

Monitoring and evaluation of climate change impacts, vulnerability and adaptation policies at different spatial scales

Work package leader: dr. Rob Swart

Content

1	<i>Description work package</i>	1
1.1	Problem definition, aim and central research questions	1
1.2	Interdisciplinarity and coherence between the projects	2
1.3	Stakeholders	3
2	<i>Project 7.1 Monitoring and evaluation of climate change impacts, vulnerability and adaptation policies at different spatial scales</i>	4
2.1	Problem definition, aim and central research questions	4
2.2	Approach and methodology	4
2.3	Scientific deliverables and results	7
2.4	Integration of general research questions with hotspot-specific questions.....	7
2.5	Societal deliverables and results	8
2.6	Most important references	8

1 Description work package

1.1 Problem definition, aim and central research questions

Questions in Dutch parliament in 2005 triggered the preparation of a National Strategy “Making Space for Climate” which was published in 2007. The strategies in The Netherlands and other European countries were instrumental in putting the issue of climate change adaptation on the political agenda. They are generally rather abstract and have to be followed by more detailed implementation plans. In The Netherlands, as in other European countries, almost no attention was paid to the question of how to implement the strategies (e.g., instruments) and how to monitor and evaluate their effectiveness (Swart et al., 2009). At the European level, the Commission (Horrocks et al., 2009) and the EEA (Harley et al., 2009) initiated explorative work on vulnerability and adaptation indicators, respectively. In Germany, an effort is underway to systematically identify indicators for measuring progress for the various items in their national strategy, but this is not yet planned in The Netherlands. This project intends to fill this gap. Just like “climate neutrality” adopted as a goal by many municipalities and companies is not clearly defined, also the concept of “climate resilience” is not well defined. Evaluation mechanisms and indicators are required to operationalize such concepts, and allow for progress evaluation towards a final long-term goal of making the Netherlands climate–proof by 2050 at the latest. Methods and associated indicators are required that can be used to measure if a plan, program or project is climate proof, and if so, until when. Such evaluation methods and indicators could be integrated into existing tools, like Strategic Environmental Assessments (SEAs, PlanMERs), Environmental Impact Assessments (EIAs, MERs), the Water Test, or new tools like the climate guidance (“Klimaatwijzer”).

The objective of this project is to identify or develop instruments and indicators to monitor and evaluate the implementation of adaptation measures and the climate-robustness of plans, programs and projects, at different spatial scales and in different phases of the adaptation policy cycle.

The following research questions will be addressed:

- ▽ Which evaluation methods and associated indicators are available or can be developed to monitor and evaluate the implementation of adaptation measures and the climate-robustness of plans, programs and projects?
- ▽ How does the choice of methods and indicators depend on the scale of application, on time, and on the specific policy objectives?
- ▽ What is a coherent framework to structure evaluation methods and indicators in the broader context of sustainability?
- ▽ How can monitoring and evaluation methods and indicators of climate change adaptation and climate resilience best be integrated into existing monitoring programs?
- ▽ How can indicators be communicated and visualized, taking into account uncertainties (with Work Package 4)?

Addressing all aspects of all questions equally and at the same time combining long-term research objectives with short-term policy support activities will be beyond the scope of the project. Currently, national and regional strategies are in the early phases of development, and monitoring and evaluation questions are expected to increase in the years to come. Therefore the final focus in terms of key sectors will depend on the choice of case studies which will be determined in the first phases of the project in consultation with national and regional stakeholders - the expected emphasis will be on water management and spatial planning. Similarly, not to exclude options at the start of the project, also the choice of tools and indicators for further elaboration will be made in consultation with the stakeholders.

1.2 Interdisciplinarity and coherence between the projects

Policy-making applications and links with other sustainable development evaluation systems requires an interdisciplinary approach. The Work Package has various links with other research within and beyond KvK:

Links with the overall project

- ▽ Indicators included in WP4 (Visualization) will be coordinated with the WP7 set of indicators.
- ▽ Quantification of indicators for past and current developments depend on observations and statistics, for projections and scenario-based evaluation methods quantification depends on model calculations; the project will be coordinated with those Work Packages that develop such analytical tools.

Links with other KvK projects

- ▽ Quantification of indicators for evaluation of future options will depend on climate and impacts projections and associated uncertainties – collaboration with theme 6 has been agreed.

- ▽ A direct link has been established with the project Bouwstenen NAS which is developing and improving a set of practical analytical tools which could provide indicators useful for this project, notably the Climate Effect Atlas.
- ▽ Collaboration with other thematic projects has not been arranged at the time of writing of the proposal, but is not excluded if such projects would address indicator-related issues and coherence is required.

Links with other research

- ▽ The project will be coordinated with international projects in which team members will be involved, notably MEDIATION (a FP7 project on the development of an integrated methodology to assess impacts, vulnerability and adaptation options with a focus on methods and metrics).
- ▽ Coherence will be sought with ongoing work in this area by the European Environment Agency through the involvement of the PBL European Topic Centre on Air and Climate Change (ETC/.ACC).

1.3 Stakeholders

The Work Package addresses primarily a question posed to KvK by the interdepartmental Adaptation, Space and Climate program (ARK), led by the Ministry of Housing, Spatial Planning and Environment (VROM). Therefore, the emphasis will be on the development of evaluation methods and indicators in the context of the NAS, and the involvement of VROM during the implementation of the project has been ensured in advance. At the national level, in the coming years the Delta Program will be developed to make the Netherlands climate proof in terms of water safety and fresh water supply. In the first phase of the project, opportunities to include monitoring and evaluation methods and indicators related to this Program will be explored in close consultation with the stakeholders in the first year of the programme. The criteria for the indicators and the desires for the monitoring will be developed jointly with Haaglanden in joint cooperation and at least 4 consultations in the first years. For this purpose budget has been allocated to Haaglanden to really contribute to this exercise. Finally, involvement of stakeholders at the regional level will take place, notably in the KvK hotspots and interested provinces, such as Zuid Holland and Brabant, to mention just a few. Stakeholder involvement in the first year will facilitate the selection of case studies and narrow the scope of the project to those indicators and tools that best fit the questions from the stakeholders.

2 Project 7.1 Monitoring and evaluation of climate change impacts, vulnerability and adaptation policies at different spatial scales

Project leader: dr. Rob Swart

2.1 Problem definition, aim and central research questions

See Work package description above because there is only one project (Note for reviewers: this procedure has been agreed with KvK management).

2.2 Approach and methodology

Monitoring and evaluation can take place at various stages of the policy process, e.g. awareness raising, allocating resources, monitoring progress, or measuring effectiveness (see Figure 1). Choices of appropriate tools and indicators can be different for different objectives.

- ▽ *Raising awareness.* At the start of climate adaptation policy development, the urgency of the problem and the legitimacy of taking action have to be agreed with stakeholders. Here, the emphasis is likely to be on vulnerability indicators.
- ▽ *Allocating resources.* One possible objective of evaluation of vulnerability is to influence the allocation of resources. For this purpose both insight into potential impacts as well as adaptive capacity are important.
- ▽ *Monitoring progress.* When a national, regional or sectoral strategy has been agreed and is being implemented, the progress should be monitored, in order to allow for periodic revisions.
- ▽ *Measuring effectiveness.* Measuring effectiveness of adaptation options or strategies can be done ex post or ex ante. Ex post evaluation and monitoring can include policy realization indicators (have spatial reservations been made?) but also at least theoretically avoided impacts (has flood frequency indeed decreased?). Ex ante evaluation of possible options includes indicators describing the level of “climate proofness”.

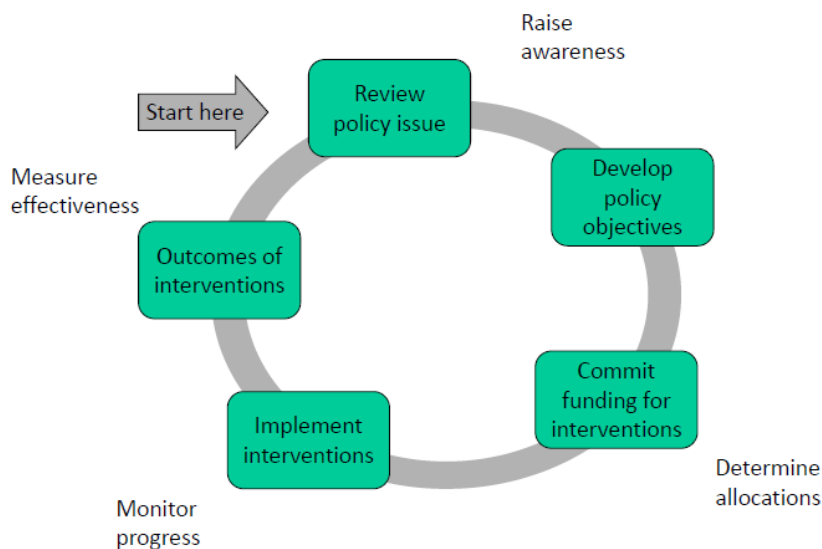


Figure 1: Typical policy cycle for regional adaptation strategies (Ribeiro et al., 2009)

In the first two stages, the emphasis will be on vulnerability, in the last two stages, the emphasis will be on the effectiveness of adaptation measures. For the former, factors that determine vulnerability will be distinguished, such as the level of exposure to climate change impacts, the sensitivity, and the adaptive capacity. Acknowledging the pitfalls of this IPCC-terminology and the problems with definitions and perceptions of such terms, as discussed by Hinkel et al. (2009), the tools and indicators will be developed for very specific questions rather than that a one-size-fits-all approach will be pursued. For adaptation measures, a distinction can be made between different kinds of adaptation options, such as building of adaptive capacity and delivery of adaptation actions (see Figure 2).

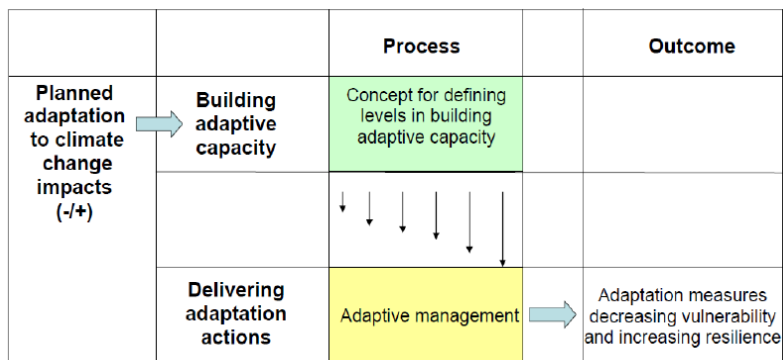


Figure 2: Different types of indicators and adaptation measures (Harley et al., 2009)

The project will be implemented in four step (Figure 3):

- ▽ Step 1: inventory of existing monitoring/evaluation tools, indicators and data through literature review;
- ▽ Step 2: inventory of policy processes in which the tools and indicators are to be used and analysis of demands related to particular applications;
- ▽ Step 3: development of methods and indicators in case study applications;
- ▽ Step 4: assessment of results in final report.

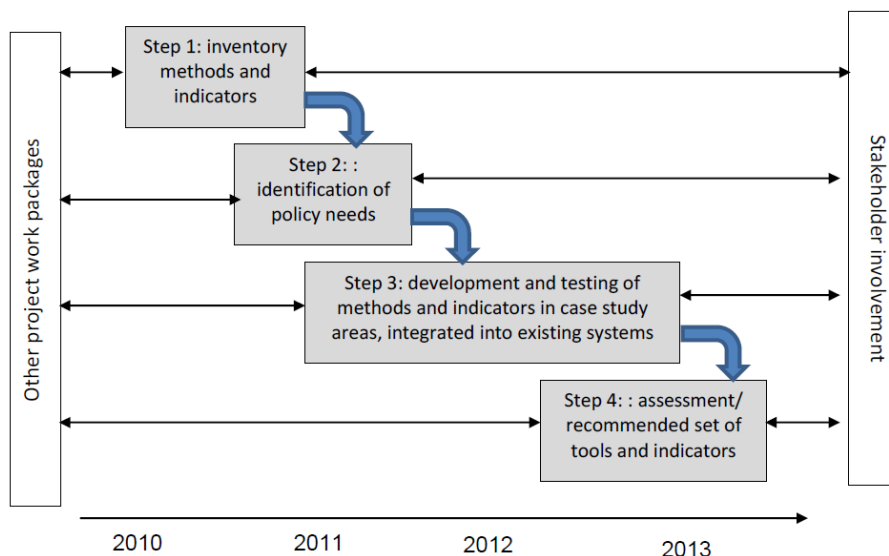


Figure 3: Project structure

Step 1: inventory of existing indicators, evaluation tools and data. In this step indicators and tools will be identified that can be used for monitoring and evaluating adaptation in the various phases of the policy process. Also the availability of relevant data will be explored, because at least initially monitoring should take place on the basis of available data. This step also addresses experiences in other countries particularly Germany¹, the United Kingdom, Finland and Spain. Also the relevance of evaluation tools and indicators in other policy areas will be explored, taking into account that many adaptation actions involve mainstreaming in other policy areas.

Step 2: inventory of policy processes. In this step the needs of the policy processes that are expected to use the indicators and evaluation tools will be identified, including the Dutch NAS, the Delta Program, and other (hotspots, provincial, municipal) adaptation planning processes. The emphasis will be on sectoral or thematic applications. In this step, a number of case studies will be identified, for example for national, regional, and sectoral applications. Also, from the very broad menu of possible options for monitoring and evaluation tools and indicators, in consultation with the stakeholders a selection of the most promising options will be made for further elaboration in the next steps of the project. Stakeholders meetings will be organized for this purpose. Stakeholders generally recognize the importance of monitoring and evaluation, particularly when adaptation strategies are in the implementation phase, but since this phase is generally not reached yet, opportunities will be sought to combine stakeholder consultations with other events in other Work Packages or projects. Initially, the Work Package will focus on the national level (ARK), and the Hotspots Haaglanden en Waddensea, If this would result not to be feasible, stakeholder consultations will be organized through visits and interviews.

Step 3: development of methods and indicators in case study applications. In this step, a set of evaluation tools and associated indicators will be developed and tested in the case study areas identified in step 2. The selection is likely to include two applications at the National Level (NAS and Delta Program) and two applications at the regional level (selected hotspots, contacts with Haaglanden and Waddensea have been established). The “Evaluation Framework” project (Leusink and Zanting, 2009), in which evaluation approaches for the national, provincial, regional, local and urban level are proposed, also influences the decisions in this step. Within these case studies, a selection of appropriate tools and indicators will be further elaborated.

Step 4: assessment of results in final report. In the final phase of the project, the lessons learned will be used to develop concrete sets of evaluation tools and indicators that can be used for different objectives at different administrative levels. The scientific underpinning will be described in a scientific report or dissertation, and complemented by more practical guidance for policy makers that will be made available through the KvK knowledge transfer activities.

Because this project requires immediate policy relevance, the project will be implemented through experienced professional staff at Alterra and the Netherlands Environmental Assessment Agency (PBL) rather than through a new PhD position. Knowledge, generated by the PBL project “Indicators for the deltaprogramme” and PBL- ETC work on indicators will be used within the analysis. Intermediate and final results will be presented at (inter-)national scientific meetings, in scientific papers, and, in parallel,

discussed with policymakers and other stakeholders during workshops and other meetings, some of which may be specifically organized for this project, while the project will make use of opportunities provided by ongoing KvK events. The possibility of an “on the job” PhD will be determined later.

¹ German report to COP15: “ To get information on the implementation of adaptation projects, policies and their effectiveness, the Federal Government in cooperation with the Federal States is developing a national set of adaptation indicators in accordance to the indicator system of the European Union. This indicator system will serve as a basis for an indicator based progress report of the German Adaptation Strategy beginning in 2011. It will cover the wide range of issues in the 14 sectors of the Strategy and highlights the causeeffect- relationships of climate change, impacts and adaptation measures. At first the indicators will be based on existing data. Step by step the Federal Government will improve the indicator set to a more comprehensive approach.” (UNFCCC, 2009)

2.3 Scientific deliverables and results

1. 8 months after start of project: informal note on selection of case studies and associated tools and indicators for monitoring and evaluation, based on initial literature review, stakeholder consultations and development in the overall project.
2. 12 months after start project: paper with a critical analysis of existing monitoring and evaluation tools and indicators. Provides an overview of national and international monitoring and evaluation tools and methods that can inform and broaden the debate on evaluating climate adaptation options or the level of climate resilience of projects, plans and programs.
3. 18 months after start project: paper on an analysis of the policy processes in which the tools and indicators are to be used and analysis of demands related to particular applications.
4. 24-36 months after start project: 2-4 papers on the testing of methods and indicators in specific case study applications.
5. 48 months after start project: final scientific report/dissertation.
6. 48 months after start project: final policy recommendations for monitoring and evaluation tools and indicators.
7. Throughout the project: ad hoc support to national and regional discussions on the development of indicators and evaluation tools.

2.4 Integration of general research questions with hotspot-specific questions

The research questions in this Work Package primarily address questions posed to the KvK program by the Adaptation, Space and Climate interdepartmental group (ARK) in the context of the development and implementation of the NAS. Four hotspots (dry rural areas, major rivers, Haaglanden region, and shallow waters and peat meadow areas) have expressed interest in support from the theme 8 project. Mainly because these hotspots are yet at the stage of preparing the ground for the development of regional adaptation strategies, they have not yet asked questions regarding evaluation and monitoring. However, it can be expected that in the course of the next four years as the options for regional adaptation strategies (ORAS) emerge, also questions regarding the implementation of those strategies should develop, and at that time the preparatory work will have been done in this project, guided by the NAS and stakeholder meetings with hotspots in the first stages of the project.

2.5 Societal deliverables and results

Throughout the project's lifetime, support will be provided to ongoing policy processes when and where needed and feasible. Nationally, a link will be established with the implementation of the NAS, which requires to "actively monitor the adaptation process", e.g. through the "Klimaatwijzer", the toolbox to be developed in the KvK "NAS Building blocks" project and the visualization component of the current proposal. Following the NAS, the WP will specifically address, but not be limited to spatial planning and the water sector. The results will also be made relevant for other national initiatives such as the Deltaprogram, which requires "sustainability, equity and flexibility" indicators for integrated environmental planning. In addition, the results are intended to be useful for evaluation and monitoring at regional levels. Monitoring and evaluation is essential for measuring progress towards reaching long-term climate resilience goals. In the final stages of the project, results will be disseminated through the KvK Knowledge Transfer program and other means available at that time. The WP will also be coordinated with international initiatives to develop monitoring tools to support the implementation and periodic revision of adaptation plans: both in neighbouring countries (e.g., UBA) and in Europe (EEA). An Advisory Committee will be established (ARK, relevant other KvK and KvR projects, other relevant stakeholders).

2.6 Most important references

1. European Environment Agency, 2008. Impacts of Europe's changing climate - 2008 indicator-based assessment. EEA Report No 4/2008, EEA Copenhagen
2. Harley, M., L. Horrocks, N. Hodgson and J. van Minnen, 2009. Climate change vulnerability and adaptation indicators. ETCACC Technical Paper 2008/9, EEA-ETC/ACC
3. Hinkel, J., S. Bisaro, T. Downing, M.E. Hofmann, K. Lonsdale, D. Mcevoy, J.D. Tabara, 2009: Learning to adapt. Narratives of decision makers adapting to climate change. In: Making Climate Change Work for Us: European Perspectives on Adaptation and Mitigation Strategies, M. Hulme and H. Neufeldt (Eds.), Cambridge University
4. Horrocks, L. et al., Climate change vulnerability indicators. EU project report (in preparation)
5. Leusink, A. and H.A. Zanting, 2009. Naar een afwegingskader voor een klimaatbestendig Nederland. Samenvatting voor bestuurders. Routeplanner project (in Dutch)
6. Ribeiro, M.M. C. Losenno, T. Dworak, E. Massey and R. Swart, 2009. Design of guidelines for the elaboration of Regional Climate Change Adaptations Strategies. Final Report, Ecologic/European Commission
7. Sullivan, C.A. and C. Huntingford, 2009. Water Resources, climate change and human vulnerability. 18th World IMACS/MODSIM Congress, Cairns, Australia
8. Swart, R.J., Biesbroek, G.R., Binnerup, S. Carter, T.R., Cowan, C., Henrichs, T., Loquen, S., Mela, H., Morecroft, M.D., Reese, M., and D. Rey, 2009. „Europe Adapts to Climate Change: Comparing National Adaptation Strategies. (no. 01/2009). Partnership for European Environmental Research (PEER), Helsinki, pp 160

9. UNECE, 2009. Guidance on water and climate adaptation. Convention of the Protection and Use of Transboundary Watercourses and International Lakes, Protocol on Water and Health, Task Force on Water and Climate, Geneva
10. UNFCCC, 2009. Efforts undertaken to monitor and evaluate the implementation of adaptation projects, policies and programs and the costs and effectiveness of completed projects, policies and programs, and views on lessons learned, good practices, gaps and needs. SBSTA, Thirty-first session, Copenhagen, 7-18 December 2009
11. VROM, 2009. Klimaatwijzer (in preparation)