

Societal aspects

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1. Relevance of the research programme for national and regional adaptation policies

Adequate national and regional climate change adaptation policies require knowledge about where and what types of adaptation is required, and what feasible adaptation strategies are in terms of support from local decision makers. This programme is designed to generate such knowledge. Because of its spatially explicit nature, the study will inform policy makers about where the potential for certain adaptation strategies is high, and where it is low (in both biophysical and human terms). It will also inform them about where intervention measures are required and where not. The human aspects of the study will inform policy makers about how local decision makers tend to interpret policy guidelines, and the extent to which they support a policy.

In designing this research programme we have carefully examined the research questions expressed by hotspot representatives and stakeholders. Sources used are the general call, the so-called source document, and discussions within representatives of the hotspots and stakeholders. Since the research questions cover a wider field than could be handled in a single programme, choices have been made about what to include. Nevertheless, we think this programme covers most of the raised topics, and certainly the most important ones. In this respect we highlight the questions on water quantity, the questions on future nature targets and their spatial differentiation, the questions on future farm management, the questions on cross-sectoral effects of climate change, and the questions on the potential of relatively new ecosystem services such as water buffering. We also consider it important that we pay attention to the human response to climate change, which will give insight into the conditions for realistic (i.e. applicable in practice) ecosystem service provision and adaptation strategies.

The hotspots that have showed strong interest in our research programme are: Dry rural areas, Shallow waters and peat meadow areas, Wadden Sea, and South-West Netherlands Delta. Involved stakeholders are, amongst others: the provinces of Friesland, Gelderland, Zuid-Holland and Noord-Brabant, drinking water companies Brabant Water and Vitens, the Ministry of Agriculture, Nature and Food Quality, and the Government Service for Land and Water Management, farmer's and nature management organisations, and water boards.

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The results of this research programme will provide hotspot representatives and stakeholders with the necessary scientific foundation for their decision-making about climate change adaptation strategies. To achieve this, we will concentrate our research partly on general themes and partly on concrete case study areas. These case studies play an important role in our efforts to produce relevant results for the stakeholders, i.e. results that they can use to design measures and strategies for climate change adaptation. In our discussions with hotspot representatives and stakeholders the following case study areas were prioritized:

- ▽ Coastal area of the Wadden Sea (hotspot Wadden Sea). The focus here is on climate proof agriculture and nature. The research question is how a climate-proof agricultural system can be developed that also contributes to a climate-proof nature, taking into account changes in water management. This is about conservation values in the agricultural areas, but also about strengthening of existing nature reserves through the development of, for example, green-blue structures (groen-blauwe dooradering). As an alternative case study the fresh water supply in relation to nature and agriculture on the island of Texel was mentioned.
- ▽ Baakse Beek and/or Blauwe Bron in the province of Gelderland(hotspot Dry rural areas). De Baakse Beek is a strategic action area according to the provincial water management plan In this area several innovative rural development processes play a role. Research questions are how to integrate nature, agriculture and water in a climate-proof way.
- ▽ Groene Ruggengraat or Natte As (hotspot Shallow waters and peat meadow areas). The research objective is to assess the freshwater claim of future climate proof, salt proof and greenhouse gas emission low land use (agriculture, nature, urban developments) in the meadow lands bordering the Randstad. Freshwater supply and demand are taken into account. This freshwater claim will be compared with other water, agricultural and climate policy objectives in this area. This is a joint case study with the Theme 2 consortium.
- ▽ A stream valley in the province of Noord-Brabant (hotspot Dry rural areas). This case study will be selected together with the regional and local stakeholders. The main objective is to analyse the spatial claims associated with climate change proofing of water storage, agriculture, and nature, and to identify possible adaptation strategies. We will assess if and how these claims can be combined with current or future land use types. To that end, we will focus on multifunctional land use, including non-conventional land use combinations, thus providing innovative solutions for design, planning, governance and stakeholder participation in a 'Multilayer Brabant'.

2. Involvement of stakeholders

We will involve stakeholders at many levels and at all stages of the research: from the individual level (farmers and nature managers), and co-operations of individual stakeholders and companies (LTO and Natuurmonumenten; drinking water companies), to governmental institutions (Staatsbosbeheer, provinces,

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Netherlands Environmental Assessment Agency The Netherlands (PBL), and water boards / STOWA), to ministries (LNV, VROM, and V&W). Currently the following stakeholders have already expressed their interest in our proposal: the provinces of Zuid- Holland, Utrecht, Gelderland and Noord-Brabant, Water board Aa en Maas, and drinking water companies Brabant Water and Vitens, and the Ministry of Agriculture, Nature and Food Quality.

We will regularly organise meetings with stakeholders to have their input and discuss (interim) results. These meetings will be related to the research in each of the work packages and the individual projects. To keep things manageable (for the researchers as well as for the stakeholders) the meetings will be organised effectively, i.e. topics and themes will be combined as much as possible.

The research will be carried out in close co-operation with stakeholders as they are responsible for the hydrological modelling of the case study areas. Using distributed hydrological models, they will provide WP 3 with the hydrological variables necessary to forecast effects of climate change and adaptive measures. Individual stakeholders will also play a prominent role in the research since their opinions and attitudes will be a fundamental element of the scientific outcomes. Some of the identified attitudes and behaviours will be in line with what policy makers expect and hope, but other attitudes will not lead to sustainable adaptation, either for development of the decision maker him/herself, or from a social and/or environmental point of view. Other attitudes may be new to policy makers, and could become potential guidelines for innovative adaptation strategies. We will feed back the outcomes of individual stakeholder attitudes through their co-operations, so that the individual stakeholders can reflect on their attitudes and examine the consequences of their own decisions.

The outcomes will also be communicated to policy makers, to identify how policy is interpreted by local decision makers, what is the support for certain policies, and possibly also as a form of inspiration for formulating policy that connects to local, autonomous tendencies.

For each research project and case study a guidance committee will be established, consisting of (a selection of) representatives of the involved stakeholders. The research plan for each of the case studies will be discussed with these guidance committees. To ensure direct and regular communication between the researchers and the stakeholders, the committees will meet at least twice a year. In doing so, these stakeholders will stay informed during the research, have the opportunity to comment on the progress of the research, and will have access to (interim) results. A yearly integrated report for stakeholders will be published. This gives them the opportunity to have real interaction with the scientists and strengthens the cooperation between science and policy. Stakeholder involvement and knowledge dissemination will also be discussed with the steering committee that will be established for this research programme.

Furthermore, we will organize a number of workshops. These workshops focus on the involvement of a broader group of people (stakeholders, governments, interest organizations, citizen, etc.). These workshops will relate to the research programme in general and to the individual research projects. All of the research

projects focus on the situation in (one of) the case study areas. They will play an important role in the dissemination of the (interim) research results, in finding commitment for these results, and in testing their practical implementation possibilities. The number of workshops will depend on the detailed research plans, but it is expected that at least ten of such workshops will be organized.

Finally, several projects, such as projects 2.5 and 3.1, apply a participatory approach. Interviews will be held with farmers and nature managers, and workshops will be organized for cognitive mapping. Innovative techniques such as digital design tables (or map tables) will be used to design new policies based on a participatory approach. Inclusion of local nature and/or other 'amateur' organisations (for example urban-based groups that influence recreational provision etc. in rural areas) will be taken care of in due time, should these be identified as important by projects 2.5 and 3.1. The attitudes of these groups to adaptation might have significant consequences for rural landowners.

3. Knowledge transfer and valorisation

The practical applicability of the research results, i.e. contribution of the research to the development of measures and strategies for climate change adaptation is the first matter of importance. Therefore, the knowledge that will be generated in this research programme will be attuned to the needs and questions of stakeholders and hotspot representatives. In order to do so, these stakeholders and hotspot representatives will be involved in the research through their participation in guidance committees and workshops (see 4B). The knowledge institutes that are part of the consortium for this research programme have a long-standing experience in fundamental and applied research, and in working together with stakeholders. Through these knowledge institutes and through the extensive networks of the leading researchers, the research results will also be transferred to the scientific and professional community, nationally as well as internationally.

The researchers will assist stakeholders in translating research results to their specific conditions, and help them to design measures and strategies for climate change adaptation. They will also be available for answering concrete short-term questions on the basis of this research. Stakeholders will also be invited to participate in the research (contribution in kind). This will stimulate the exchange of knowledge and experience.

The research results will be published in international peer-reviewed journals as well as in Dutch professional journals, and they will be presented at (inter)national conferences. The knowledge obtained in this programme will also be used in education at the universities. This may also take the form of student workshops and practicals which focus on answering specific questions. The publications in Dutch professional journals aim at dissemination of the research results to the groups of professionals that work on planning, decision-making and implementation of climate change adaptation measures. We also aim at publishing in newspapers and newsmagazines for the general public.

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We will deliver a synthesis of adaptation options and strategies in response to climate change that reflects the diversity of biophysical and socio-economic contexts within the Netherlands. The synthesis will also draw parallels with the potential for adaptation in other parts of the world that will allow the Netherlands to learn from ongoing international initiatives.

At the end of the research programme we will organize an international conference to present and discuss the research results.