

Climate services

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1 Description work package

1.1 Problem definition, aim and central research questions

Aim: To improve data and information exchange in the chain of climate research, to impact/adaptation research, to policy making through a web portal.

Many long term decisions on infrastructure, spatial planning, economy etc. are based on information on the climate for the lifetime of the object in question. Governments, businesses and private companies, as well as organisations increasingly need data and tailored information on climate change and its impacts in order to allow them to make informed decisions on climate adaptation strategies. Considerable amounts of data are available. Indeed, stakeholders can get a huge amount of related data and information. However, it is all too often difficult for a stakeholder to obtain an overview of available data, judge their quality and the assumptions behind, how uncertainties are taken into account, etc. This implies a serious limitation in the sense that stakeholders risk to miss crucial information, misinterpret what they obtain and base complex

decisions on non-consistent data. From experiences in former projects (among others CCsP), it is evident that stakeholders often find it difficult to specify at the beginning of their projects which specific data on climate (change) and impacts are needed. Additional requests for data/information often rise later, some of which require research to accommodate. Getting an overview and integrated data sets is even more difficult when stakeholders are involved in border crossing projects. Each country has its own approaches, methods, tools, etc.

In the first tranche of KfC a project (KKF-T) was started up that makes a pilot web portal in which it is tried to integrate information and data on climate change and its impacts in a similar way for a number of sectors (climate, hydrology, ecosystems, agriculture, land use). This WP builds on by creating integrated data sets and an overview of the available data and information from various disciplines. The expert pool within this theme will work together with stakeholders engaged in climate-proofing of their operations or decisions.

Research questions:

- ▽ what data on climate change and its impacts are available and will become available and can be included in a web portal?
- ▽ How can this data and information be made consistent across location, disciplines and applications?
- ▽ What is the appropriate set-up of the web portal to give overview of the available data and information, including information about uncertainty?
- ▽ What are the differences and similarities in approaches for climate services and in dealing with uncertainties (data and information on climate change and impact) in a number of European countries?

1.2 Interdisciplinarity and coherence between the projects

As indicated already under A, this WP focuses on the integration of data and information from various disciplines in the dissemination to scientists, policy makers, general public.

WP4 is the last step in this theme 6 between scientific research and users. It will incorporate the results of WP1 – WP3. It does not depend on the exact results from these WPs, as it focuses on the dissemination of data and information, making coherent use of what is and becomes available. WP4 also pays attention to dealing with uncertainty (e.g. when data are missing). However, the data and knowledge generated in WP1-WP3 is clearly relevant for impact researchers, policy makers and the general public.

We will cooperate with “Bouwstenen NAS” (Building blocks National Adaptation Strategy) as one means to improve dissemination to policy makers through the climate effect geo-portal. Furthermore, the web portal may also serve as a platform for other themes to disseminate (part) of their data and information, and the web portal will also serve as a tool for Knowledge Transfer within KfC.

The expert pool (project 3) will consist of experts of all the main disciplines in Theme 6, and is open for interdisciplinary requests.

1.3 Stakeholders

This WP focuses on the dissemination of scientific information from the other WPs in theme 6 to stakeholders of the information on climate change and its impacts. Stakeholder consultations are, therefore essential, to see whether the data and the way they are supplied, fit with their requirements.

The stakeholders can be subdivided in two main groups for this theme:

- ▼ scientists included in theme 6
- ▼ scientists, policy makers, etc. outside theme 6 (e.g. within KfC, but also outside the KfC programme)

Consultation of the stakeholders in the first group takes place continuously during the whole project, and includes working together (also in WP3). Consultation of the second group will take place through stakeholder consultations (broad consultations once a year, and more often with a limited group, feedback via web portal).

2 Project 4.1 Integration of data and information (integration of data series and background information on climate change and its impacts in a web portal)

Project leader: Janette Bessembinder

2.1 Problem definition, aim and central research questions

Aim: To improve data and information exchange in the chain of climate research, to impact/adaptation research, to policy making through a web portal.

As explained earlier in the general part of the description of this WP, some of the most important issues for climate services for a wide range of stakeholders are overview and consistency/integration between datasets from various disciplines. Stakeholders can get a huge amount of data and information on climate change and its impacts. However, it is all too often difficult for a stakeholder to obtain an overview of available data, judge their quality and the assumptions behind, how uncertainties are taken into account, etc. This implies a serious limitation in the sense that stakeholders risk to miss crucial information, misinterpret what they obtain and base complex decisions on non-consistent data. There is a clear need for the experts to provide information on the assumptions behind their data, the consequences for the interpretation of the data and information, the interactions with other disciplines, etc. On the other hand, experts need feed back from stakeholders on the applicability of the provided information (structure and content).

Research questions:

- ▽ what data on climate change and its impacts are available and will become available and can be included in a web portal?
- ▽ How to consistently combine this data and information for various locations and various disciplines?
- ▽ What is the appropriate set up of the web portal to give the potential users overview of the available data and information, including information about uncertainty?

2.2 Approach and methodology

Integration and further development of the web portal includes the following aspects:

- a. Stakeholder consultations on set-up of the web portal and on the data and information included. Once a year a stakeholder consultation will be organized with a broad group of stakeholders. With a smaller group more regular meetings will be held. Feed back from stakeholders will also be collected through the web portal and personal contacts with stakeholders.
- b. Inclusion of additional available data and information from (almost) finished programmes (e.g. CcSP) and ongoing programmes (KfC and international programmes) and adaption of the structure and content, based on feedback from stakeholders (first meeting held in November 2009 for project KKFT). This part of the project also includes the provision of information on the methodologies used to generate the data, important assumptions, information on uncertainties, interpretation of the data (what can be concluded and what not, in which way the data can be used in other studies?). This meta information is often essential for appropriate use of the scientific results. By organizing the background information for each discipline in the same way, we aim to make it easier for stakeholders to find the information and to stimulate the scientists to provide the same type of background information and in a similar way. In the overall part of the web portal integrated overviews will be included.
- c. Web Services (as viewing and downloading gridded and polygon data) to make the data easily available for users. Practical tools are developed to visualize the data on different temporal and spatial scales through web interfaces.
- d. Generate data on climate change and impacts for a predefined and limited number of combinations of climate scenarios (climate scenarios W and W+, or similar scenarios for areas outside the Netherlands) and spatial scenarios (to be selected) and time horizons (2050). Aim of this part of the project is to create an integrated data set that can be used as a reference. 2050 is a time horizon used by many users, the same counts for the climate scenarios W and W+. The spatial scenarios included should cover clearly different developments in land use. Where possible this should be coupled with the activities within WP3 (Coupling) and WP1-WP2 (especially information on uncertainties).
- e. Overview of interactions, gaps, ways of handling uncertainties, which feedbacks are included, which not, how to deal with uncertainties, etc. for various types of users (scientists – policy makers). Whereas part b of this project focuses on providing the background information per discipline, this part is focussing on the integration of the various disciplines. It aims to identify interactions between disciplines (e.g. plant biomass production is affected by the hydrological conditions. Is the uptake of water from the soil included in hydrological models in an interactive

way, or is a given ground cover and growing season by plants included, independent of water availability?). This part of the project also aims to make overviews of the integrated data and information, in order to make them more accessible to especially policy makers (and the general public). The information of this part of the project will be included in the overall part of the web portal.

We will consolidate on tools and methods developed in other research programs (further development of the website that is being built in the first tranche of KfC; in particular CCsP and KfC). We will include new data and background information during the whole project. In a later stage data from the other WPs within theme 6 should be made available through this web portal (e.g. from WP3 coupling, but also information on uncertainties). Links to data and information from other themes and projects within KfC (e.g. Bouwstenen NAS) and other research programmes (e.g. ENSEMBLES, EURO4M, ADAM, IS-ENES) will also be included in this portal. In principle a generic approach will be adopted, from which specific applications, such as the hotspots, can draw information. Users will be consulted on the structure and content of the web portal.

In the various parts of this project attention is paid to the technical aspects of making data and information more easily available. However, also a lot of attention is paid to the following aspects: interpretation of the data, how can the data be used (and how not), processing of data, the assumptions used for generating the data and the influence on how the data can be used/interpreted, interaction with other disciplines, etc. For example, currently the effect of increased CO₂ on potential evapotranspiration is not included in hydrological models, since it is difficult to quantify. We know that the current hydrological models may overestimate the potential evapotranspiration in the future, and therefore the need for fresh water may be overestimated. In the web portal the same set up will be used for each discipline and the same type of information will be included for each discipline.

2.3 Scientific deliverables and results

Focus is on dissemination of scientific results to wider public, not on writing scientific articles.

2.4 Integration of general research questions with hotspot-specific questions

The hotspots of KfC need primarily local information on future climate. Most questions are related to drought, extreme rainfall, extreme temperatures and wind. For river discharge (hotspot HSGR) there is a need for capturing uncertainties by constructing probabilistic discharge scenarios. For Schiphol Mainport and Schiphol Region (HSSM and HSSR) both wind and water-related questions are of direct relevance. For the dry rural areas (hotspot HSDR) drought poses a problem to water management, agriculture and ecosystems. Low lying areas (hotspot HSOV and HSWZ) need to cope with uncertainty in extreme rainfall and regional sea level. Within this WP we will make the available information on these climate variables more easily available through the web portal for among others the hotspots. Also information will be given about the spatial detail (spatial resolution of the data). WP4 and WP3 (coupling) will directly address questions from stakeholders. Results of scientific research cannot always be used directly by stakeholders. The results need to be translated to fit the specific question of the stakeholder. In this work

package tools will be included to translate/transform the information. Beside this, WP4 will also give information to the hotspots on how to use climate scenarios, how to combine them with spatial scenarios, how to deal with uncertainties.

2.5 Societal deliverables and results

- ▽ Further elaboration of the pilot web portal developed in the KKF-T project with available data and information on climate, climate change and impacts resulting in better overview of information for scientists, policy makers and a broader public. This web portal can also be used as a tool by “Knowledge Transfer”.
- ▽ Stakeholder consultations on the set-up of the portal and the data and information included. Where possible stakeholder wishes will be included in the set-up and content of the portal.

2.6 Most important references

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6. Swart, R., L. Bernstein, M-H Duong and A. Petersen, 2009. Agreeing to disagree: Uncertainty management in assessing climate change, impacts and responses by the IPCC, Climatic Change 92(1-2):pp 1-29
7. <http://ukclimateprojections.defra.gov.uk/content/view/868/531/>
8. http://www.wmo.int/wcc3/declaration_en.php

3 Project 4.2 Climate information services in neighboring countries

Project leader: Markku Rummukainen

3.1 Problem definition, aim and central research questions

Aim: inventory of practices in the field of climate services concerning climate change in European countries, in order to promote more international/European cooperation in the field of climate services

Climate impacts and climate adaptation options do not limit themselves to the borders of the Netherlands. Getting an overview and integrated data sets is even more difficult when stakeholders are involved in border crossing projects, since each country has its own approaches, methods, tools, etc. There is a lot of international cooperation on climate modelling/research, but very little on climate services and/or tailoring of data on climate change and its impacts. However, over the past year this cooperation on climate services has got considerable attention (e.g. WCC3, EUMETNET). Many countries are starting up climate services, or are further developing their current services to encompass climate change aspects. An international workshop on climate services on 10-11 September 2009 in De Bilt provided an overview of activities in several European countries, and showed that many countries deal with the same type of questions and can learn from each other. To promote more international cooperation a broader inventarisation of approaches in various countries is needed. Case studies are needed to identify options and difficulties in cooperation in practice.

Research question:

- ▽ What are the differences and similarities in approaches for climate services and in dealing with uncertainties (data and information on climate change and impact) in a number of European countries?

3.2 Approach and methodology

This project has two related elements:

1. Inventarisation of approaches and services related to climate change in EU countries: available climate scenarios, web sites related to climate change, tools, overview of how various countries in the EU deal with uncertainty, etc. Since the number of potential subjects is very broad, we focus especially on subjects related to hydrology and the communication of uncertainties. Changes in water availability and water excess as a result of climate change get a lot of attention in the Netherlands, but also in other European countries, and they affect many other sectors. The existing uncertainty on future climate change is often an obstacle for use of data on climate change by stakeholders in the Netherlands, but also in other countries. Therefore, uncertainty (reducing, quantifying, dealing with) is an important issue in WP1-3 of this theme. The first step for more international cooperation on climate services will be an inventarisation, taking stock of earlier efforts. During the workshop on September 10-11 2009 a short overview was presented by several European countries of their activities concerning climate services/tailoring of climate data. A more systematic overview is however needed. Special attention will be given also to approaches of dissemination (e.g. websites for different types of users, integration of information on climate and

climate impacts, integration of past-present-future climate, availability of tailored products for various sectors, communication of uncertainties). At the start of this part of the project a inventory of relevant subjects will be made that will be used during the inventarisation (see among others subjects mentioned in this paragraph) and the international comparison. The inventarisation will be concluded with an international workshop to discuss results and further steps for cooperation.

2. Case study: how to deal with uncertainty in climate projections in a border crossing subject. The focus will be on river discharges of the river Rhine and in particular on impacts of water excess and shortage relevant for the Netherlands and for Germany. We will work with the German national weather service (DWD), which is involved in other studies on Rhine discharges (e.g. KLIWA). There have already been several studies on this subject, but they have often had different aims, build on different sets of climate scenarios and/or climate models, and concerned different organisations. In the RHEINBLICK project, initiated by the CHR, the Netherlands is mainly interested in average and high river water discharges, and Germany especially in low discharges. What is more, the Netherlands and Germany have different approaches on the generation of regional climate scenarios and they have both their own regional climate model. Also differences exist in the methods used for making projections of river discharges (e.g. modelling, statistical methods, delta-approach for climate data, bias correction of climate model output). The differences in approaches result in different results, which is at the very least a communication problem, but can also lead to different decisions. The causes will be investigated and the apparent differences in results assessed for significance. Efforts will also focus on identifying in detail what climate data are needed for projections of river discharges, and whether these type of data are supplied by the two countries. We will also look at how information on future river discharges is disseminated towards the organisations that work on adaptation measures. This case is highly relevant for the Netherlands for various hotspots and a considerable number of projects have been executed already (NL Deltacommission, ACER, Rheinblick, GRADE). This case study consists mainly of comparison of existing studies, but will provide recommendations for additional simulations and other data-generation.. Special emphasis will be given to the dissemination of information on climate change, river discharges and uncertainty from climate research, to impact research to policymakers/practice.

3.3 Scientific deliverables and results

- ▽ Overview of approaches in climate services concerning future climate in a limited number of European countries
- ▽ Comparison of approaches for projections of Rhine river discharges between the Netherlands and Germany and the effect on the results

3.4 Integration of general research questions with hotspot-specific questions

The inventarisation is relevant for several hotspots, especially those that look at ecosystems and agriculture. For these sectors it is essential to look at larger regions than just the Netherlands to get a good overview of the impacts of climate change. The information from the inventarisation can help interpret and use data and information from other EU-countries. The case on river discharges is highly relevant to various hotspots within KfC (see under B)

3.5 Societal deliverables and results

- ▽ Overview of approaches in climate services concerning future climate in a limited number of European countries, relevant for adaptation and policy makers
- ▽ Recommendations and guidance for improved national, transboundary and European coherency in national information services
- ▽ Recommendations and guidance for climate change and climate impact data for improved meeting of stakeholder needs.

3.6 Most important references

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11. <http://www.kliwa.de/>
12. http://www.knmi.nl/klimaatscenarios/aanvullend/Regionale_klimaatscenarios.pdf (inventarisation regional climate scenarios EU countries, Bessembinder, 2007)
13. <http://ukclimateprojections.defra.gov.uk/content/view/868/531/>

4 Project 4.3 Expert pool for additional data and advice for KfC themes and hotspots

Project leader: Bernadet Overbeek

4.1 Problem definition, aim and central research questions

Aim: to provide additional and essential data and information for KfC hotspots and themes that were not foreseen during the formulation of the project proposals for the second tranche.

From experiences in former projects (among others Climate changes spatial Planning), we know that several stakeholders find it difficult to specify exactly, at the beginning of their project, which data on climate (change) and impacts are needed. Also, during research on impacts and adaptation measures often additional requests for data/information rise (for this purpose in CCsP an additional project was formulated). To accommodate these requests, an expert pool is created within this theme.

The central research questions will be determined by the requests.

4.2 Approach and methodology

The partners in Theme 6 have, in general, considerable experience with potential stakeholders and many are also partner in one of the other themes within KfC. This experience was used in setting up the various work packages and projects within theme 6. From experiences in former projects (among others CCsP), it is also evident that stakeholders often find it difficult to specify at the beginning of their projects which specific data on climate (change) and impacts are needed and which data are most urgent. Additional requests for data/information often rise later, several of which require research to accommodate. Besides, they often need input from specialists to generate the data in a correct and consistent way. To accommodate these requests an expert pool is created within this theme.

Only those requests are taken into account that meet a set of criteria:

- ▽ requested data should be useful for a broader range of users
- ▽ should be related to the hotspots and themes in KfC
- ▽ should be relevant for making an adaptation strategy (for the hotspots in a later stage).
- ▽ no possibility to finance the generation of the data in another way and in time

- ▽ should not need complete budget for “free space” (the budget will be spread over the years).
- ▽ Use of generally accepted models/tools (used in WP3) for the generation of data/information

The expert pool, that will consist of researchers from the disciplines included in theme 6, will decide which requests will be elaborated, on the basis of above criteria,

4.3 Scientific deliverables and results

The work within this project will be driven by the requests from hotspots and themes during the implementation of the second tranche (2010-2013). Therefore, it is impossible to indicate exactly what will be the scientific deliverables. A general description can be given: the deliverables will be additional data, e.g. climate data or data on impacts for additional time horizons, for an additional scenario of a neighbouring country. It can also include information on the interpretation of results.

4.4 Integration of general research questions with hotspot-specific questions

As indicated under B, the criteria will include a check on the relevance for the KfC hotspots and themes. The additional data and information should also be useful for a broader range of users (preferably useful for more than 1 hotspot).

4.5 Societal deliverables and results

One of the criteria is related to the relevance of the data/information for the adaptation strategy that the hotspots are expected to make later on in the research programme.

4.6 Most important references

1. KNMI, 2009. Climate change in the Netherlands. Supplements to the KNMI'06 scenarios. Brochure KNMI.
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