting now with a long-term and incremental approach will be both effective, efficient and no-regret in the long run (ecologically and economically).
- Challenge: paradigm shift needed: 'Forward with nature, instead of back to nature.'
- Challenge: institutional complexity.
- Challenge: trilateral cooperation.
- Opportunity: 'largest and most beautiful wetlands in the world.'
- Opportunity: unparalleled (exportable) knowledge source.
- Intention of KfC: investigate chances and burdens for the mentioned paradigm shift.
- Key question: what are the long-term costs and burdens for such a strategy?




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

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