



Project information

Assessing an IPCC assessment: An analysis of statements on projected regional impacts in the 2007 report

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Date 2012-10-15

General comments on the project 'Assessing an IPCC Assessment'

- In January 2010, the Dutch Parliament asked Jacqueline Cramer, the then Dutch Minister of Environment, for an investigation into the implications of errors reported by the media in specific parts of the Fourth Assessment Report of the IPCC (2007).
- Subsequently, the minister asked PBL in February 2010 to make an assessment of the reliability of the regional chapters (9 to 16) of the IPCC Working Group II contribution to the Fourth Assessment Report (the part on Impacts, Adaptation and Vulnerability), and to assess the effects of any errors on the summary conclusions drawn by the IPCC.
- From the outset it was clear that PBL would not be able to repeat the original IPCC Working Group II assessment, given the sheer volume of the scientific work reported in the IPCC exercise. What we were able to do, however, was investigate the extent to which the IPCC in their summaries had presented existing scientific knowledge to the world of policymakers, in a way that was supported by the underlying texts and scientific references. What is more, we also investigated what could be learned from our findings so that informed choices could be made in future assessments.
- For several months, a special PBL team worked assiduously on this project.
- This does not represent a typical PBL activity, but may be seen as a specific example of quality control of scientific research carried out by the institute. PBL scientists had contributed to the Working Group II report (and were also responsible for one of the errors in the report). Therefore, PBL was faced with the challenge of carrying out this quality control without repeating the original work of Working Group II, in a respectful way towards the IPCC, and at the same time dispelling suspicions of this being a PBL 'white-wash' operation.

Information about the project itself

- *Time frame of the project*

February 2010 – July 2010

- *Project structure, sub-activities, and project management*

A project group of 13 PBL researchers and a former PBL employee with experience in the IPCC (Dr Rob Swart, WUR) was formed in February 2010, under the direction of Dr Leo Meyer (project leader) and Professor Arthur Petersen (deputy project leader).

The following sub-projects were executed:

1. Brief re-assessment of the literature on the melting of Himalayan glaciers;

2. Analysis of the eight selected IPCC AR4 WG II chapters (on the regional impacts of climate change), including input from public registration website for possible errors; and
3. Preparation of parliamentary briefing on the IPCC process and the role of the Netherlands in this intergovernmental organisation.

A steering group headed by PBL director Professor Maarten Hajer was actively involved in making the major decisions. Besides the director and the project leaders Leo Meyer and Arthur Petersen, this steering group included PBL's head of the department of climate, air and energy (then Mr. Joop Oude Lohuis), the head of the office of communication and management support (first Ms. Gerda de Lange, later Ms. Jacqueline Timmerhuis), and a researcher from an unrelated PBL department with the role of critical outsider (Dr Edwin Buitelaar).

The IPCC authors of the regional chapters of the Working Group II Report were invited to comment on the draft findings, and in their communication the project group and IPCC authors went through several detailed iterations. In some cases, PBL also contacted the authors of cited references.

The draft of the report was reviewed by selected internal and external, national and international experts. Moreover, this project has been conducted under the independent supervision of the Royal Netherlands Academy of Arts and Sciences (KNAW), at the request of the minister of Environment. The KNAW has reported back to the minister concluding at the end of the project that "the PBL had based its assessment on sound scientific principles. The Academy also observed that the PBL's analysis had refined and added depth to the IPCC's report. Its work represented an improvement on the original IPCC report. The PBL's findings also found their way into the IPCC review conducted in 2010 at the request of the United Nations." The last sentence refers to the review of the InterAcademy Council of the IPCC processes and procedures that was published in August 2010.

- *Researchers involved in the project*

Besides the project leaders, the following PBL researchers were involved in the execution of the project: Dr Rob Alkemade, Mr. Michel Bakkenes, Mr. Gert Jan van den Born, Dr Lex Bouwman, Dr Hans van Grinsven, Dr Henk Hilderink, Dr Peter Janssen, Mr. Willem Ligtvoet, Mr. Ton Manders, Dr Jelle van Minnen, Dr Hans Visser, Ms. Marijke Vonk, Ms. Martine de Vos. From Wageningen University and Research centre, Dr Rob Swart was involved.

The following people acted as reviewers:

PBL internal (besides steering group): Mr. Tom Kram, Dr Jos Olivier, Dr Otto Raspe, Dr Detlef van Vuuren and Dr Anet Wetering (internal);

National (besides KNAW): Professor Frans Berkhout (VU University Amsterdam), Dr Jeroen van der Sluijs (Utrecht University), Professor Rik Leemans (Wageningen University), and Dr Hein Haak (Royal Netherlands Meteorological Institute, KNMI);

International (besides IPCC): Professor Mike Hulme (University of East Anglia) and Professor Steve Rayner (University of Oxford).

KNAW supervisory committee: Professor Rudi Rabbinge, chair (Wageningen University & Research Centre), Professor J. Bouma (Wageningen University &

Research Centre), Professor R.P. Griessen (Free University Amsterdam), Professor Peter Nijkamp (Free University Amsterdam), Professor Henry Hooghiemstra (University of Amsterdam), and Secretary Dr. Wim de Haas, head of the Advisory and Foresight Department, Academy Bureau.

- *Researchers' experience with working at the science-policy interface*

Of the 17 researchers involved (including project leaders) about half had considerable experience in providing scientific advice to policymakers. The other half had considerable research experience in a science-policy interface organisation. In the project leadership, much experience was present with the IPCC.

Leo Meyer had been involved with the IPCC since the mid-1990s when he still worked at the Ministry of the Environment (VROM) as a government representative in the IPCC Bureau before he joined PBL as Head of the IPCC WG III Technical Support Unit between 2002–2007. In his career he has built up experience in the science-policy interface as an advisor to the Ministry of Economic Affairs on Energy between 1984 and 1992 and later as funder of policy-relevant climate research and science advisor at the Ministry of Environment between 1992 and 2002. He has led a PBL assessment project 'News in climate science' in the lead-up to the Copenhagen summit in 2009 on request of the Minister of Environment.

Arthur Petersen had been involved in plenary sessions of the IPCC since 2001, had been responsible for PBL's methodology of science-policy interface work as director of the methodology and modelling programme since 2003 and had written a (2nd) dissertation on (dealing with computer-simulation uncertainty at) the science-policy interface in 2006.

- *Resources (money, facilities)*

In total 3,737 hours (3 fte year) were spent (amounting to about 400,000 euro in personnel costs). In addition, a material budget of about 40,000 euro was used.

- *Possible collaborations with other research institutes*

The assessment was done under sole responsibility of PBL, but researchers from other institutes were involved (e.g. KNMI, WUR, see above under researchers involved in the project).

- *Method(s) of integrating knowledge from different sources*

The whole project was about how to best integrate knowledge from different sources. It has built upon the many years of experience available at PBL in assessing environmental information in a way that is both scientifically robust and relevant to policy makers. The IPCC is a prime example of how this can be done and in the project, PBL has aimed to make some criteria of assessment explicit (see the report).

The project implemented assessing the scientific quality of an assessment as an evaluation on a meta-level. That means the solidity of underpinning

evidence of conclusions in the IPCC report has been checked. A classification system for the degree of underpinning by scientific evidence was set up and used for evaluation of the conclusions in the working group II report.

- *Which models were used (and why)?*

There were no specific models used, but a method for meta-evaluation of scientific conclusions.

- *Which methodological difficulties were encountered?*

Methodologically, there were some exciting discussions on what level of transparency can be maximally expected from IPCC assessments (and what is the nature of 'expert judgment') and on making a fundamental distinction between errors and shortcomings. Subsequently, we had intensive discussions on what could be considered as an error or just as an insufficiently founded conclusion (i.e., a shortcoming).

- *What were the main research findings?*

Overall the IPCC summary conclusions of the Fourth Assessment Report of 2007 on projected regional climate-change impacts were considered well founded and none were found to contain any significant errors.

The Working Group II contribution to the Fourth Assessment Report shows ample observational evidence of regional climate-change impacts, which have been projected to pose substantial risks to most parts of the world, under increasing temperatures. However, in some instances the foundations for the summary statements are not that solid and should at the least have been made more transparent. While acknowledging the essential role of expert judgment in scientific assessments, the PBL recommends improving the transparency of these judgments in future IPCC reports.

In addition, the investigated summary conclusions tend to single out the most important negative impacts of climate change. Although this approach was implicitly agreed to by the IPCC governments for the Fourth Assessment Report, the PBL recommends that the full spectrum of regional impacts is summarised for the Fifth Assessment Report, including positive impacts and the uncertainties. The PBL believes that the IPCC should invest more in quality control in order to prevent mistakes and shortcomings, to the extent possible.

- *What were the conclusions from the project evaluation?*

Most members of the project team were quite happy with the end result and the public reception of the double message (no, we did not find errors which undermine the main conclusions; yes, we have some critical comments and recommendations for improvement of the IPCC assessment process). Nobody had ever done a project like this – assessing an IPCC assessment, under severe time constraints and without a ready-to-use methodology. So it was a lot 'learning by doing'. This meant that not all work that was done ultimately fed into the final report; so with hindsight the project could perhaps have been run a bit more efficiently. Furthermore, the editors (Leo Meyer and Arthur Petersen) put much effort in editing texts that had been produced by project

team members and they had to make some tough calls on the categorisation of errors and/or critical comments, which were not always shared by the project team members (in cases, for instance, where a project team member found that a comment should be made and the editors were not fully convinced of the evidence for that). Some project team members thought that PBL had been too nice for the IPCC, while most thought that PBL had been fair. But all project team members recognised that the project was a test case for the PBL and valued the rigorous way the project was managed.

A complication in this project was that the PBL director wanted to have the report simultaneously in Dutch and English, which was an organisational challenge to get this done properly within the deadlines.

The involvement of and constructive communication with the IPCC authors and officials was found to be difficult. Not everybody within IPCC appreciated this exercise and took a long time and a lot of effort to get working in the end.

Information that is relevant for evaluating the societal quality of the research

- *Motivation for the activity*

The then Minister for the Environment, Jacqueline Cramer, commissioned PBL to analyse the implications of errors found in the Fourth Assessment Report of the IPCC, and check the reliability of the contribution by Working Group II to this report. Parliament had asked the Minister to investigate the implications of errors found in the report, which had been publicised in the media. Parliament discussed the IPCC report on January 28th 2010.

- *Target audiences, interested parties, client(s) and knowledge demand by the client(s)*

Primarily, the then Minister of Environment. In general, policymakers, politicians, the general public, and scientists; both national and international. In particular, recommendations were meant for policymakers, officials and scientists involved in the IPCC.

- *To what extent and for which purpose has interaction with the client and target audiences taken place?*

The interactions with the target audiences has been kept to a minimum during the project, in order to avoid any leakage before PBL had finalised its judgments and framing of the conclusions. There have been some contacts with high-ranking civil servants at the ministry of Environment on the exact timing of the publication. There were iterative interactions with IPCC authors regarding the project's findings, which were necessary to reach a better understanding of the reasoning behind expert judgments.

The PBL did launch a public website that would be available for the course of one month, in order to give all experts in the Netherlands the opportunity to contribute to PBL's investigation. PBL asked for submissions of possible errors found in regional chapters of the Working Group II Report. By the end of that month, the PBL had registered 40 submissions; however, most of them were

about issues related to the Working Group I Report. Two submissions qualified to be addressed in the report. All submissions and PBL's responses have been published on the PBL website at the moment of the release of the report.

- *The various products of the project; their availability (e.g. from the website) and the language of publication(s); the number of hard copies of publications; (possibly:) popularising publications to present research findings to a wider audience*

The report was available in both Dutch and English on the date of publication (July 5th 2010) from the website. About 300 hard copies were printed of the Dutch edition and about 200 hard copies were printed of the English edition. The report was presented to both national and international press. Among the international media, *The Economist* and *Nature* had received a copy under embargo a few days before the release.

- *How research findings and conclusions were communicated to the client and whether or not recommendations to policymakers and other target audiences were made*

The report was presented to the Minister and a press conference was organised to present the main conclusions of the assessment. The report included recommendations for improvement of the IPCC assessment process.

PBL was also invited to a hearing on the IPCC held by the parliament during the project.

- *References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an impression of how products were valued by clients, target audience(s) and other stakeholders ('impact monitoring data');*

All major newspapers and TV stations in the Netherlands, but also many internationally (including *The Economist*, *The Guardian*, *BBC*, *Time*, *The New York Times*, *Le Monde*, *The Wall Street Journal*) featured the report.

In the general societal domain, the report was referenced 149 times (103 unique references, that is, from different websites). The InterAcademy Council made 5 references to the study in their 'Review of Processes and Procedures of the IPCC' (August 2010).

Although the study started with doubts by some Members of Parliament about a sufficiently independent position of PBL to be able to perform the study, the results have not been criticised in parliamentary debates, also not by these Members of Parliament.

- *Possible follow-up activities that emerged as a result of this project*

For the IPCC: The findings and recommendations of the PBL report have been used as an input for the review by the InterAcademy Council, that was available by late August 2010, which focused on procedural and process issues of the IPCC. A number of conclusions and recommendations by PBL concern

the set-up of the procedures and processes of the IPCC. IPCC has adopted most recommendations of the InterAcademy Council.

For the PBL: The problems found in IPCC reports could also be found in PBL reports. Therefore, PBL has a Chief Scientist for 0.4 fte since January 1st 2011, Arthur Petersen, whose special assignment it is to see whether the system of procedures and standards that have been worked out for quality control works, that is, whether the norms are adhered to and/or need to be changed. He also facilitates internal and external discussions on contentious scientific issues and supposed biases towards particular scientific views. He acts as senior advisor to the Directors, with access to both the Management Team and the Directors Team. Arthur Petersen is Deputy Head of the Department of Information, Data and Methodology, which makes it possible to directly enlist staff for assistance in Chief Scientist tasks. One of the projects in which methodological follow-up is taking place is a multi-year strategic research project titled "Open Assessment Methodology".

Information that is relevant for evaluating the scientific quality of the research

With regard to the publication(s) about this project

- *Which publication(s) have been produced?*

The project itself delivered an evaluation report in Dutch and English on July 5th 2010.

English title: "Assessing an IPCC assessment: An analysis of statements on projected regional impacts in the 2007 report"

Dutch title: "Evaluatie van een IPCC-klimaatrapport: Een analyse van conclusies over de mogelijke regionale gevolgen van klimaatverandering"

- *Which publication(s) are/is peer reviewed, which are/is not?*

The product itself underwent peer review, both by the IPCC authors scrutinised and by external peers (see under 'Researchers involved in the project').

In the PBL's strategic research project "Open Assessment Methodology" a peer-reviewed journal publication was prepared about the methodology of the project.

Reference: Bart Strengers, Leo Meyer, Arthur Petersen, Maarten Hajer, Detlef van Vuuren, and Peter Janssen, "Opening up scientific assessments for policy: The importance of transparency in expert judgements", *Science and Public Policy*, in press.

- *How many references to these publications have been made in scientific literature?*

The report itself was referenced about 30 times in scholarly publications. The methodological publication is still in press.

- *Which presentations of the research findings were held for a scientific audience, for example at conferences?*

Maarten Hajer (director of PBL), Arthur Petersen and Leo Meyer have integrated the research findings in numerous presentations for scientific audiences.

- *Is the publication the result of collaboration with other research institutes? If so, what is the scientific ranking of these institutes?*

No other scientific institutes have really contributed to the assessment, but they have been involved in quality control and they have been asked to deliver scientific evidence in some cases.

- *How does the publication deal with methodological questions and uncertainties?*

Methodological questions are dealt with in the chapter on methodology in the report.

First of all, PBL researchers dealt with the question what errors were found in the report and whether these errors would affect the content of the IPCC's key statements on regional climate-change impacts, and then, whether these key statements would meet seven quality criteria formulated by the PBL.

Apart from a typology of errors, that could be corrected either in an erratum or through reassessment, PBL distinguished between seven types of qualifications or comments that would signify the quality of a statement. The typology of errors and qualifications ('comments') was reached through an inductive process – the results from which are outlined in the corresponding section of the report. A distinction was made between 'major' and 'minor' errors or comments. Issues were labelled to be 'major' when we judged them to have a significant quantitative impact on statements pertaining to food, water, ecosystems, coastal areas, and health.

With regard to individual researchers, what is:

- *Their position within research networks (possible university affiliations)*
- *Their scientific background (Ph.D. or other title) and membership of scientific groups, advisory committees, etc.*

The report's main editors, Dr Leo Meyer and Professor Arthur Petersen, both hold PhDs. Leo Meyer has experience in scientific assessment; he was energy and climate science advisor to and in Dutch ministries, has run IPCC WG III's Technical Support Unit, published a PBL assessment 'News in climate science and exploring boundaries' in the run-up to the UNFCCC Copenhagen Conference, and is currently the head of the Technical Support Unit of the Synthesis Report of the Fifth Assessment of the IPCC. Arthur Petersen has been a Visiting Professor at the London School of Economics and Political and a Research Affiliate at the Massachusetts Institute of Technology since 2009. In January 2011, he became PBL's Chief Scientist. In April 2011, he also became Special Professor of Science and Environmental Public Policy at the VU University Amsterdam.

- *Their Hirsch index score:*
Hirsch indexes (SCOPUS and ISI): Leo Meyer: 0; Arthur Petersen: 9



Project information

Climate Adaptation in the Dutch Delta

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Date 2012-10-15

Information about the project itself

General remarks about the project

- In 2008 the PBL Netherlands Environmental Assessment Agency was asked by the Ministry of Public Housing, Spatial Planning and the Environment (VROM) to investigate options for climate-proofing spatial development in the Netherlands. The request of VROM was to execute the study in collaboration with the research programmes 'Climate changes spatial planning' and 'Knowledge for Climate', both funded by the Dutch government.
- In September 2009 the 2nd Delta committee published its advice on long-term adaptation challenges for the Netherlands (Delta committee 2009) and following this advice in 2010 the Dutch Delta Programme was established. The Delta Programme is led by the Delta commissioner and he is responsible for developing a long term strategy on flood protection, water supplies and climate proofing (re)development of urban areas (see for further information Appendix 1).
- In 2010, after elections a new government was established with new ministries. The Ministry of Public Housing, Spatial Planning and the Environment was discontinued, and a new Ministry of Infrastructure and the Environment was established, hosting the new Delta Programme as well.
- After these changes, in the period 2010 - 2011 the client of the PBL project remained unclear for a long time since the original client was discontinued and the Delta Programme was in the phase of organising itself, starting up its own research process and exploring future challenges involving the various departments, provinces, water boards, municipalities and NGOs. The PBL study, already focusing on solutions, i.e. strategic options for climate proofing the Netherlands with respect to flood risks, fresh water supplies, nature and urban development, was seen as a competing research process rather than a potentially supportive one.
- This uncomfortable situation hampered the project execution and was a burden in the communication between PBL, Ministry and Delta Programme. Only by June 2011 a solution was found and it was decided that the PBL study presenting strategic options would be published at the same time as the publication of the Delta Programme 2012 in September 2011. The strategic options of PBL thus could provide a start for further discussions in the Deltaprogramme on the development of an adaptive strategy for the Netherlands.
- The *interface challenges* of this PBL project thus encompassed:
 - a *policy challenge*: to keep an open communication line with the Delta Programme, organise an interaction process in order to exchange information and ideas, reposition the project in the Delta Programme process and create for both parties an interesting content and timing of publication of the PBL

report;

- *a scientific challenge*: to keep the researchers and institutes in the various supporting research lines involved, motivated and focused on the required outcome and eventually integrate the research results into one report.

1. Introduction

- *Outline of the aims and purposes of the project:*

In 2008 the PBL Netherlands Environmental Assessment Agency was asked by the Ministry of Infrastructure and the Environment to investigate options for climate-proofing spatial development in the Netherlands. The project was split up into two phases. In the first phase the main challenges for adapting to climate change were identified, and the types of policies needed to tackle these challenges were indicated (publications 2009). Based on the results of the first phase 2008-2009, strategic options for climate-proofing the Netherlands were further elaborated in the second phase 2009-2011 (publications 2011, 2012).

- *Time frame of the project*

September 2008 – September 2011

- *Project structure, sub-activities, and project management*

Two supervisors of management team (Heads of sector WLV G. de Hollander and ROL R. van der Wouden)

Project leader W. Ligetvoet/ N. Pieterse + deputy project leader M. Vonk.

PBL project team of 8 persons, encompassing the most relevant domains:

- J.G. van Minnen - Climate change
- G.J. van den Born - Agriculture
- J. Knoop - Water – Flood risks, water availability, dealing with uncertainties
- L. van Bree - Health
- M. Vonk - Nature
- N. Pieterse - Urban development
- L. Pols – Spatial development and design
- J. Tennekes – Governance
- A. Sedee (KvK) - Interfacing Research programs KvK (Knowledge for Climate) and RvK (Climate changes Spatial Planning)

Project management

- Two weekly project meetings
- Regular workshops with Management Team
- Scientific Workshop November 2010

Frequent Knowledge exchange with contributing institutes

Interfacing with ministries and the Delta programme through workshops

Sub-activities

Background studies were executed on:

- Flood risks and water supplies: Deltares
- Agriculture and nature: WUR/Alterra within KvK/RvK covenant
- Urban development – Deltares/UNESCO-IHE within KvK/RvK covenant
- Governance and legislative challenges – WUR/UU within KvK/RvK covenant
- Update of 'Climate Change Impacts in the Netherlands'

Background study on flood risks and water supplies was financed by PBL; the other studies were co-financed by the research programmes Climate Changes Spatial planning (RvK) and Knowledge for Climate (KvK).

Members of the PBL project team were responsible for the interfacing between PBL and the research institutes working on the various topics:

- J. Knoop & R. Franken: Flood risks and water supplies: Deltares
- G.J vd Born: Agriculture and nature: WUR/Alterra within KvK/RvK covenant
- N. Pieterse & L. van Bree: Urban development – Deltares/UNESCO-IHE within KvK/RvK covenant
- L. van Bree: Health – Utrecht University, Maastricht University
- J. Tennekes: Governance and legislative challenges – WUR/UU within KvK/RvK covenant
- J. van Minnen: Update of 'Climate change Impacts in the Netherlands'

- *Researchers involved in the project*

- PBL: MSc. W. Ligtoet, PhD. N. Pieterse, MSc. M. Vonk, MSc. G.J vd. Born, MSc. J. Knoop, PhD. L. van Bree, MSc. J. Tennekes, MSc L. Pols, PhD. J. van Minnen, MSc. F. Kragt, MSc. M. Reudink, MSc. A. Ruijs, MSc R. Franken, MSc O.J. van Gerwen.
- Deltares: PhD. F. Klijn, PhD. R van Beek, PhD. K. de Bruijn, PhD. J. Kwadijk, professor F. v.d. Ven, MSc. J. Huinink, PhD. K. Stone; PhD A. ter Linde
- Utrecht University: professor P. Driessen, PhD. A. de Gier, PhD S. Meijerink, PhD. H. van Rijswick, Professor J. van der Sluijs
- Wageningen University and Research Centre: PhD. C.C. Vos, MSc. K. van de Sandt; MSc. H. Goosen, PhD. B. Schueler, professor C. Termeer, PhD. J. Verhagen
- UNESCO IHE: professor C. Zevenbergen, MSc. E. van Nieuwkerk, MSc. W. Veerbeek J. Rijke, S. van Herk
- KNMI : PhD. J. Bessembinder, PhD. C. Katsman, PhD. A. Klein Tank, PhD. G-J. van Oldenborgh, PhD. G. van Schrier, PhD R. Sluijter
- Maastricht University: PhD. M. Heijnen

- *Researchers' experience with working at the science-policy interface*

Highly experienced: project leaders and PBL researchers.

- *Resources (money, facilities)*

2009-2011 total project budget 2.8m euros

- PBL: 1.4 M euros
- KvK/RvK: 1.4 M euros

Collaboration with other research institutes

Collaboration with:

- Deltares
- Wageningen university and research Centre
- Utrecht University
- Maastricht University
- UNESCO-IHE
- KNMI
- research program RvK = Climate Changes Spatial Planning
- research program KvK = Knowledge for Climate

1.2 Methodological aspects

- *Method(s) of integrating knowledge from different sources*

Integration was restricted, analysing adaptive strategies for different sectors (flood risks, water supplies, nature, urban areas).

Integration between the sectors mentioned and the policy and legal aspects was realised by analysing the governance and legal aspects of the technical and spatial measures considered.

- *Which models were used (and why)?*

Flood risks: Deltamodel - HIS module of Deltares estimating economic losses and deaths of flood scenarios

Water availability and drought risks: Deltamodel of Deltares.

Spatial developments: Ruimte-scanner of PBL – exploring future spatial developments in the Netherlands. Only results of earlier studies were used (Netherlands in the Future – PBL, 2007/2008)

- *Which methodological difficulties were encountered?*

- Inventory of costs and effects of potential measures in the various domains, especially urban and rural areas
- Spatial integration of background studies
- Integration of background studies on the physical environment and governance challenges
- Overall Societal Cost Benefit analysis

1.3 What were the main research findings?

Key messages of the report Climate Adaptation in the Dutch Delta:

- Unbreachable dykes and managing spatial development in the Rhine-Meuse floodplain will make the Netherlands safer and more climate-resilient.
- Climate-proofing freshwater supplies will require a more flexible water system and better use of the water in the Rhine.
- Climate-proofing ecosystems and biodiversity will require revising the strategy behind the National Ecological Network.
- Implementation of climate-proofing measures in urban development today may considerably reduce costs for tomorrow.

- A clear division of responsibilities between central government and other parties.

See **Appendix 1** for detailed messages.

- *What were the conclusions from the project evaluation?*

Still to be presented

2. Information that is relevant for evaluating the societal quality of the research

2.1 Motivation for the activity

Request in 2008 from former Ministry of VROM (Public Housing, Spatial development and Environment) which, from 2006-2010 coordinated the development of the national adaptation strategy.

First phase of the project was a scoping study 2008-2009: Roadmap to a climate-proof Netherlands. In this study the follow-up study 2009-2011 was defined.

In 2010, the Delta Programme was established (See information Appendix 1) and after the elections new Ministries were formed. This meant that PBL's primary client changed. It took quite some time to come to an agreement about the position of PBL's study in the new ministerial and Delta Programme setting. Various meetings at director level were required and eventually the study was coupled with the publication of the Delta Programme 2012, published in September 2011. In the Delta Programme 2012 the PBL study was announced as 'relevant developments' and the first results were mentioned:

http://www.deltacommissaris.nl/english/Images/11%23094%20Deltaprogramma%202012_EN_def%20internet_tcm310-307583.pdf

2.2 Target audiences, interested parties, client(s) and knowledge demand by the client(s)

Target audiences: government, ministries, provinces, water boards, municipalities, NGOs, commercial sectors (agriculture, building community etc.)

Primary client: Ministry of VROM, after 2010, the Delta programme (within the Ministry of Infrastructure and the Environment).

Knowledge demand:

- spatial consequences of climate adaptation,
- options for adaptation within the context of adaptive strategy,
- integration of knowledge from research programmes Climate Changes Spatial Planning (RvK) and Knowledge for Climate (KvK)

2.3 To what extent and for which purpose has interaction with the client and target audiences taken place?

2009-2010 – regular meetings of the PBL project management and project team with representatives of (former) ministries VROM, LNV (Agriculture, Nature and Food Security), V&W (Public works and Water Management); IPO (Inter Provincial Coordination), UvW (Union of Water boards)

2010-2011 – regular meetings of the project management and the project team with programme directors of the Delta programme (flood risks, water supplies, urban development)

2010-2011 – workshops with various audiences around background studies.

2.4 The various products of the project; their availability (e.g. from the website) and the language of publication(s)

Main report 2011:

Een delta in beweging – Bouwstenen voor een klimaatbestendige ontwikkeling van Nederland (2011)

Dutch; number of hard copies: 750 (sold out by now).

Available on PBL website:

<http://www.pbl.nl/publicaties/2011/een-delta-in-beweging-bouwstenen-voor-een-klimaatbestendige-ontwikkeling-van-nederland>

English Summary 2011:

Climate adaptation in the Dutch delta – Strategic options for a climate-proof development of the Netherlands

English; number of hard copies: 750 (280 left by now).

Available on PBL website:

<http://www.pbl.nl/en/news/newsitems/2012/climate-adaptation-in-the-dutch-delta>

Exploratory studies 2009:

Wegen naar een klimaatbestendig Nederland (2009)

Dutch; number of hard copies: 500 (100 left by now)

Available on PBL website:

<http://www.pbl.nl/publicaties/2009/Wegen-naar-een-klimaatbestendig-Nederland>

English summary: Roadmap to a climate-proof Netherlands (2009)

English; number of hard copies: 500.

Available on PBL website:

<http://www.pbl.nl/en/publications/2009/Roadmap-to-a-climate-proof-Netherlands>

Flood protection in the Netherlands: framing long-term challenges and options for a climate resilient delta (2009)

English; number of hard copies: 500 (40 left by now).

<http://www.pbl.nl/en/publications/2009/Flood-protection-in-the-Netherlands-framing-long-term-challenges-and-options-for-a-climate-resilient-delta>

Supporting background reports

- Klijn et al (2010). Flood risks and drought risks in a changing climate (In Dutch). Overstromingsrisico's en droogte risico's in een veranderend klimaat. Deltares, Utrecht/Delft.
[http://publicwiki.deltares.nl/download/attachments/20119560/1002565-000-VEB-0005-r-Overstromingsrisico%27s+en+droogte-
risico%27s+in+een+veranderend+klimaat+bieb.pdf?version=1&modificationDate=1290006779000](http://publicwiki.deltares.nl/download/attachments/20119560/1002565-000-VEB-0005-r-Overstromingsrisico%27s+en+droogte-
risico%27s+in+een+veranderend+klimaat+bieb.pdf?version=1&modificationDate=1290006779000)
- M. Vonk, C.C. Vos, D.C.J. van der Hoek (2010). Adaptation strategy for climate-proofing nature. (In Dutch) Adaptatiestrategie voor een klimaatbestendige natuur. PBL publication number 500078002.
http://www.pbl.nl/publicaties/2010/Adaptatiestrategie_Voor_Een_Klimaatbestendige_Natuur
- Van de Sandt & Goosen (2011). Towards a climate-proof rural area. (In Dutch). Naar een klimaatbestendig landelijk gebied.
- Van de Ven et al (2011). Building the Netherlands climate proof. Urban areas. UNESCO IHE/Deltares, Delft.
- Driessen et al (2011). Policy and juridical aspects of adaptation to climate change. (In Dutch). Beleids- en rechtswetenschappelijke aspecten van klimaatadaptatie. KvK, KvR, Wageningen.
- Van Minnen, J.G. & W. Ligtoet et al (2012). Effects of climate change in the Netherlands – un update. In Dutch: Effecten van klimaatverandering in Nederland – een update. PBL publication number 500193003. PBL Netherlands Environmental assessment Agency, Bilthoven/The Hague.
<http://www.pbl.nl/publicaties/2012/effecten-van-klimaatverandering-in-nederland-2012>

3. How were research findings and conclusions communicated to the client and whether or not recommendations to policymakers and other target audiences were made

16 June 2010 – presentation by M. Hajer on findings PBL study on Delta programme Knowledge Symposium (Amsterdam)
November 2010 – M. Hajer invited for interview on stage at the 1st National Delta Congress of the Delta Programme (Scheveningen)
February 2011 – meeting at director level with the Delta Programme and Ministry of Infrastructure and Environment (The Hague)
June 2011 – meeting at director level with the Delta Programme and Ministry of Infrastructure and Environment (The Hague)
November 2011 – M. Hajer invited for reflections on stage for Panel discussions at the 2nd National Delta Congress (Amsterdam).
June 2012: presentation by J. van Minnen, invited by the EEA for the EIONET workshop 'Climate Change Impacts, Vulnerability & Adaptation', Brussels,
March 2012, presentation by J. Van Minnen, to the members of the European Network of Environmental Protection Agencies (EPA), Dessau.

References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an impression of how products were valued by clients, target audience(s) and other stakeholders ('impact monitoring data');

- In the Delta programme report 2011, the PBL report is referred to under the heading "Relevant developments" and conclusions are cited in relevant chapters (Deltaprogramma, 2011).
- Interview of M. Hajer + publication in NRC newspaper (2011)
- Interview of W. Ligtoet by 'Waternet' on flood risk strategies + publication on waterforum.net (2011)
<http://www.waterforum.net/component/content/article/5-archief/2129-planbureau-rol-nieuwe-waterweg-bij-tegengaan-verziltng>
- Interview of W. Ligtoet by 'Waternet' on water supplies strategies + publication on waterforum.net (2011)
<http://www.waterforum.net/component/content/article/5-archief/2124-rapport-pbl-qdeltadijken-zijn-veel-veiligerq>
- Newspaper articles on 'Effects of climate change in the Netherlands' in NRC, Volkskrant, Elsevier, Financial Newspaper and references to the report on many websites (all 2012).
- Interviews about 'Effects of climate change in the Netherlands' in Financial Newspaper in Agricultural Magazine 'Bloembollenvisie' (August 2012).

Possible follow-up activities that emerged as a result of this project

- Invited by the Delta programme to collaborate with CPB, KNMI, Rijkswaterstaat, Deltares in project "Delta-scenarios" – exploring future developments and adaptation strategies in the Netherlands, combining socio-economic and climate change scenarios.
http://publicwiki.deltares.nl/download/attachments/4882623/Delta-scenario's_final.pdf
- Invited by the Delta programme to execute in collaboration with CPB Netherlands Bureau for Economic Policy Analysis a cost benefit analysis of short term and long term adaptation options for the IJsselmeergebied (region in the middle of the Netherlands)(water supplies). <http://www.cpb.nl/publicatie/een-snelle-kosten-effectiviteitanalyse-voor-het-deltaprogramma-ijsselmeergebied>
- Invited by Delta programme to take a seat in the Steering Group on Cost Benefit Analysis for the Delta programme (dr. F. Dietz Head of Sector Sustainable Development)
- Organisation of Interministerial Diner/workshop with 7 Director Generals, Delta Commissioner and Programme manager South-west Delta on long term development scenarios for the Southwestern delta area of the Netherlands (March 2012, The Hague; summary of results in PBL, 2012)
<http://www.pbl.nl/publicaties/2012/samenhang-in-de-delta-op-weg-naar-een-integrale-visie-en-goed-afgestemde-investeringsbeslissingen>
- Invited by ministry of Infrastructure and the Environment and three provinces to develop long-term integrated development scenarios for the Southwestern delta area of the Netherlands and investigate the consequences for short term investments of ministries, provinces and municipalities (May-September 2012).
- Invited by EEA in Advisory group in EEA report 2012 on Climate change and adaptation in Europe.

4. Information that is relevant for evaluating the scientific quality of the research

With regard to the publication(s) about this project

Which publication(s) have been produced?

Publications with PBL authors:

- *Klijn, F., K.M. de Bruijn, J.M. Knoop, & Kwadijk, J. 2012. Assessment of the Netherlands' flood risk management policy under global change. DOI: 10.1007/s13280-011-0193-x. *Ambio* 41(2012)/ 180-192.
- *Klijn, F., J.M. Knoop, W. Ligtoet, & M.Mens. 2012. In search of robust flood risk management alternatives for the Netherlands. *Natural Hazards and Earth System Science* 12: 1469-1479.
- *Knoop, J.M., F.Klijn, and W. Ligtoet. 2012. On the potential contribution of spatial planning in combination with unbreachable embankments in the design of a robust flood risk system, exemplified for the Netherlands. *Proceedings of the Floodrisk 2012 conference (accepted)*
- *Tennekes, J. (2012) 'Improving Institutional Conditions for Adaptive Planning in the Netherlands', in: Hartmann, Th. and B. Needham (eds): *Planning by Law and Property Rights Reconsidered*, Ashgate, London.
- *Vos, C.C., D.C. J. van der Hoek & M. Vonk (2010) Spatial planning of a climate adaptation zone for wetland ecosystems, *Landscape Ecol* (2010) 25:1465–1477 _ Springer Science+Business Media B.V. 2010
- Witte, J.P.M., J. Runhaar, R. van Ek & D.C.J. van der Hoek (2009b), 'Eerste landelijke schets van de ecohydrologische effecten van een warmer en grilliger klimaat', *H2O* 16/17.

Publications of other authors:

- *Peter P.J. Driessen and Helena F.M.W. van Rijswijk (2011), *Normative Aspects of Climate Adaptation Policy*, 2(4) *Climate Law* p. 1-23.

Which publication(s) are/is peer reviewed, which are/is not?

See above, publications marked *.

How many references to these publications have been made in scientific literature?

No data available

Which presentations of the research findings were held for a scientific audience, for example at conferences?

Claire Vos, Marijke Vonk, Dirk-Jan van der Hoek (2010) Building adaptive capacity for wetlands when competition for land is high. *Delta's in change Rotterdam 2010*

D.C.J. van der Hoek (2009) Adapting the landscape to climate change,

Examples of climate corridors for several ecosystems ENCA, Vilm 24-06-2009

C.C. Vos, M Vonk, DCJ van der Hoek (2010) Adapting the landscape to climate change, Example Climate corridor for wetlands Green infrastructure EU

Brussels

Tennekes, J. *How to choose appropriate policy instruments for climate adaptation?* Paper presented at the Fourth International Academic Conference on Planning, Law, and Property Rights, Dortmund 10-12 february 2010
Tennekes, J. , P. Driessen, M. van Rijswick, L. van Bree, *Normative aspects of planning for climate adaptation: Out of the comfort zone.* Paper presented at at the colloquium L'action publique face au changement climatique, Bordeaux 15-16 of March 2012.

Presentations for other forums

Knoop, J. Costs and effects of flood protection policies in the Netherlands. Deltacongres, 29 Sept 2010, Scheveningen.
Knoop, J. Climate-proofing the Metropolic region of Rotterdam/Dordrecht. Metropooldag, 15 March 2012, Den Haag.
Ligtvoet, W. Adaptation in the Dutch Delta – Strategic options for a climate-proof development of the Netherlands. Amsterdam World Water Week, 3 November 2011, Amsterdam.
Ligtvoet, W. Adaptation in the Dutch Delta – Strategic options for a climate-proof development: Water Supplies. Committee Water Management/ Directors of the Water Boards. 18 November 2012, Amersfoort.
Ligtvoet, W. Adaptation in the Dutch Delta – Strategic options for a climate-proof development of the Netherlands. Meeting on behalf of the Chinese delegation on adaptation in the Netherlands. Ministry of Infrastructure & Environment, 2012, Den Haag.
Minnen, J. van. Adaptation in the Dutch Delta – Strategic options for a climate-proof development of the Netherlands. EPA Specialist Group conference, Dessau, Germany, March 2012.
Minnen, J. van. Adaptation in the Dutch Delta – Strategic options for a climate-proof development of the Netherlands. Brussels, May 2012.

Are the publications the result of collaboration with other research institutes?

Collaboration with other institutes:

- Deltares
- Wageningen University
- Utrecht University
- Maastricht University
- UNESCO-IHE
- KNMI

How does the publication deal with methodological questions and uncertainties?

Dealing with uncertainty is the starting point of the analysis of adaptation options within the context of an adaptive strategy with respect to flood risks, water supplies, nature, and urban areas. Focus is on technical and spatial measures and governance challenges.

With regard to individual researchers, what is:

*Their position within research networks (possible university affiliations)
Their scientific background (PhD. or other title) and membership of scientific groups, advisory committees, etc.*

Willem Ligtoet

Willem Ligtoet works since 1997 at the PBL Netherlands Environmental Assessment Agency in the field of water, spatial development and adaptation (at the global, European and national scale). He has been head of the department Policy Research on Water of the Water and Drinking Water Unit of the National Institute for Public Health and the Environment and is adjunct head of the sector Water Agriculture and Food within PBL. Willem has been project leader for several major PBL-projects in the field of water, ecology, sustainability outlooks and adaptation to climate change. He has been/is a member of several advisory boards and expert groups for the Dutch government and the EEA. Before joining the PBL, Willem worked as a researcher at the National Institute of Nature Management, the University of Leiden (fishery ecology of Lake Victoria, Tanzania) and as senior consultant at Witteveen & Bos Consulting engineers where he, among other things, coordinated environmental assessment projects in the Netherlands and abroad (Gaza, Egypt, Indonesia). Willem holds a MSc in biology from the University of Leiden, the Netherlands.

Nico Pieterse

Nico Pieterse is a physical geographer with a 18-year track record in multidisciplinary research and spatial planning. Within this period, he worked at the University Utrecht (where he acquired his Ph.D), as a consultant and for the PBL Netherlands Environmental Assessment Agency. Nico has experience in the field of integrated landscape modeling, scenario development and flood risk zoning. Last year he was co-project leader of the organisational change of PBL from two locations to one (virtual) location, especially focused on ICT and new working possibilities.

Marijke Vonk

Marijke Vonk is a senior policy researcher at the PBL Netherlands Environmental Assessment Agency. Her work focuses on integrated assessments of environment, nature and water management, in particular climate change adaptation. Over the years, Marijke Vonk has been involved in many outlook studies, analyses and evaluations on strategic decision-making by the Dutch Government: the relationship between governance issues and the progress in solving environmental problems. She has been the author of several policy assessments on biodiversity and climate adaptation.

Gert Jan van den Born

Gert Jan van den Born is a senior researcher on sustainable land use at the PBL Netherlands Environmental Assessment Agency. His work focuses mainly on agriculture. He has been the author of studies and publications on emissions from land use and land use change, integrated environmental assessments (national, European and global scale), climate change (impacts assessments, mitigation and adaptation), bio-energy (biofuels, bio-products) and scenario studies on behalf of the Dutch Delta program. Gert Jan van den Born was one of the scientists involved in the assessing of an IPCC

assessment, an analysis of statements on projected regional impacts in the 2007 report.

Leendert van Bree

Leendert van Bree is a senior policy researcher position at the Netherlands Environmental Assessment Agency (PBL) and the focus of his work is on environmental health governance and spatial planning, risk assessment and risk management, climate change and health, climate-proof cities, and environmental assessment tools in the field of health, well-being, and quality of life. Before, at the National Institute of Public Health and the Environment (RIVM) he has headed the inhalation toxicology group focusing on the health effects of air pollutants and, later, the health risk assessment group of the environment department. He has coordinated a large number of environmental health studies, funded by Dutch scientific organizations and the Dutch ministry of Environment. He is currently involved in environmental policy evaluations and advice for national and international bodies and agencies (Dutch Government, European Commission, EEA, and WHO) and also functions as a liaison officer for collaboration between PBL and universities. Leendert holds a PhD on structure-toxicity relationships of persistent environmental pollutants.

Ron Franken

Ron Franken is general water policy researcher at PBL Netherlands Environmental Assessment Agency. The Dutch freshwater policy related to climate change adaptation is one of his topics. With respect to this topic he is involved in the Delta Programme. His contributions are published in PBL-reports and reports of related Dutch institutes (CPB Netherlands Bureau for Economic Policy Analysis and RWS Centre for Water Management). Ron holds a MSc in Chemical engineering from the University of Wageningen, the Netherlands.

Olav Jan van Gerwen

Olav-Jan van Gerwen is an environmental economist. Since 1992 he is working at PBL Netherlands Environmental Assessment Agency and its earlier precursors. He was involved in various integrated assessments, such as the 4-yearly National Environmental Outlook, the yearly Environmental Balance, the so called 'building stones' for the fourth National Environmental Policy Plan and for example the evaluation of the environmental effects of election programmes. In the end of 1999 he became head of the national division of the Department for Environmental Assessment. In 2002 he became head of the Coordination and Advice Unit of the Environmental Assessment Agency. Since September 2010 he is deputy head of the sector Spatial Planning and Quality of the Local Environment of PBL.

Joost Knoop

Joost Knoop is a senior policy researcher at the PBL Netherlands Environmental Assessment Agency working on studies on the adaptation to climate changes in the field of water, at the national scale as well as at the European and global scale. Before that he was head of the department of Mathematical Models and Statistics at the Water and Drinking Water Unit of the National Institute for Public Health and the Environment. He holds a MSc in Chemical Engineering from the University of Twente. Joost has experience in the field of environmental modeling and policy research on a broad range of subjects.

Frits Kragt

Frits Kragt is a senior researcher at the PBL Netherlands Environmental Assessment Agency working on integrated assessments, in particular on the aspects of water and spatial planning. Frits has worked at the PBL mainly on national outlooks and assessments on water and space issues. He is graduated as a physical geographer. Prior to PBL he worked on national and international (agro)hydrological issues and informatics.

Jelle van Minnen

Jelle van Minnen has a background in forest ecology and environmental science at the University of Wageningen (MsC 1988; PhD 2008). He is a Senior Climate Change Policy Researcher at PBL with more than 20 years international experience in ecological and environmental research, with particular emphasis on Integrated Environmental Assessment of climate and land-use change impacts, mitigation and adaptation. The work has involved (i) the assessment of climate change and climate extremes impacts at different scales, (ii) the evaluation of adaptation options and strategies within EU countries, (iii) the development of Integrated Environmental Assessment Frameworks in order to project causes and impacts of climate change and air pollution and to compare options to limit these impacts; (iv) policy support in the field of climate change and air pollution. In addition the drivers and pressures of and climate change became part of Jelle's activities. The work has extensively been published and all activities wouldn't be possible without an extensive network of contacts throughout the world.

Leo Pols

Leo Pols is senior environmental researcher and designer at the PBL Netherlands Environmental Assessment Agency. He does research on the transformation of the Dutch landscape and cities and works with scenarios for future development. He also works with designing research on spatial implications of water management and 'building with water'. In the past he made plans for 'new forests', spatial policy for new 'country estates' and relations between city and country-side.

Melchert Reudink

Melchert Reudink has a scientific background in land use planning and public administration. At PBL Netherlands Environmental Assessment Agency he has conducted policy assessments on several topics, particular with a focus on institutional design. For several years Melchert Reudink was coordinator of the PBL in-house training program on policy evaluation.

Arjan Ruijs

Arjan Ruijs is senior policy researcher at PBL Netherlands Environmental Assessment Agency. He has a background in environmental and natural resource economics and has published 15 scientific journal articles. He has ample experience with theory and application of cost-benefit analysis, environmental valuation and evaluation of environmental policy instruments. He participated in several research projects related to the economic aspects of water management, climate change adaptation and mitigation and the management and valuation of biodiversity and ecosystem services. He participated in a number of projects related to the implementation of the Water Framework Directive and the Dutch 'Room for the River'-plans. He was project manager of a World Bank funded project on climate change adaptation in developing countries.

Joost Tennekes

Joost Tennekes studied Philosophy and Public Administration in Amsterdam and Heidelberg. His PhD thesis at the University of Twente focused on the concept of 'good governance' in the field of international development cooperation. At the PBL Netherlands Environment Assessment Agency, he published on the subjects of climate adaptation through planning, institutional factors in urbanization processes, and the impact of European policy on Dutch planning.

. *their Hirsch index score according to SCOPUS.*

Willem Ligtvoet,	2
Nico Pieterse,	4
Marijke Vonk,	1
Gert Jan van den Born,	2
Leendert van Bree,	12
Ron Franken,	0
OlavJan van Gerwen,	0
Joost Knoop,	7
Frits Kragt,	0
Jelle van Minnen,	7
Leo Pols,	0
Melchert Reudink,	0
Arjan Ruijs,	5
Joost Tennekes,	0

Appendix 1 The Dutch Delta Programme

The Dutch Delta Programme

Following an advice by the second Delta Committee (Deltacommissie, 2010) in 2011, the Delta Programme was launched (Deltacommissaris, 2010). The Delta Programme (In Dutch: *Deltaprogramma*) is aimed at creating a safe and attractive Netherlands, now and in the future. By way of the Delta Programme, the Dutch Cabinet seeks to ensure that there is certainty about flood risk management and sufficient supply of fresh water, in the long term, acknowledging both socioeconomic developments and climate change. Apart from protecting people, animals and goods, this is also a purely economic necessity. The damage and suffering caused by a flood in the Netherlands could be incalculable, which is why Cabinet wants to forestall such a disaster. In addition, water shortages are also damaging.

The Delta Programme is a national programme, involving the Dutch Government, provinces, water boards and municipalities. Social organisations, knowledge institutes and the business community are actively involved, as well. The Delta Programme is directed by the Delta Commissioner (*regeringscommissaris*), appointed by Cabinet. Based on the Delta Commissioner's proposal, Cabinet has opted for a realistic and adaptive approach.

Five delta decisions for 2014

Preparing decisions for a climate-proof development of the Dutch delta is the main task of the Delta Programme. The Delta Commissioner is meant to submit five guiding 'delta decisions' on flood risk management, freshwater supply and (re)development of built-up areas in 2014, to be embedded in the next National Water Plan (2015). These five delta decisions concern:

1. Updating safety standards for primary flood defence systems;
2. A freshwater strategy that should guarantee a sufficient and long-term water supply in the Netherlands;
3. Long-term water level management for the IJsselmeer, with a focus on freshwater supply in the Netherlands and the safety task in the area;
4. Protection of the Rhine-Meuse floodplain;
5. A national policy framework for the (re)development of built-up areas.

Knowledge and innovation

Part of the Delta Programme is the joint development of knowledge, in the next few years, in support of the required decision-making. As consistency and integration of sectoral scientific knowledge is of great importance for developing a cohesive set of solutions, the following research lines have been set up:

- A number of scenarios to be used for all research in the Delta Programme;
- An evaluation system that will enable comparison of all possible solution strategies;
- A Delta model with which to carry out (some) of the underlying calculations.

The Delta Programme is committed to strengthening the relationship between knowledge and innovation. Along with water technology and maritime technology, delta technology is part of the so called Key Area Water areas, in which the Netherlands plays a leading international role. Innovation, therefore, is doubly rewarding given that it not only serves the needs of the Delta Programme, but also stimulates the Dutch economy.

Further information

<http://www.deltacommissaris.nl/english/>

Appendix 2. Key messages of the PBL report

- **Unbreachable dykes and managing spatial development in the Rhine-Meuse floodplain will make the Netherlands safer and more climate-resilient**

Flood risk in the Netherlands can be structurally reduced if the Dutch Government not only acts to reduce the *probability* of flooding, but also to reduce the possible consequences of flooding. An effective way to achieve this is to reinforce the dykes to create so-called Delta Dykes ('unbreachable dykes'), especially in areas with the highest concentrations of population and fixed assets. Building unbreachable dykes will reduce the dangers and impacts of flooding to such an extent that there is little need for adjustment to built-up areas behind these dykes in order to reduce the *consequences* of flooding (flood-resilient building). Because the consequences of flooding are always less damaging when areas are protected by unbreachable dykes, the Netherlands would then also be less sensitive to climate change and unexpected, more extreme conditions. In addition, areas must be reserved in the Rhine-Meuse floodplain for managing the consequences of potentially higher river discharges in the future, combined with higher sea levels, in the longer term. This will require management of new spatial developments in the riverine areas.

- **Climate-proofing freshwater supplies will require a more flexible water system and better use of the water in the Rhine**

It is expected that climate change will lead to more frequent and longer periods of water deficit during the summer months. Making better use of the water in the Rhine may compensate for shortages in the freshwater supply. In addition to the option of increasing the water reserves in the IJsselmeer (as previously proposed by the Delta Committee), changes to the management of the New Waterway is an interesting alternative to make more fresh water available. This would be effective because about 80% of all the water in the Rhine is discharged through the New Waterway into the sea – even in dry years – to counteract salt water intrusion. Doing this more effectively, in other words with less water, will release more fresh Rhine water for other uses, such as the irrigation of agricultural land. Moreover, there are various possibilities for making regional water systems more flexible, thus temporarily curbing demand for water in dry years. The main options are those of optimising water management practices and water management authorities taking a more flexible approach to salinity standards.

- **Climate-proofing ecosystems and biodiversity will require revising the strategy behind the National Ecological Network**

Climate change increases the risk of biodiversity loss in the Netherlands. This, in turn, reduces the chances for the Netherlands to meet international nature conservation and restoration obligations in the longer term. Biodiversity levels can be maintained in the face of climate change if nature conservation policies focus more forcefully than at present on increasing the spatial connectivity of nature conservation areas, improving environmental and water conditions, and creating room for natural processes. For the internationally important habitats in the low-lying areas of the Netherlands, this will involve strengthening spatial connectivity in the coastal dunes, the peat marshes and the Rhine-Meuse floodplain, and restoring natural processes in the Wadden Sea, the south-west delta area, and the coastal zone. Greater spatial connectivity and restoration of the natural hydrological dynamics is also required in forest and

heathland ecosystems. Climate-proofing ecosystems and biodiversity, therefore will require revision of the government strategy for the National Ecological Network.

• Implementation of climate-proofing measures in urban development today may considerably reduce costs for tomorrow

Phenomena associated with climate change, such as urban flooding and water shortages, the retention of heat in built-up areas (heat build-up) and drought may vary considerably in nature and scale from city to city and from neighbourhood to neighbourhood. Climate resilience is hardest to achieve in highly urbanised areas. These areas contain the largest proportion of hard surfacing, causing more heat build-up and urban flooding, whereas the space available for mitigating measures is more limited. A broad range of measures is available for use at various scales, from individual buildings and streets to neighbourhoods, districts, and whole cities. Structural measures, such as the construction of parks, canals, ponds, thermal energystorage, and modified sewerage systems can be implemented in new developments and urban restructuring projects. The key players for such adaptations at neighbourhood or city scales are municipal councils and real estate developers. The most appropriate measures in existing urban areas are adaptations at the scale of individual buildings or streets, such as insulation, green roofs, and adapting street paving for water retention. The key actors at this scale are housing corporations, companies, and private property owners. Urban areas are constantly changing: new homes, offices, and infrastructure are built, neighbourhoods and business estates are restructured and sewerage systems replaced. If municipal authorities, developers, housing corporations, and private owners consistently incorporate climate resilience into their investments in the built environment and urban facilities, the additional costs of climate adaptations can be minimised. Municipal authorities are the most suited to play a leading role in coordinating and managing these adaptations. The opportunities to incorporate climate resilience into planned and new investments in urban areas in regions experiencing growth are different to those in areas that are in decline.

• A clear division of responsibilities between central government and other parties

Central government has the overall responsibility for tasks such as spatial planning, freshwater supplies, and flood protection. In decentralising these responsibilities, central government must create preconditions and enabling mechanisms for municipal authorities, water boards, provincial government, and citizens to adapt to climate change, primarily in the areas of urban climate resilience and freshwater supply. This means that central government must indicate exactly where the limits of its responsibility of care lie and what investments in climate adaptation it expects from other government authorities, the business community, and citizens. Central government must also be alert to the need to embed climate adaptation into its decision-making process on the funding of spatial investments.



October 2012

Demographic decline

Project information

Demographic decline and its spatial consequences

Author: Jan Ritsema Van Eck
Contact: Jan.RitsemavanEck@pbl.nl
Date 2012-10-15

Summary

- In 2006, The Netherlands Institute for Spatial Research (a predecessor of the PBL) was one of the first institutes to call attention to the prospect of demographic decline (shrinkage) in many parts of the Netherlands, and to help put this theme on the policy agenda.
- Since then, PBL has done four projects on this theme and has been asked for advice and other input by national, regional and local governments as well as other actors such as political parties and professional organizations.
- PBL work on this theme has resulted in 3 PBL reports, 1 PhD dissertation, 2 contributions in other books, 18 articles in professional journals and 43 conference presentations, as well as a working conference for local administrators organized by the PBL, and prominent input in two similar conferences.
- Since 2010, PBL has not initiated new research on this theme; instead we make sure that PBL research on themes like housing market, regional economy, ageing and governance will generate results that are also relevant to the theme of demographic decline.

Questions to the audit committee

- 1) In the PBL activities on the theme of population decline, the main focus was on agenda setting and translating research findings into policy advice, not on contributing to the international scientific debate, except the PhD research of Verwest on local policy reactions to population decline. This has resulted in four policy-oriented reports, many articles in Dutch-language professional journals and much interaction with relevant actors on the national, regional and local scale; and also in one PhD dissertation and a number of international scientific conference papers, but not in peer reviewed international publications. Is this a good strategy, given the urgency of the problem and the limited capacity of the research group? Has this strategy been sufficient to make sure that the results of PBL research and the PhD dissertation 'landed' in the international scientific discussion?
- 2) Since 2010, the PBL has not initiated new research on the theme of regional population decline. PBL has decided to use its limited capacity for demographic-related research to call the attention for new policy issues such as ageing and increasing uncertainty about future regional demographic developments. Still the PBL gets many requests for advice and presentations on demographic decline from municipalities and other local actors, and is also asked to contribute to the recent national strategic knowledge agenda about shrinkage. Our strategy is to make sure that current PBL research on themes like housing market, regional economy, ageing and governance will generate knowledge relevant to shrinkage, and bring this knowledge to the relevant organizations by presentations, papers etc. What is the opinion of the committee on this strategy?

Information about the project itself

- *Introduction*

Outline of the aims and purposes:

Demographic decline in all its aspects is going to be a major trend in several countries and regions in Europe, including parts of the Netherlands. Already since 2006, research has been done by the PBL and one of its predecessors, the NISR (Netherlands Institute for Spatial Research) in the fields of spatial effects (in the regional housing market and the regional economy, among others) and policy responses.

In 2006, the PBL/NISR was triggered by the outcome of first Regional Population forecast of PBL/NISR and Statistics Netherlands in 2006, showing demographic decline in several regions in the Netherlands. Both PBL and a researcher of the University of Maastricht asked for attention to the national and regional policy implications of demographic decline. Since then, also due to the fact that some municipalities experienced decline, demographic decline became an increasingly important national, regional and local policy issue. The first NISR project on the spatial consequences of demographic decline was published in 2006 (Van Dam and others, 2006) and discussed at the conference organised by the (former) Ministry of Housing, Spatial Planning and Environment and the NISR in 2007. Up till now, demographic decline is seen as an urgent national and regional policy issue. PBL/NISR is often asked for support on this topic, for instance by the National Ministries (especially the Ministry of Interior and Kingdom Relations), the political parties, regional and local governments, national institutes like SER (Social and Economic Council of the Netherlands), WRR (Scientific Council for Governmental Policy) and NIDI (The Netherlands Interdisciplinary Demographic Institute). The Minister of Housing, Communities and Integration (Van der Laan) and the secretary of state for Interior Affairs (Bijleveld) has put the demographic decline on the national political agenda. This has resulted in several policy measures, among which the Action plan about Population Decline. Subsequent studies of PBL/NISR focused on the effects on the regional housing market (Verwest et al. 2008), on policy strategies to deal with demographic decline (Verwest & Van Dam 2010). Also, a PhD on local policy responses to demographic decline was published by Verwest in 2011. Whereas the NISR, together with other institutes, was one of the first to address the importance of demographic decline for policy, PBL has decided to use its limited capacity for demographic-related research to call the attention for new policy issues such as ageing and increasing uncertainty about future regional demographic developments. PBL has decided to use its limited capacity for demographic-related research to call the attention for new policy issues due to increasing uncertainty about future regional demographic developments, e.g. in the *Ruimtelijke Verkenning 2011 (Spatial Outlook, PBL 2011)*. The PBL also participates in international demographic research, e.g. in the European research project *DEMIFER (Demographic and Migratory Flows affecting European Regions and cities, ESPON & NIDI 2010)*. PBL will continue to contribute to policy discussions on population decline by making sure that current PBL research on themes like housing market, regional economy, ageing and governance will generate knowledge relevant to shrinkage, and bringing this knowledge to the relevant organizations by means that require relatively little effort, such as presentations, papers in professional journals, etc.

- *Time frame of the project*

2006 – 2011

- a) Demographic decline and spatial development: planning for the consequences of population changes; January - June 2006.
- b) Regional shrinkage and housing market: dealing with a transformation task; June 2007 - June 2008
- c) From combatting to accepting: Demographic decline in the Netherlands. Policy strategies for current and future shrinking regions; September – December 2010.
- d) Demographic decline and local government strategies: A study of policy change in the Netherlands (Doctoral thesis); January 2008-September 2011.

- *Project structure, sub-activities, and project management*

- a) Frank van Dam, Carola de Groot and Femke Verwest.
- b) Femke Verwest, Niels Sorel and Edwin Buitelaar.
- c) Femke Verwest and Frank van Dam.
- d) Femke Verwest, Promotor: Prof. dr. D.B. Needham (Radboud University Nijmegen), Copromotor: Dr. E. Buitelaar.

Projects a and c are supervised by dr. D. Manting, and projects b and d are supervised by prof. D.B. Needham. The content of projects a, b and c are approved by the management team of PBL/NISR, and the content of project d is approved by the Doctoral Thesis Committee. Besides, different researcher working for PBL and other knowledge institutes (NIROV, Radboud University, University of Manchester) have read the concept reports and gave comments on it, which have been integrated in the final reports.

- *Researchers involved in the project*

Researchers involved in the project were:

- a) Frank van Dam, Carola de Groot and Femke Verwest.
- b) Femke Verwest, Niels Sorel and Edwin Buitelaar.
- c) Femke Verwest and Frank van Dam.
- d) Femke Verwest, Promotor: Prof. dr. D.B. Needham (Radboud University Nijmegen), Copromotor: Dr. E. Buitelaar.

- *Researchers' experience with working at the science-policy interface*

All researchers involved have several years working experience in the context of science and policy as researchers at the PBL Netherlands Environmental Assessment Agency. Indications are the number of policy-related presentations, scientific and policy related publications, and interviews (see below).

- *Resources (money, facilities)*

Projects a), b), and c) financed by PBL. Projects a and b roughly about 1 fte each, project c roughly 0.5 fte.

Project d) financed by PBL and Radboud University Nijmegen. Roughly about 2 fte.

- *Possible collaborations with other research institutes*
 - Statistics Netherlands (model development and regional demographic projections).
 - Radboud University Nijmegen (project d: PhD research Verwest).
 - NIDI (collaborative research project and publication).
- *Method(s) of integrating knowledge from different sources*

Case studies were used in all projects. Quantitative analysis and qualitative research were combined using descriptive statistics, demographic modeling, literature study, document analyses and interviews.

- Case study method: three Dutch and two foreign case studies were selected: Parkstad Limburg (NL), Eemsdelta (NL), Zeeuws-Vlaanderen (NL), Greater Manchester (UK), and the north western part of Niedersachsen (DE).
 - Literature study: in order to understand the relationship between demographic decline and local government reactions, a conceptual framework was developed based on studies about policy dynamics, demographic decline and urban decline, and transitions.
 - Descriptive statistics: a large number of data sets were used to describe regional demographic developments and their spatial consequences: data from Statistics Netherlands, the Dutch land registry office, the Dutch association of real estate brokers and real estate experts (NVM), Central housing fund (CFV), Locatus, Lisa, and Netherlands Chamber of Commerce.
 - Demographic modeling: future demographic developments were estimated using the Regional Population and Household Projections Model, made by Statistics Netherlands and PBL.
 - Interviews: in total more than 100 personal interviews, which can be divided in two groups. First: interviews with scientific experts and national policy makers. Second: interviews with local/regional policy makers and stake holders in the case study regions, such as property development companies, housing associations, businesses, chambers of commerce, and the confederation of small and medium-sized enterprises.
 - Document analysis: focused on local reactions to demographic decline.
- *Which models were used (and why)?*

The regional demographic projections were made with PEARL (Projecting Population Events At the Regional Level). This model was developed by PBL and Statistics Netherlands with collaboration of QQQ Delft (an ICT company).

As early in 2004, PBL/NISR felt a growing need for a regional population and household forecast, to provide information on relevant demographic trends for policy makers, and also to provide demographic base data for its own outlooks and assessments. The model was developed in close cooperation between PBL and Statistics Netherlands, and since 2006 these agencies publish the bi-annual regional population and household forecast using this model. PBL-researchers involved in the development of PEARL are: Barry Zondag (programme manager), Andries de Jong (project leader), Mark ter Veer, Stephaan Declerck, and Rob Loke.

PEARL is a state of the art regional demographic forecasting model. It is a dynamic model (it works with demographic growth components and transition rates between household position). It is a bottom-up model: it works on the municipal level, and are fully consistent with the national figures from the national demographic forecasts of Statistics Netherlands. Three types of sub models are used within the PEARL model: the cohort component model (for demographic growth component), the multistate life table model (for the transitions between household positions), and a (concise) housing market model (relating demand of houses with supply of houses within the step of modeling internal migration). The model also contains a micro layer, so at the level of the individual (fictive) person, information is available on the demographic variables in the future. The visitation committee of NISR was impressed by the methodology of PEARL (see visitation report of NISR by Don, 2007).

- *Which methodological difficulties were encountered?*
 - Lack of a conceptual framework to study local government policy reactions to demographic decline, was the main methodological difficulty. Therefore this conceptual framework was developed in the PhD study of Verwest.
 - Other methodological difficulties had to do with decisions about the selection of case study regions, delimitation of the research subject, definition of concepts, and data collecting strategies.

- *What were the main research findings?*

- 'Demographic decline and spatial development: planning for the consequences of population changes':
 - The spatial consequences of this demographic decline will be limited. Other factors, such as economic growth, behavioural change, and planning policy, will have a major influence on spatial development. The fixation on population numbers in both the public debate about demographic decline and in policy-making is therefore misplaced and futile. Insofar as demographic trends already have an influence on spatial developments, this influence is primarily through changes in household numbers and population composition, for example in relation to housing needs.
 - This does not mean that demographic decline will not raise issues pertinent to spatial development policy. Given that household numbers are expected to reach a maximum in about thirty years or so, and in some regions have already peaked, we need to think carefully about additions to the current housing stock at both the regional and local levels. Not only should we take account of demographic changes, but also factor in changing housing preferences resulting from demographic and economic trends.
 - In municipalities and regions, falling household numbers may push up housing vacancy rates and exacerbate segregation, leading to a reduction in the quality of the living environment. These negative consequences will be concentrated in specific districts, neighbourhoods, and villages. The early post-war developments are most susceptible to this form of decline.
 - Demographic decline is not only a threat; it also presents opportunities. In regions currently suffering from serious housing shortages, a shrinking number of households will relieve pressure on the housing market. Moreover, vacancies in certain districts and neighbourhoods will provide a good indication of people's preferences for certain types of homes and neighbourhoods. In addition,

contraction of local and regional populations will open up opportunities for reducing densities and 'greening' these neighbourhoods. For more information, see the Summary.

- 'Regional shrinkage and housing market: dealing with a transformation task':
 - Demographic decline affects the housing market positively and negatively. It can lead to a more relaxed housing market, which will benefit housing consumers as it makes it easier for them to find housing that meets their requirements and at relatively low prices. The drawbacks are primarily felt by the parties supplying the housing, i.e. an oversupply of houses, vacancies, longer selling times, and concentration of lower-income groups. As the number of households drops, attention should be focused on reducing and changing the housing supply by moderating and adjusting new housing plans and by stimulating demolition and restructuring. In shrinking regions, this transformation strategy should be coordinated at the regional level. Problems related to funding and coordination make it difficult to implement the transformation strategy. (See the Summary).
- 'From combatting to accepting: Demographic decline in the Netherlands. Policy strategies for current and future shrinking regions':
 - The study gives an overview of the demographic developments in the past, present, and future (based on the forecasts of PBL and SN), the effects the demographic decline have on housing and economy (oversupply, vacancies, prices, length of time properties are on the market), the local government policy reactions to it (do nothing, combatting and accepting the decline), the implementation problems (lack of problem perception, patterns of interaction focused on growing, lack of resources, and current rules), and the possible solutions. See the Summary.
- 'Demographic decline and local government strategies: A study of policy change in the Netherlands' (Doctoral thesis):
 - It was investigated how local governments in three shrinking regions (Parkstad Limburg, de Eemdelta and Zeeuws-Vlaanderen) react to demographic decline, and under which circumstances they adapt their policies to it. Verwest concludes that municipalities in shrinking regions pay little attention to demographic decline, and when they did it was found in policy on housing and focused on combatting the decline (called conservative changes) rather than accepting it (called radical changes). In the field of economy, local governments were found hardly to have included demographic decline in their policies, let alone have changed their policies in response to it. The way local governments respond to demographic decline can be explained not only by the policy perception and the pattern of interaction of the actors involved, but also by the available resources (money and knowledge), the rules, and the (in)congruence with the external national institutional context. Other explanations are the extent and duration of the decline and the local spatial conditions in the region. See the Summary for more information about the conclusions of this study.
- *What were the conclusions from the project evaluation?*

Project evaluation has been done by the PBL researchers: the process was facilitated by a colleague researcher who did not participate in the research. The project evaluations

showed that with a relatively small investment in terms of capacity (roughly about 1 to 1,5 fte per project), a new policy issue was explored, expertise was gained on this topic, and much attention of external parties (e.g. the media, governments and semi-public parties) was generated. Given that this policy issue that lasted for years and will still be of great importance in the future (with a shift in focus to labour shortage, expertise on demographic decline proves to be of great importance to PBL.

Information that is relevant for evaluating the societal quality of the research

- *Motivation for the activity*

The motivation was agenda setting and exploring a rather new phenomenon. Most parts of the Netherlands had had a long period of continuous demographic growth, but many regions were expected to experience population decline before 2025. This triggered the PBL/NISR to study demographic decline, its spatial consequences, and local government strategies. At the time this study was started, little attention was paid to planning for demographic decline, either in academic discussion or in actual practice. The conviction that awareness for the policy implications of demographic decline was needed, was another important reason to start the studies. Up till now, society feels a need for more research on the policy related issues of demographic decline. Recently (October 2012), the Ministry of Interior Affairs have launched a national strategic knowledge agenda about shrinkage, and a knowledge platform called 'Demographic transition'.

- *Target audiences, interested parties, client(s) and knowledge demand by the client(s)*

The PBL themselves took the initiative to study demographic decline and its spatial consequences. The interest that the findings have generated (see below) show that they are useful for national and local governments (municipalities, regions, and provinces), but also for several other actors. The studies prove to be also relevant to academic debate. They aim to deepen international and national academic debate on demographic decline and spatial planning, and policy changes in general.

- *To what extent and for which purpose has interaction with the client and target audiences taken place?*

The interaction with the client and target audience has taken place in various manners, through:

- Presentations: In total 43 presentations were held for a policy, scientific, and political audience. A wide range of participants attended these presentations. See the list of presentations below for more information.
- Conferences organised by PBL: in 2007, the then Netherlands Institute for Spatial Research (NISR) organised a conference about demographic decline together with the Ministry of Housing, Spatial Planning and the Environment. In 2010, the then Ministry of Housing, Spatial Planning and the Environment, the Association of Netherlands Municipalities, and the Association of the provinces in the Netherlands organised a conference in The Hague about demographic decline for local administrators.
- Supporting policy makers by giving input and comments on policy documents (action plan population decline and the progress report about this action plan) and national

strategic knowledge agenda of the Ministries (Infrastructure and Environment and Interior and Kingdom Relations)

- Meetings with people working for national and local governments, political parties, research institutes, councils, interest parties, consultancy firms, etc..
 - Participating in discussions, round table meetings, working groups, chat sessions etc. organised by ministries, provinces, municipalities, research institutes, councils, etc.
 - Publication of PBL reports, other books and articles (see the list of books and articles below).
 - Lectures at universities, congresses, and congress papers.
 - Statistical information via internet, several websites (www.pbl.nl, www.statline.nl, www.vanmeernaarbeter.nl, www.nicis.nl, www.platform31.nl). The number of hits is large, especially for the figures on future demographic developments, and they are relatively often downloaded (105.000 views and 14.000 downloads for the regional population and household forecast on the website of Statistics Netherlands between 2008 and 2011).
 - Interviews at national television and regional radio programmes, for daily national and local newspapers and magazines (see the list of interviews in appendix 3 & 4), by colleague researchers working for other knowledge institutes and universities. In total around 40.
- *The various products of the project; their availability (e.g. from the website) and the language of publication(s); the number of hard copies of publications; (possibly:) popularising publications to present research findings to a wider audience*

Almost all publications, articles and data are available on the PBL website (see <http://www.pbl.nl/dossiers/krimp>). The most recent report (From combatting to accepting; Verwest & Van Dam 2010) was included in the contextual response analysis by A. Prins, who found 175 references, of which 128 unique ones, on the Internet. Of each of the PBL reports, roughly 800 hard copies were printed. They were sent to all interviewees and too many contact persons working at national and local governments. Hard copies can be requested without cost by e-mail to the PBL. Most publications are, however, no longer available in hard copy. Most publications are in Dutch. Dutch publications generally have a summary in English.

- *How research findings and conclusions were communicated to the client and whether or not recommendations to policymakers and other target audiences were made*

The research findings were communicated to the national and local government through publications, articles, papers, presentations, and interviews (for daily newspapers, magazines, radio- and television programmes). Recommendations were made to policymakers at national and local government level.

- *References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an impression of how products were valued by clients, target audience(s) and other stakeholders (‘impact monitoring data’);*

Policy documents:

Both national policy documents (e.g. Action Plan Population Decline of the Ministry of Interior and Kingdom Relations, Association of the Netherlands municipalities, and Association of the provinces of the Netherlands, and the structure vision infrastructure

and spatial planning of the Ministry of Infrastructure and the Environment) and a large number of local policy documents (e.g. housing policy of municipalities located in shrinking regions) make reference to the PBL publications about demographic decline. See the list below (Appendix 1).

Parliamentary discussions:

PBL publications about demographic decline are referred to several times in the Dutch parliamentary. Especially in discussions about the action plan population decline, and the progress report of this action plan. For more detailed information, see Appendix 2.

Political parties:

Several political parties (VVD, CDA, D'66) have published visions on demographic decline making use of knowledge and insights from the PBL studies.

Interviews on television and radio programmes:

PBL-researchers have been interviewed on demographic decline both on national TV, as on regional TV and local radio. See Appendix 3.

Interviews for daily newspapers and magazines:

The researchers were interviewed about 20 times by journalists from daily national and local newspapers (e.g. *Trouw*, *AD*, *Financieel Dagblad*, *Cobouw*), and national (e.g. *Binnenlands Bestuur* and *Elsevier*) and international magazines (e.g. *National Geographic* Netherlands and Belgium). For more detailed information see Appendix 4.

Reference to the studies about demographic decline in daily newspapers:

Several references are made to the studies about demographic decline in daily national and local newspapers (e.g. *Telegraaf*, *Trouw*, *Volkskrant*, *NRC*, *De Limburger*). For more detailed information, see Appendix 5.

- *Possible follow-up activities that emerged as a result of this project*

The PBL studies about demographic decline assisted in raising attention for this subject at local and national government. Partly as a result of the PBL studies, the national government set up several initiatives, among which:

- Ministry of Housing, Spatial Planning and the Environment organised two conferences on demographic decline to inform local administrators about the decline and its challenges (in 2009 in Van Nelle Fabriek Rotterdam, and in 2010 in The Hague). PBL was actively involved in the preparation of the second conference.
- The Ministry of Housing, Spatial Planning and the Environment, The Ministry of Interior and Kingdom Relations, the Association of Netherlands Municipalities, and the Association of the provinces of the Netherlands launched an action plan population decline (called *Interbestuurlijk Actieplan Bevolkingsdaling*), and a progress report about this action plan (called *Voortgangsrapportage Interbestuurlijk Actieplan Bevolkingsdaling*). The PBL publications were used as input for the action plan and the progress report.
- A top team on shrinkage was installed to study the shrinking regions of Parkstad Limburg, Zeeland, and Groningen. They used PBL publications in their studies and referred to them.
- The Ministry of Interior and Kingdom Relations set up a national network on population decline (called *Nationaal netwerk Bevolkingsdaling* NNB). PBL

- participated in the working groups that were installed in the fields of Housing and Spatial Planning, Services, and the Labour market.
- The Ministry of Housing, Spatial Planning and the Environment formulated a strategic knowledge agenda in 2008. In 2011, the Ministry of Interior and Kingdom Relations, and Ministry of Infrastructure and the Environment both formulated new strategic knowledge agendas. Decline is a subject on both agendas. The PBL assisted the ministries with formulating research questions on this subject. In 2012, The Ministry of Interior and Kingdom Relations launched a separate strategic knowledge agenda on shrinkage, in which the PBL also assisted.
 - PBL also participated in several accompanying committees of organisations that investigated demographic decline. Examples are:
 - research done by the Social Economic Council of the Netherlands (SER 2011),
 - consultancy firms that made an analysis about the societal costs and benefits of restructuring in shrinking region Parkstad (RIGO & EIB 2010 commissioned by steering committee Krimp als Kans, region of Parkstad Limburg, province of Limburg, Ministry of Housing, Spatial Planning and the Environment Directorate-General Housing, Communities and Integration, cooperating housing associations, municipality of Heerlen),
 - Deetman committee installed by the province of Limburg to study demographic decline in the province (Commissie Deetman 2011).
 - several political parties (VVD, D'66, PvdA) have invited PBL-researchers to present their findings in order to help them develop a vision on demographic decline.

Information that is relevant for evaluating the scientific quality of the research

With regard to the publication(s) about this project

Which publication(s) have been produced?

Books

- Dam, F. van, C. de Groot, F. Verwest (2006), *Krimp en Ruimte: bevolkingsafname, ruimtelijke gevolgen en beleid* (in Dutch; *Demographic decline and spatial development: Planning for the consequences of population changes*), Rotterdam/The Hague: Nai uitgevers/Ruimtelijk Planbureau.
- Van Dam, F. (2009), *Ruimtelijke gevolgen*, (In Dutch; *Spatial Effects*), in: Nimwegen, N. & L. Van Heering (2009), *Van groei naar krimp: een demografische omslag (From growth to shrinkage: a demographic turning point)*, The Hague: NIDI, p. 87-112.
- Jong, A. & F. Verwest (2009), *Tot 2025 bevolkings- en huishoudenskrimp* (in Dutch; *Until 2025 population and household decline*), in: Latten, J. & S. Musterd (2009), *De nieuwe groei heet krimp: een perspectief voor Parkstad Limburg*, Parkstad Limburg & NICIS institute, p. 35-45.
- Verwest, F. & F. van Dam (2010), *Van krimp bestrijden naar begeleiden: Demografische krimp in Nederland. Beleidsstrategieën voor huidige en toekomstige krimpregio's* (in Dutch; *From combatting to accepting: Demographic decline in the Netherlands. Policy strategies for current and future shrinking regions*), The Hague: PBL.
- Verwest, F. (2011), *Demographic decline and local government strategies. A study of policy change in the Netherlands* (PhD thesis), Delft: Eburon.
- Verwest, F., N. Sorel, E. Buitelaar (2008), *Regionale krimp en woningbouw. Omgaan met een transformatieopgave* (In Dutch; *Regional shrinkage and housing. Dealing*

with a transformation task), Rotterdam/The Hague: Nai Uitgevers/Ruimtelijk Planbureau.

Verwest, F., N. Sorel, E. Buitelaar (2009), *Beleidsreacties in krimpregio's* (In Dutch; *Policy reactions in shrinking regions*), in: Nimwegen, N. & L. van Heering (2009), *Van groei naar krimp: een demografische omslag*, The Hague: NIDI, p. 113-139.

Articles

- Dam, F. van & D. Manting (2006) 'Bouwstop is niet verstandig' (in Dutch; building stop is not wise), *de Volkskrant* (in Dutch; daily national newspaper), 21 March 2006, (Opiniepagina Forum).
- Latten, J. & D. Manting (2006), *Bevolkings- en allochtonenprognose: Nederland in 2025 sterk geprofileerd*, in *Demos* (22), juni/juli, no. 6, 54-57
- Manting, D. & F. Vernooij (2006), *Waar wonen ouderen nu en in 2025? Bevolkingstrends*, 3e kwartaal 2006, pag 60-62, CBS, Voorburg/Heerlen
- Dam, F. van (2007) 'Geen krimp door krimp' (In Dutch; no panic for population decline), *RO Magazine* (in Dutch; Magazine about spatial developments), 15, 1/2: 18-19.
- Dam, F. van, & F. Verwest (2010), 'Krimp is prikkel voor de woningmarkt' (in Dutch; decline is an incentive for the housing market). *Dagblad van het Noorden* (in Dutch; daily local newspaper): 13 February 2010, p. 4.
- Dam, F. van, C. de Groot, F. Verwest (2007), 'Zeven misverstanden over de ruimtelijke gevolgen van bevolkingskrimp' (in Dutch; seven misunderstandings about the spatial consequences of population decline), *Geografie* (in Dutch; Geography. Magazine about current spatial issues), KNAG, 16 (1): 20-23.
- Dam, F. van, C. Groot, F. Verwest (2007), 'Groei, krimp en ruimte. Toekomstige regionale en lokale verschillen' (in Dutch; Growth, decline and spatial planning. Future regional and local differences), *Demos* (in Dutch; Bulletin about population and society), 23 (1): 1-5.
- Dam, F. van, F. Verwest, C. de Groot (2007), 'Demografische krimp: prikkel voor de woningmarkt' (in Dutch; Demographic decline: incentive for the housing market), *Ruimte in Debat* (in Dutch; Magazine of the Netherlands Institute for Spatial Research), 2007 (1): 2-7.
- Dam, F. van, F. Verwest, C. de Groot (2008), 'De ruimtelijke gevolgen van demografische krimp' (in Dutch; The spatial consequences of demographic decline), *BenM* themanummer Krimp: zegen of vloek? (in Dutch; magazine about policy and society theme number Shrinkage: blessing or curse?), December 2008, jrg. 35, LEMMA, p.322-329.
- Veer, M. ter, S. Boschman & F. Verwest (2010), 'De krimpregio's van de toekomst. Regionale demografische ontwikkelingen tot 2040: omslag van groei naar krimp' (in Dutch; The shrinking regions of the future; regional demographic developments until 2040: turn from growth to decline), *Demos* (in Dutch; Bulletin about population and society), 26 (8): p. 5-8.
- Verwest, F. & F. van Dam & F. Daalhuizen (2010), 'Het nieuwe wonen: het krimpende platteland rekt zich rijk' (in Dutch; the new living; the shrinking rural area counts oneself rich), *Geografie* (in Dutch; Geography. Magazine about current spatial issues), 19 (9): p. 42-45.
- Verwest, F. & N. Sorel (2008), 'Regionale krimp en woningbouw. Omgaan met een transformatieopgave' (in Dutch; regional shrinkage and housing. Dealing with a transformation task), *Intervisie* (in Dutch; magazine of the association of the Netherlands municipalities), December 2008, p.4.

- Verwest, F. & F. van Dam (2010), 'Demografische krimp en regionale economie' (in Dutch; Demographic decline and regional economy), *Rooilijn* (in Dutch; magazine for science and policy in the field of spatial planning), 43 (7): p. 508-513.
- Verwest, F., F. van Dam, C. de Groot (2007), 'Krimp bestrijden of begeleiden?' (in Dutch; combatting or accepting decline?), *Openbaar Bestuur* (in Dutch; Public Administration. Magazine for policy, organisation and politics), April 2007, jrg. 17, nr.4, pp.25-28.
- Verwest, F., N. Sorel, E. Buitelaar (2007), 'Regionale krimp en woningbouw' (in Dutch; regional shrinkage and housing), *Property Research Quarterly*, VOGON/Property NL, December 2007, jrg/ 6, nr.4, pp.10-15.
- Verwest, F., N. Sorel, E. Buitelaar (2008), 'Krimp een nieuwe opgave voor ontwikkelaars' (in Dutch; Shrinkage a new task for developers), *Service Magazine* Studievereniging Real Estate Management and Development Eindhoven (in Dutch; Magazine of the study Real Estate Management and Development at the University of Eindhoven), jrg. 13 nr. 3 July 2008.
- Verwest, F., N. Sorel, E. Buitelaar (2008), 'Krimp vraagt om regionale aanpak woningbouw' (in Dutch; Shrinkage asks for a regional approach of housing), *Christen Democratische Verkenningen* themanummer Krimpen zonder klein te worden (In Dutch; Christian Democratic Explorations theme number Shrinking without growing small), Autumn 2008, Boom Tijdschriften, p. 104-110.
- Verwest, F., N. Sorel, E. Buitelaar (2009), 'Krimp vraagt om veranderingen woningvoorraad' (in Dutch; Shrinkage asks for changes in supply of housing), *Demos* (in Dutch; bulletin about population and society), jrg.25, January 2009, p.7-9.

- *Which publication(s) are/is peer reviewed, which are/is not?*

The PhD thesis of Verwest is peer reviewed.

The first NISR publication was discussed by the Onderzoeksberaad of the NISR. Several scientists from different disciplines were member of the Onderzoeksberaad.

Braak, H.J.M. ter (2012), Review 'Demographic decline and local government strategies', *TPC*, The Hague: Sdu Uitgevers, April 2012: 41.

Project 'Demographic decline and local government strategies: A study of policy change in the Netherlands' (Doctoral thesis). Doctoral Thesis Committee: Prof.dr.B. Dankbaar (chairman), Prof. C.R. Couch (University of Liverpool), Prof. V. Nadin (TU Delft).

- *How many references to these publications have been made in scientific literature?*

Many references to the PBL publications about demographic decline have been made in various articles and books written by researchers working for Dutch Universities (e.g. Wageningen University, University of Amsterdam, Radboud University Nijmegen, University of Groningen, University of Utrecht), knowledge institutes (e.g. Rob/Rfv (in Dutch; The Council for Public Administration and the Financial Relations Council), Kenniscentrum Recreatie (in Dutch; knowledge centre for recreation), The Royal Dutch Scientific Institute NIDI (in Dutch; The Netherlands Interdisciplinary Demographic Institute), RLG (in Dutch; The Council for Rural Area), SER (in Dutch; Social and Economic Council of the Netherlands), interest groups (e.g. BNA (in Dutch; Royal Institute for Dutch Architects)), and scientific offices of political parties (e.g. Teldersstichting (in Dutch; Telders Foundation. Dutch liberal think tank). Some examples are given in Appendix 6; this list is not exhaustive.

- *Which presentations of the research findings were held for a scientific audience, for example at conferences?*

Many presentations (43 in total) of the research findings of the publications about demographic decline were held for scientific audience (students and researchers) as well as policy audience (working for the local and national government). Most presentations were focused on policy-makers, but scientists were often also present. See Appendix 7.

- *Is the publication the result of collaboration with other research institutes? If so, what is the scientific ranking of these institutes?*

The PhD research of Femke Verwest took place at Radboud University Nijmegen, Faculty of Management Sciences, Institute of Management Research.

“The Institute for Management Research (IMR) conducts fundamental and applied research on the development, design and effectiveness of the public and private structures that regulate, govern and manage human interaction. These structures exist at various levels, ranging from societies to urban networks and from macro-economic systems to individual organisations and firms.

The multidisciplinary composition of the IMR makes it possible to analyse such structures from a number of theoretical perspectives, such as the managerial, the economic, the geographic and the political. IMR aims to combine and integrate these theoretical perspectives in an attempt to provide a richer understanding of international, societal and organisational phenomena, their complexity and their interrelatedness.

That broad, integrated perspective distinguishes IMR from competing research institutes that offer more traditional and narrow approaches, and it has helped it become a strong player in the international research arena.” For more information see the website www.ru.nl/imr.

Demographic Research was done together with NIDI (the Netherlands Interdisciplinary Demographic Institute).

“NIDI is the national demographic institute of the Netherlands. Founded in 1970, NIDI became affiliated to the Royal Netherlands Academy of Arts and Sciences (KNAW) in 2003 and is the only social science institute of the Academy. Firmly rooted in science and society NIDI draws its inspiration from the interplay of demographic and social issues and strives for scientific excellence.” For more information see the website www.nidi.knaw.nl.

- ***With regard to individual researchers, what is:***
- *Their position within research networks (possible university affiliations)*
- *Their scientific background (Ph.D. or other title) and membership of scientific groups, advisory committees, etc.*

Dr. Frank van Dam: Graduated in 1987 from Utrecht University in the field of Urban and Rural Geography. He worked from 1989 until 2002 at the Faculty of Geosciences, Utrecht University. In 1995 he obtained his PhD (Utrecht University) on research on the scale enlargement and accessibility of services in rural areas. He is editor of the Dutch geographical magazine ‘Geografie’.

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Dr. Femke Verwest: Graduated in 2002 from the Leiden University in the field of Public Administration, and in 2011, she obtained the degree of doctor in the field of Management Sciences from Radboud University Nijmegen.

. *their Hirsch index score according to SCOPUS.*

Frank van Dam: H-index 4 (11 publications)

Femke Verwest: H-index 3 (9 publications)

Appendix 1 Policy documents

Regional demographic decline in the Netherlands: effects and policy responses

National policy documents

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Local policy documents

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Regional demographic decline in the Netherlands: effects and policy responses

Tweede Kamer (2011), *Verslag van een algemeen overleg, vastgesteld 22 March 2011, 31 757 nr. 29, p. 13.*

Tweede Kamer (2011), *Lijst vragen en antwoorden over Urgentieprogramma randstad, 6 June 2011, 31089 nr. 85, vergaderjaar 2010-2011, p.15.*

Tweede Kamer (2010), *Stedenbeleid vanaf 2010 Lijst met vragen en antwoorden, 31 757 nr 23.*

Tweede Kamer (2010), *Verslag van een algemeen overleg over interbestuurlijk actieprogramma bevolkingsdaling 17 February 2010, vastgesteld 15 March 2010, 31 7575 nr. 19, p. 14.*

Tweede Kamer (2006), *Het wetsvoorstel Vaststelling van de begrotingsstaten van het Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer (XI) voor het jaar 2007 (30800-XI) (deel Volkshuisvesting en Ruimtelijke Ordening), 12 december 2006, p.4.*

Appendix 3 Interviews at television and radio programmes

Regional demographic decline in the Netherlands: effects and policy responses

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Verwest, F. (2011), Discussie met dhr. Selten (directeur van woningcorporatie Leffier) en mw. De Wit (wethouder van de gemeente Heerlen) over demografische krimp en de rol van de provincie, tv optreden in Buitenhof, debat onder leiding van Peter van Ingen, aflevering 13 February 2011, Amsterdam. Zie website
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http://www.l1.nl/L1NWS/_pid/links4/_rp_links4_firstElementId/1_5374245/_rp_links4_hasclickpage/1_1013

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Regional demographic decline in the Netherlands: effects and policy responses

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Real estate magazines

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Harms, E. (2010), Krimp hoog op politieke en bestuurlijke agenda's. in: *Real Estate Magazine*.71 (12): p. 11-15.
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Local/Regional newspapers

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Regionale Krimp en Woningbouw(2008)

National newspapers

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AD.nl, Juni 24, 2008 Snelle sloop redt dorpen en steden
AD.nl, Juni 24, 2008 Creativiteit voorkomt leegloop
FD, 2 juli 2008 Krimp gemeenten Limburg wil beeld van lege woestijnsteden achter zich laten
Republic.nl, Juni 24, 2008 Afstemming krimpgemeenten moet beter
FD, 25 juni 2008 Gemeenten slecht voorbereid op bevolkingskrimp
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Regional/Local newspapers

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AT5, 10 juli 2008 Verkoop huurhuis, bouw koopwoning
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Real estate sector

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Vastgoedjournaal.nl, 17 september 2008 Aedes deelt kabinetsvisie 'ontschotting' maar mist aandacht voor krimp
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Aedesnet.nl, 25 juni 2008 '**Demografische krimp regionaal aanpakken**'

Political parties

Groenlinks.nl, Juli 9, 2008 Minister Vogelaar moet werk maken van verkoop huurwoningen

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National newspapers

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Trouw, december 2, 2010 Krimpgemeenten steken kop in het zand

Regional/local newspapers

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Real estate magazines

Vastgoedadviseur, april 15, 2011 Bevolgingskrimp: 'bestrijden of begeleiden'?

Cobouw, 4 december 2010 Gemeenten onbewust van krimp
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Krimp en Ruimte (2006)

National newspapers

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Het Financieele Dagblad, 30 November 2006, Beleidsmakers moeten leren leven met bevolgingskrimp, p. 5, Hans Verbraeken
Trouw, 30 November 2006, 'Gemeenten maken paniekbeleid'; p. 4-5, Maaïke Bezemer
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Regional/local newspapers

AD/Groene Hart, 6 mei 2009 Hoe Nieuwerbrug leefbaar blijft, p. 8.

Appendix 6 References to these publications in scientific literature

Regional demographic decline in the Netherlands: effects and policy responses

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Appendix 7 Presentations of research findings

Regional demographic decline in the Netherlands: effects and policy responses

National government

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Political parties

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Project information

Environmentally harmful subsidies

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Date 2012-10-15

General comments on the project 'Environmentally Harmful Subsidies'

- The project was initiated as a result of a request of the Department of the Prime Minister to inform that department, as well as the Department of Infrastructure and Environment about the main subsidies which have a negative (side-)effect on the environment.
- The project is an assessment that uses only existing information on environmentally harmful subsidies. The project did not aim to generate new research or collect new data
- The outcome of the project was a list of the main environmentally harmful subsidies in the Netherlands and a preliminary indication of the size of these subsidies.
- Because of time constraints, we did not give a complete list of environmentally harmful subsidies and did not give a full update of the size of the different subsidies. Both issues are the subject of further research that currently takes place at PBL.
- The PBL-list with the main environmentally harmful subsidies in the Netherlands was strikingly different from a list with the same aim that the OECD generated in the same year.
- Because they were working on the same subject, we got in touch with the OECD This contact led to a translation in English of the PBL-memo on environmentally harmful subsidies.
- In the memo, we did not give a clear-cut definition of Environmentally Harmful Subsidies, but rather followed a pragmatic approach with respect to the definition. Such an approach is also advocated by the OECD, but there are also other definitions of Environmentally Harmful Subsidies used and a discussion about the definition and boundaries of Environmentally Harmful Subsidies comes back on different places, not only in the scientific world, but also in the statistical world (Eurostat and the national statistical agencies affiliated to Eurostat) and the political world (between some Dutch Departments). In the latter discussion, PBL also follows a pragmatic approach and advises to start with a list of Environmentally Harmful Subsidies that meets all the definitions supported by the departments.
- The project illustrates the interface function of PBL: it assesses available information from a policy perspective. More specifically, it aims to address Environmentally Harmful Subsidies in the policy arena, because PBL received signals that this issue is not widely known in that arena. The memo introduces the issue, discusses some theoretical issue (such as demarcating the concept "subsidy"), reviews the relevant recent literature for the Dutch situation and gives a list of the most important Environmentally Harmful Subsidies in the Netherlands.
 - Is the approach followed accurate for the aim of the memo?
 - Is it necessary to dig deeper in the theoretical aspects of the issue for the aim of this memo?

Information about the project itself

- *Time frame of the project*

June 2011 – September 2011

- *Project structure, sub-activities, and project management*

The memo on Environmentally Harmful Subsidies was the result of an ad hoc question from the Department of the Prime Minister. It was not a separate project, but part of a larger project on the Greening of the Economy. The project manager of this larger project, Aldert Hanemaaijer, was also the manager of the activities employed for the ad hoc question with respect to Environmentally Harmful Subsidies. The project manager was also responsible for the communication to the Ministries. The sector manager maintained high level contact with the Department of the Prime Minister (who commissioned the ad hoc question) and the Department of Infrastructure and Environment (who commissioned and financed the larger project on the Greening of the Economy).

- *Researchers involved in the project*

Dr Eric Drissen, drs Aldert Hanemaaijer and dr Frank Dietz did most of the research. In addition, several experts within PBL were consulted.

- *Researchers' experience with working at the science-policy interface*

Eric Drissen has been at PBL and its predecessors since 1995 and worked on, e.g., economic scenarios for scenario studies as the Dutch Environmental Outlooks 4 and 5, Welvaart en Leefomgeving (Welfare, prosperity and quality of the living environment), Reference Projection 2010-2020, the forthcoming Reference projection 2012-2020; consumer behavior where he developed an analysis model for consumer expenditures (CAM) and linked this model to the dynamic input-output model DIMITRI and participated in the GAMON-financed¹ project CONTRAST with Gert Spaargaren (WUR) and Hans Mommaas (Tilburg University); several studies on (financial) policy instruments and several studies on the relation between economy and ecology, such as a study on the effect of the economic crisis on the environment in 2010. Furthermore, he contributed to several Dutch Environmental Balances and to the two Sustainability Outlooks.

Aldert Hanemaaijer has worked at PBL and its predecessors since 1992. He has been working in different fields like waste, environmental costs, the relation between economy and ecology, and dealing with risks. More recently, his focus has mainly been on sustainable development and greening the economy. Aldert's role is often as coordinator for a theme and project manager for broad integrated projects like the Dutch Environmental Balance (2001-2004), the second Sustainability Outlook (2007), and the Sustainability

¹ GAMON was a subsidy financed by several ministries for social-scientific research on the environment, landscape and nature.

Monitor for the Netherlands (2009 and 2011). In other cases he contributes to the broad studies, for example by coordinating the first chapter in Environmental Balance 2008-2009 on the relation between economy and environment, coordinating biodiversity in Getting in the Right Lane for 2050 (2009). Currently he is the project leader for greening the economy. As project leader he is often in consultation with people from different Ministries, diverging from Finance and Economic Affairs to Environment and Foreign Affairs.

Frank Dietz has been at PBL since 2007 and is head of the department Duurzame Ontwikkeling (Sustainable Development). Between 2005 and 2007 he was deputy director of the Interdepartmental Program Directory on Energy Transition (IPE), in which the departments of Economic Affairs; Housing, Spatial Planning and the Environment; Transport, Public Works and Water Management; Agriculture, Nature and Fishing; Foreign Affairs, and Finance participated in their aim to realise a sustainable energy supply. Between 2001 and 2005 he worked at the department of Housing, Spatial Planning and the Environment, where he had an intermediate function between science and policy. Until 2002 he worked as a researcher and teacher at several universities.

- *Resources (money, facilities)*

In total, approximately 10 weeks or 400 hours (or 50,000 euros) were necessary to come up with this memo, including internal and external communication.

- *Possible collaborations with other research institutes*

Not Applicable

- *Method(s) of integrating knowledge from different sources*

By mainstreaming the information of available studies, the study provides in a nutshell the consequences of abolishing environmentally harmful subsidies in the Netherlands

- *Which models were used (and why)?*

No models were used.

- *Which methodological difficulties were encountered?*

Methodologically, there was some discussion on the definition and boundaries of Environmentally Harmful Subsidies.

- *What were the main research findings?*

Abolition of environmentally harmful subsidies would mean a significant first step towards 'getting the prices right' for the environment. Large environmentally harmful subsidies are specifically found in the energy, transport, and agricultural sectors. In the Netherlands, in 2010, this amounted to a total of between 5 and 10 billion euros. A more precise number is difficult

to derive, as this strongly depends on varying criteria and methods of calculation. The same applies to determining the harmful effects on the environment. Abolition of certain environmentally harmful subsidies could be arranged on a national level; for example, those related to delivery vans and taxation advantages for company vehicles and private use of such vehicles. However, for most of these harmful subsidies related to energy and fuels, it would seem most logical that abolition takes place within a European context, not in the least, to avoid border issues because of differences between national regimes.

- *What were the conclusions from the project evaluation?*

As already mentioned, the memo is the result of an ad hoc question from the Department of the Prime Minister. The work for this memo was incorporated in a larger project on the greening of the economy. This project is still ongoing and, therefore, not evaluated, yet. Because this memo is just a small part of the greening project, it was decided to leave out an evaluation of the memo alone.

Information that is relevant for evaluating the societal quality of the research

- *Motivation for the activity*

The project was initiated after a question from the Department of the Prime Minister on the size of Environmentally Harmful Subsidies.

- *Target audiences, interested parties, client(s) and knowledge demand by the client(s)*

The memo was primarily written for the Department of the Prime Minister and for the Department of Infrastructure and Environment, but is also of interest to the Department of Finance and of Economic Affairs, Agriculture and Innovation. Also, political parties and members of the House of Representatives (Tweede Kamer) may be interested in the results of the project.

- *To what extent and for which purpose has interaction with the client and target audiences taken place?*

Preliminary results were sent to the Department of the Prime Minister and the Department of Infrastructure and Environment. The final results of the memo were discussed with the Department of Infrastructure and Environment on September 19th 2011.

- *The various products of the project; their availability (e.g. from the website) and the language of publication(s); the number of hard copies of publications; (possibly:) popularising publications to present research findings to a wider audience*

The memo on Environmentally Harmful Subsidies can be obtained from the PBL website in Dutch as well as in English. There was also a press release when the Dutch memo was put on the website as well as a short note in

Nieuwsbrief Milieu en Economie (Newsletter for Environment and Economics). There are no hardcopies of the memo available.

- *How research findings and conclusions were communicated to the client and whether or not recommendations to policymakers and other target audiences were made*

The final results of the memo were discussed with the Department of Infrastructure and Environment on September 19th 2011.

- *References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an impression of how products were valued by clients, target audience(s) and other stakeholders ('impact monitoring data');*

A resolution in the House of Representatives by the members Thieme and Sap on September 22nd 2011 (resolution nr. 26); on the internet, several sites had a news item on the memo, e.g. FoodHolland, AgriHolland, Duurzaamnieuws.nl, Joop.nl, Duurzaam op Weg, Envirodesk, Nederlandse Energiebranche, VROM Totaal, Natuurlijk Brabant, Sargasso, and IUCN.nl. In a contextual response analysis of 40 PBL reports (June 2012) 160 users (websites that referred to the report) have been found.

- *Possible follow-up activities that emerged as a result of this project*

There was contact with the OECD on the subject, which led to the decision to make an English translation of the memo. This contact is still ongoing. There was also interest from the Institute of European Environmental Policy (IEEP) for the results of our work. The Department of Infrastructure and Environment is interested in a further elaboration on some of the subsidies mentioned in the memo and asked PBL to participate in the discussion between several Departments on the definition and boundaries of Environmental Subsidies.

Information that is relevant for evaluating the scientific quality of the research

With regard to the publication(s) about this project

Which publication(s) have been produced?

A memo on Environmentally Harmful Subsidies in the Netherlands in Dutch and English. There was also a short note in Nieuwsbrief Milieu en Economie (Newsletter Environment and Economics).

- *Which publication(s) are/is peer reviewed, which are/is not?*

The aim of the project was to inform policy makers on the subject at hand. The project did not have a scientific orientation and did not aim to publish in peer reviewed journals.

- *How many references to these publications have been made in scientific literature?*

None

- *Which presentations of the research findings were held for a scientific audience, for example at conferences?*

None for a scientific audience.

- *Is the publication the result of collaboration with other research institutes? If so, what is the scientific ranking of these institutes?*

No other research institutes participated in the project

- *How does the publication deal with methodological questions and uncertainties?*

With respect to the definition of Environmental Harmful Subsidies, we took a pragmatic stance and did not thoroughly elaborate on the ins and outs of different definitions. With respect to uncertainties, we did not execute a statistical analysis on the separate measures, but rather gave a broad range of the total size of Environmental Harmful Subsidies and stressed that this range gives an *indication* of the size.

- **With regard to individual researchers, what is:**

- *Their position within research networks (possible university affiliations)*
- *Their scientific background (Ph.D. or other title) and membership of scientific groups, advisory committees, etc.*

- **Aldert Hanemaaijer** has an MSc in Economics and is a member of the Dutch Network on Economy and the Environment, of the Dutch Association for Environmental Professionals (VVM) and has been Chair of the group on sustainable development for several years.

- **Frank Dietz** holds a Ph.D. in Economics and is an advisory member of the permanent committee on Sustainable Development of the Social-Economic Council (Sociaal-Economische Raad, SER), chairman of the Dutch Network on Economy and the Environment, member of the advisory group of experts on Social Cost-Benefit Analysis for the Delta Committee, and Member of the International Scientific Committee for the review of the Tilburg Sustainability Center of the University of Tilburg

- **Eric Drissen** has a Ph.D. in Economics.

- *Their Hirsch index score:*

Hirsch index according to SCOPUS

Aldert Hanemaaijer	0
Eric Drissen	2
Frank Dietz	0



October 2012

Ex durante evaluation of Dutch Spatial Planning Act

Project information

Ex-durante evaluation of the Dutch Spatial Planning Act

Author: Niels Sorel
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Date 2012-10-01

Summary

On July 1st 2008 a 'new' Spatial Planning Act (*Wet ruimtelijke ordening*, abbreviated as 'Wro') came into force. This act replaced the 'old' 1965 Spatial planning Act (*Wet op de Ruimtelijke Ordening*, abbreviated as 'WRO'). Although in the course of time several changes were made to the 'old' act, this 'new' Act was seen as a fundamental review of the Dutch planning system. The traditional decentralised structure was abandoned in favour of a system that enables every tier of government to achieve its spatial development and management goals on its own. New legal instruments were introduced, while others were abandoned or altered.

In view of the major change in the planning system from the old Spatial planning Act (WRO) to the new Act (Wro), the Dutch Senate passed a motion calling on the government to carry out an ex-durante monitoring and evaluation of 'the progress, problems and successes of the Wro in practice right from the start'. The minister asked PBL to carry out this evaluation.

Descriptive statistics and qualitative case study research (interviews) were used as research methods. Hereby the several publications provided a nationwide perspective on the quantitative use of legal instruments for spatial planning, combined with in-depth insight into the considerations for using or not using certain types of legal instruments. Evaluation design was made in consultation with the Ministry of Infrastructure and the Environment. During the research period, between the first and second report, several changes were made to the Act and new legislation was introduced. Furthermore the Minister of Infrastructure and the Environment announced the start of yet another major legal reform. Against this background, the character of the conclusions of the second report were not restricted to experiences with the Spatial Planning Act alone. Lessons learned were also formulated in terms of recommendations for the forthcoming Environmental and Planning Act.

Information about the project itself

- *Time frame of the project*

2009–2012
- *Project structure, sub-activities, and project management*

The project consists of monitoring and an ex-durante evaluation, resulting in three reports (only available in Dutch):

- 1) Design / baseline measurement: Buitelaar, E. & N. Sorel (2009). *Ex-durante evaluatie Wro. Evaluatieontwerp en nulmeting*, The Hague: PBL Netherlands Environmental Assessment Agency.
- 2) First report with empirical findings: PBL (2010). *Ex-durante evaluatie Wet ruimtelijke ordening: eerste resultaten*, The Hague: PBL Netherlands Environmental Assessment Agency.

- 3) Second report with empirical findings: PBL (2012). *Ex-durante evaluatie Wet ruimtelijke ordening: tweede rapportage*, The Hague: PBL Netherlands Environmental Assessment Agency.

A third report with empirical findings was envisaged for 2015, but the process was terminated due to a change in the political and policy context (see below).

- *Researchers involved in the project*

PBL Netherlands Environmental Assessment Agency:

- Edwin Buitelaar, PhD (project leader)
- David Evers, PhD
- Lia van den Broek, MA
- Maaïke Galle, MA
- Wim Nieuwenhuizen, MSc (involved in first report)
- Niels Sorel, MA

Institute for Construction Law (*Instituut voor Bouwrecht*, IBR):

- Arjan Bregman, PhD, MSc

- *Researchers' experience with working at the science-policy interface*

All researchers have several years of work experience in the context of science and policy.

- *Resources (money, facilities)*

The time of the PBL staff was funded from the main PBL budget. An additional project budget of 100,000 euros for three years was used to pay for the services of a legal expert from the Institute for Construction Law (Arjan Bregman).

- *Collaboration with other research institutes*

Institute for Construction Law (*Instituut voor Bouwrecht*, IBR).

- *Method(s) of integrating knowledge from different sources*

Quantitative data research is rare in the field of spatial planning, particularly with regard to the legal aspects. Two methods were used for the evaluation: descriptive statistics and qualitative case study research (interviews). These provided a nationwide perspective on the quantitative use of legal instruments for spatial planning, combined with in-depth insight into the considerations for using or not using certain types of legal instruments.

Quantitative data were collected by a research assistant hired by PBL. Information on local land-use plans (*bestemmingsplannen*) was obtained from publications on the government's official notifications website (<https://www.officielebekendmakingen.nl/>). By law every new local land-use plan must be published on this website. All the provincial authorities and government departments were contacted and asked to provide an overview of the number of times they had made use of certain specified legal instruments. The number of planning appeals was retrieved from the database of the Council of State (*Raad van State*, the highest administrative court in the Netherlands).

For the baseline measurement, data were collected on the use of legal instruments under the 'old' Spatial Planning Act (WRO). Data on the quantitative use of land-use plans and their alternatives were obtained from the 12 provincial authorities. The average length of the formal procedure for preparing and adopting a local land-use plan was determined using information from the database of the VROM Inspectorate (*VROM-inspectie*, a government agency charged with enforcing compliance with the national spatial planning legislation and monitoring the use of the planning system).

Empirical data were collected by PBL itself. Face-to-face interviews were conducted by the authors. All the interviews were semi-structured and recorded. Interview reports were sent to the interviewees and checked by them.

For the first report (2010), representatives from 13 municipalities were interviewed (one from each Dutch province plus one 'test case'). The criteria used for selecting the municipalities were the use of legal instruments and municipality size. For the second report (2012), representatives from a different municipality in each province were interviewed. The criteria for selecting these municipalities were, again, the use of certain legal instruments (or the lack of using certain types of instruments), as well as to obtain a cross-section of urban and rural municipalities. In addition, representatives from all 12 provinces and representatives from all the government departments involved in making spatial plans were interviewed for the first and second reports.

- *Which models were used (and why)?*

No models were used in this research. Given the evaluative nature of the research, the main sources of information consisted of empirical data, supplemented by a literature study.

- *Which methodological difficulties were encountered?*

The goals of the new Spatial Planning Act (Wro), as stated in the Explanatory Memorandum, are expressed in relative terms. For instance, formal procedures needed to be 'shortened'. To make progress towards these goals measurable, an extensive baseline measurement was undertaken. However, it remained difficult to operationalise some of the goals in measurable units. For example, being 'more proactive' and 'decentralised where possible, centralised where necessary' are hard to measure. This was particularly problematic for the national level, as there was no point of reference in time or in the form of comparison with equivalent authorities at the same tier of government (which was the case for the provincial and local authorities). In these respects, the evaluation remained more descriptive.

- *What were the main research findings?*

Background: a fundamental change in the Dutch legal planning system

The first Dutch Spatial Planning Act (*Wet op de Ruimtelijke Ordening*, here referred to as the 'old' Spatial Planning Act and abbreviated as 'WRO') was passed in 1965. The Spatial Planning Act is a 'procedural law' that allocates responsibilities for different aspects of spatial planning between administrative bodies, prescribes procedural rules and defines legal instruments. The Act was based on the idea of a 'decentralised unitary state'. Legally binding spatial plans

were only made by the local authorities, with regard to policies adopted by the provincial authorities and the national government.

Since 1965, the Act was amended several times. For example, in 1985 provisions were introduced enabling central government to include a legally binding policy statement in national spatial plans, known as the 'spatial planning key decision' (*planologische kernbeslissing*, abbreviated as PKB). Another example is the introduction of a simpler procedure for 'projects'. Local authorities often used a section of the law (Article 19) that allowed them to approve minor developments in anticipation of the adoption of a new land-use plan, but in most cases this land-use plan subsequently was never made. In 2000, the Spatial Planning Act was amended to legalise this practice by abolishing the requirement that a new land-use plan must subsequently be adopted.

Although, over the years, various changes were made to the 1965 Act, its main principles remained intact. However, the planning *system* was also criticised. During the legislative process which led to the changes in 2000 members of the Dutch House of Representatives (*Tweede Kamer*) expressed their concern about the fragmentation of the spatial planning system and the lack of consistency between projects and plans. The Dutch Council of State also drew attention to the 'patchwork' nature of the Spatial Planning Act resulting from the numerous amendments over the years. The time had come for a fundamental review of the Dutch planning system.

Following years of debate about the design of a new planning system and an appropriate legislative framework, the 'new' Spatial Planning Act (*Wet ruimtelijke ordening*, abbreviated as 'Wro') came into force on 1 July 2008. The traditional decentralised structure was abandoned in favour of a system that enables every tier of government to achieve its spatial development and management goals on its own. New legal instruments were introduced, while others were abandoned or altered. In accordance with the then National Spatial Strategy (*Nota Ruimte*), the adage for the Act being 'decentralised where possible, centralised where necessary'.

Evaluation design and baseline measurements

The most important legislative changes were identified during the design of the evaluation study and the baseline measurement (Buitelaar and Sorel, 2009). It was decided to include only the changes to the legal system and not consider other issues, such as the requirement to make digital plans. This requirement has made considerable organisational demands on local authorities, but was not a fundamental change to the law itself.

Six goals were identified for the 'new' Wro, based mainly on parliamentary debates and the Explanatory Memorandum to the Spatial Planning Act, and were operationalised in several indicators. Baseline measurements of the use of the previous Act (WRO) were made to provide – where possible and relevant – reference points against which to evaluate current practice.

The first identified goal was to restore the primacy of the land-use plan for regulating land use and issuing building permits. Various indicators were used to assess the role of land-use plans in practice: the ratio between land-use plans and their alternatives (e.g. exemptions); the obsolescence of land-use plans; and the relationship between the land-use plan, building permits and spatial development. The key question here being the extent to which land-use

plans guide development; some plans are used merely to formalise development initiatives or existing land uses, while others are used as a forward planning tool.

The second identified goal was to shorten legal procedures. The indicators used to assess the success of the new Act (Wro) in meeting this goal were the length of formal procedures and the number and length of appeals at the Council of State. A baseline measurement was performed for these indicators under the old Spatial Planning Act (WRO).

The third identified goal concerned the provisions in the new Act for recovering public costs of planning, such as plan making, land acquisition, demolition of buildings and site preparation. As this section of the Act was entirely new, a baseline measurement was not possible. The quantitative use of and considerations for using the public instrument of a development plan were investigated solely within the context of the new Act (Wro).

The first three goals relate mainly to the local level; goals four to six apply to the provincial and national level of government.

The fourth identified goal of the new Act was to implement the adage of the then National Spatial Strategy (*Nota Ruimte*): 'decentralised where possible, centralised where necessary'. The new Act (Wro) introduced a system based on subsidiarity in which every problem should be dealt with at the appropriate level of government. This is a difficult goal to measure, as the principle underlying the Spatial Planning Act (Wro) is that each tier of government can determine its own interests. A baseline measurement was therefore not possible. Instead, the 12 provincial ordinances were compared. Consideration was also given to the use of land-use plans by the provincial authorities and central government (under the old Act (WRO) reserved only for municipalities).

The fifth identified goal of the new Act was to effect a shift from 'reactive' to 'proactive' policy: provincial and national interests were to be guaranteed in advance through regulations and ordinances, instead of being enforced afterwards. Among other changes, the new Act (Wro) abolished the approval of local land-use plans by the provincial council. Again, a baseline measurement was not possible. The proactivity of provincial authorities and central government was measured by the degree to which they formally responded to and issued instructions on local plans (reactive) compared with their use of proactive legal instruments.

The sixth identified goal was the division the new Act (Wro) made between strategic, non-binding spatial development visions and legally binding plans and regulations. In the past, these were frequently included in the same document, which often led to confusion. The new ordinances, regulations and plans prepared by the provincial and national authorities were examined to ascertain how this division was being put into practice. A baseline measurement was not applicable.

First report

The first report (*Ex-durante evaluatie Wet ruimtelijke ordening: eerste resultaten*, PBL, 2010) covered the first 18 months after the new Spatial Planning Act (Wro) came into force. Although only the early experiences with the new Act (Wro) could be assessed, the quantitative data and the interviews showed a revival of the local land-use plan, rather than use of the newly

introduced 'project decision'. However, a closer look at these local land-use plans revealed that they did not have the *strategic* character the legislator hoped for, but were adopted merely to approve *concrete development* initiatives. From this it can be concluded that the additional substantive requirements introduced in the new Act to discourage use of the project decision did not affect the *practice* of planning on a project-by-project basis. In actual practise, very small land-use plans – sometimes referred to as 'postage stamp plans' – were tailor made to enable concrete building initiatives (see also Buitelaar, Galle and Sorel, 2011).

The goal of shortening the formal legal procedures for land-use plans was clearly reflected in the data. The baseline measurement showed that under the old Act (WRO) it took on average 46 weeks, from first formal public consultation on a land-use plan to its approval by the provincial council. Abolition of provincial approval in the new Act (Wro) reduced the average time from formal public consultation to approval by the municipal council to 19 weeks. However, all interviewees put this time gain in perspective by saying that the most time-consuming part of the whole plan-making process was not the formal procedure, but the informal procedure of plan preparation leading up to public consultation.

When the provincial authorities and the national government recast their spatial policies in the form of the legal instruments introduced by the new Act (Wro), they retained the content of these policies as much as possible. Nine of the 12 provinces made a general ordinance. The report gives an overview of the arguments the provinces used when making or not making an ordinance. The provincial authorities and the national government have already made use of their powers to prepare land-use plans on several occasions; for example, to secure the alignment of high-voltage power cables.

With respect to the Act's goal of stimulating more proactive policies, some provincial authorities mentioned the increased importance of advance consultation. Nevertheless, there has been an increase in the number of official representations by provincial authorities and central government on municipal local land-use plans. At the time of the first evaluation, none of these had led to an appeal by a provincial council or central government at the Dutch Council of State.

Change of law

As a response to the economic crisis, the Dutch Government introduced a temporary Crisis and Recovery Act (*Crisis- en herstelwet*, abbreviated as 'Chw'). This Act came into force on 31 March 2010. Among other measures, including new legal instruments, the Chw amended some parts of the newly introduced Spatial Planning Act (Wro). An important amendment was an alteration to the project decision. The 2008 Spatial Planning Act (Wro) contained provisions and sanctions to make the use of this instrument less attractive than taking the route of adopting a land-use plan. For example, it required project decisions to be followed up by a land-use plan within one year; if the municipal council failed to do this, it was prohibited from collecting the planning application fees. The Crisis and Recovery Act (Chw) abolished these sanctions, in order to encourage more frequent use of the project decision and take advantage of the slightly shorter procedure made possible by the opportunity to delegate decision-making powers for project decisions from the municipal council to the municipal executive.

In October 2010, yet another law affecting the Spatial Planning Act came into force. The Environmental Licensing (General Provisions) Act (*Wet Algemene bepalingen omgevingsrecht*, abbreviated as 'Wabo') replaced 25 existing systems for issuing permits, licenses and exemptions, with a single environmental license. This presented the municipal councils with the major task of reorganising their administrative procedures.

In June 2011, the Minister of Infrastructure and the Environment sent a letter to Parliament in which she announced the start of yet another legal reform, entitled 'Better Regulations' (*Eenvoudig Beter*). The ambitious goal of this reform would be to completely reform and integrate several administrative laws, including the Spatial Planning Act and environmental laws, such as the Noise Abatement Act and Air Pollution Act (integrating a total of 15 existing Acts). The resulting new Environmental and Planning Act (*Omgevingswet*) should come into force in 2014.

Second report

As several laws had changed and the discussion on a complete reform had begun, the design of evaluation for the second report (*Ex-durante evaluatie Wet ruimtelijke ordening: tweede rapportage*, PBL, 2012) was slightly changed. First, the relevant aspects of the Crisis and Recovery Act (Chw) and the Environmental Licensing (General Provisions) Act (Wabo) were included in the study. Second, the conclusions of the report were not restricted to experiences with the Spatial Planning Act alone. Lessons learned were also formulated in terms of recommendations for the forthcoming Environmental and Planning Act.

Although the Crisis and Recovery Act and the Environmental Licensing (General Provisions) Act made it more attractive to use the project decision as an alternative to a local land-use plan, the land-use plan has remained the most popular legal instrument for regulating land use and providing a framework for new developments. The popularity of the land-use plan compared with the project decision is due largely to the statutory provisions available for making a flexible land-use plan, as well as the many years of experience with land-use plans, the crystallised jurisprudence and the fact that the internal administrative arrangements of municipal authorities are tailored to the procedures and processes of preparing and working with land-use plans. The effectiveness and legal viability of the new instruments introduced in the Spatial Planning Act and the Crisis and Recovery Act still need to be demonstrated.

The abolition of the need for the provincial council to formally approve local land-use plans has significantly shortened the formal procedure for adopting these plans. However, the length of appeal procedures at the Council of State has increased, which is probably a result of the absence of scrutiny by the provincial authority. Formal objections to the land-use plan must now be lodged with the Dutch Council of State, which has led to a large increase in its caseload. The proportion of legitimate appeals is the same as under the old Spatial Planning Act (WRO), which indicates that abolishing the provincial approval has not led to a reduction in the quality of local land-use plans regarding administrative standards and compliance with legislative requirements.

The introduction of the 'public development plan' (*exploitatieplan*) gave municipalities a legal instrument to recover the public costs of site preparation and other planning tasks from developers. Nevertheless, local authorities are not keen to use this instrument as it is seen as complicated and legally risky.

They prefer to make private agreements with developers, a method which is permitted by the legislator and in fact even preferred. Recent decisions by the Council of State on land valuation have made the use of the public development plan even less attractive. However, local authorities need the backing of a strong public instrument to give them a good negotiating position when entering into private contracts.

The introduction of the 2008 Spatial Planning Act (Wro) gave provincial councils and central government powers to prepare land-use plans. Almost all the provincial councils have used this instrument at least once, even those that initially had reservations about using these powers. A provincial land-use plan is used mainly for cross-municipality developments, such as (provincial) roads and green structures.

In their ordinances, several provincial councils have laid down general criteria in their rules on the content of land-use plans, such as 'spatial quality', rather than more specific criteria. It is not yet clear to what extent these general regulations are legally permissible, as they are at odds with the core philosophy behind the Spatial Planning Act of decentralising responsibilities as far possible. The adage of 'decentralised where possible, centralised where necessary' was not applied by the national government in the case of the protection of national landscapes. As these landscapes are regarded to be of national importance, central government, according to its own adage, should have provided an appropriate legally binding framework to protect these landscapes against unwanted developments. Instead, it delegated the responsibility of protecting such valuable landscapes to the provincial councils by establishing a provincial ordinance. Delegating this responsibility and prescribing the use of legal instruments was contrary to the aforementioned adage of the Act. An Emergency Act had to be passed to legalise this delegation within the framework of the Spatial Planning Act (Wro).

With respect to the forthcoming Environmental and Planning Act, we concluded that it would be wise to keep a close eye on the day-to-day practice of local land-use planning. For instance, the popularity of the local land-use plan is something to keep in mind, especially as the ministry plans to abolish this instrument.

The changeover from the decentralised Dutch planning system to a system in which each tier of government can pursue its own spatial planning goals can be called a qualified success, judged by the use of land-use plans by the provincial councils and central government.

Information that is relevant for evaluating the societal quality of the research

- *Motivation for the activity*

In view of the major change in the planning system from the old Spatial planning Act (WRO) to the new Act (Wro), the Dutch Senate passed a motion calling on the government to carry out an ex-durante monitoring and evaluation of 'the progress, problems and successes of the Wro in practice right from the start' (Smaling et al., 2008, motion). The minister asked PBL to carry out this evaluation.

The research project also presented a good opportunity for PBL to pursue its ambition to enhance its research into institutions and governance. Knowledge

of the new Act and the use of this Act, in actual practice, by national, provincial and local authorities would provide good insight into the way spatial development is conducted in the Netherlands. The legal perspective expanded the scope of previous institutional research by PBL, such as research on the functioning of the land market and on the practice of development planning.

- *Target audiences, interested parties, client(s) and knowledge demand by the client(s)*

The original intention was to evaluate the new Spatial Planning Act (Wro) in 2015 (a legal requirement). The PBL ex-durante evaluation was intended to be used as an input to this evaluation. The main client for this was the national spatial planning department of the Ministry of Infrastructure and the Environment, responsible for the introduction of the Act. As the plan for a complete reform of several environmental laws emerged, the department running the Better Regulations Programme (Programmadirectie Eenvoudig Beter) of the Ministry of Infrastructure and the Environment responsible for preparing this new Act also became a client.

More broadly, the ex-durante evaluation was also intended to inform various ministries, such as the Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, Agriculture and Innovation, as well as Members of Parliament and planning officers at provincial and local levels.

- *To what extent and for which purpose has interaction with the client and target audiences taken place?*

In January 2009, four discussion sessions were held to discuss the most important changes to the practice of spatial planning that could be expected as a result of the new Act (Wro). Sessions were devoted to the consequences for planning practice at national, provincial and local levels, and for the recovery of public costs through the introduction of the public development plan. A wide range of participants attended, including lawyers (affiliated to a university), civil servants from all levels of government, consultants and representatives from interest groups. The sessions served a twofold goal. First, the output of the sessions was used as an input to the evaluation design. Second, the sessions provided an opportunity to build a network of experts, who were consulted later in the research process to provide answers to more detailed questions and/or to review draft texts.

The Ministry of Infrastructure and the Environment (in this instance the national spatial planning department) was regularly informed of progress. In particular, representatives were invited to comment on the design of the evaluation and of the research to be conducted for the first and second reports.

Representatives from the Association of Netherlands Municipalities (VNG) and the Association of Provincial Authorities (IPO) were involved during the research design and were briefed on the findings.

The findings of the reports have been presented on several occasions.

- *The various products of the project; their availability (e.g. from the website) and the language of publication(s); the number of hard copies of publications; (possibly:) popularising publications to present research findings to a wider audience*

PBL reports (in Dutch)

PBL (2012) *Ex-durante evaluatie Wet ruimtelijke ordening: tweede rapportage* [Ex-durante evaluation of the Spatial Planning Act: Second report]. The Hague: PBL Netherlands Environmental Assessment Agency.

<http://www.pbl.nl/sites/default/files/cms/publicaties/PBL-2012-WRO-500160001.pdf>.

- Second report. Update of the findings of the first report. Between the publication of the first and second reports, the Spatial Planning Act was amended and the Crisis and Recovery Act and the Environmental Licensing (General Provisions) Act came into force. These changes were taken into account in the second evaluation, which takes a broader view than the Spatial Planning Act alone. The report covers experience with using the legislation between July 2008 and December 2010. Print: 750 copies; PDF: 299 downloads.

PBL (2010) *Ex-durante evaluatie Wet ruimtelijke ordening, eerste resultaten* [Ex-durante evaluation of the Spatial Planning Act: First results]. The Hague: PBL Netherlands Environmental Assessment Agency.

<http://www.pbl.nl/Ex-durante-evaluatie-Wet-ruimtelijke-ordening>.

- First report. Experience with using the legislation between July 2008 and December 2009. Print: 900 copies; PDF: downloads unknown because of a changed web server.

Buitelaar, E. & N. Sorel (2009). *Ex-durante evaluatie Wet ruimtelijke ordening; Evaluatieontwerp en nulmeting* [Ex-durante evaluation of the Spatial Planning Act: Evaluation design and baseline measurement]. The Hague: PBL Netherlands Environmental Assessment Agency.

http://www.pbl.nl/Evaluatie_en_WRO_WEBpdf

- Evaluation design and a baseline measurement of the current situation. Print: 900 copies; PDF: downloads unknown because of a changed web server.

Peer reviewed articles (in English)

Buitelaar, E., M. Galle & W. Salet (2012, submitted). Third-party appeal rights and the regulatory state: Understanding the reduction of planning appeal options, *Land Use Policy*.

Buitelaar E, M. Galle & N. Sorel (2011). Plan-led planning systems in development-led practices: An empirical analysis into the (lack of) institutionalisation of planning law, *Environment and Planning A* 43(4): 928–941. <http://dx.doi.org/10.1068/a43400>

Buitelaar, E. & N. Sorel (2010). Between the rule of law and the quest for control: Legal certainty in the Dutch planning system, *Land Use Policy* 27(3): 983–989. <http://dx.doi.org/10.1016/j.landusepol.2010.01.002>

Non peer reviewed articles and papers

Buitelaar, E., M. Galle & N. Sorel (2011). Projectplanologie en de toekomst van het bestemmingsplan [Project planning and the future of the local land-use plan], *S&RO* 01: 56–59.

<http://www.pbl.nl/sites/default/files/cms/publicaties/Projectplanologie.pdf>

- Non-scientific journal on urban and regional planning. Article on the future of the local land-use plan.

Buitelaar, E., M. Galle & W. Salet (2011). Third-party rights in the regulatory state: Understanding the reduction of planning appeal options in the Netherlands.

- Paper presented at the Planning, Law and Property Rights (PLPR) conference in Belfast, 7–10 February 2012.

Evers, D. (2010). Provincial diversity: A preliminary assessment of the implementation of the Dutch Spatial Planning Act of 2008.

- Paper submitted for the Planning, Law and Property Rights (PLPR) conference in Dortmund.

Buitelaar, E. & N. Sorel (2009). 'The quest for control' in de Nederlandse ruimtelijke ordening: Rechtszekerheid in het plannersparadijs [The quest for control in Dutch spatial planning: Legal certainty in the planners' paradise], In G. Bouma et al. (ed.) *Tussen droom en werkelijkheid; gebundelde papers en ontwerpopgaven plandag 2009* [Between dream and reality: Collected papers and design assignments for *Plandag 2009*].

- Paper submitted for the 'Plandag', an annual one-day conference for Dutch and Belgian (Flemish) urban and regional planners. The paper was presented at the conference.

- *How were research findings and conclusions communicated to the client and whether or not recommendations to policymakers and other target audiences were made*

Three pre-publication presentations were held by Edwin Buitelaar for policymakers from the ministry (one presentation for each publication). All the reports were sent to the Ministry of Infrastructure and the Environment, PBL's general mailing list and all interviewed persons. All the reports are available from the PBL website, accompanied by a brief summary of the main findings. A press release was sent to all relevant newspapers, journals and magazines.

Recommendations

The first report is descriptive in nature in accordance with the motion by the Senate. It describes how the new Spatial Planning Act (Wro) is used and the considerations underlying this use. The recommendations in the report are pitched at a rather abstract level. For instance, no recommendations were made on amending specific provisions of the Act. The first report also 'warned' the ministry to temper its expectations that the new Act could transform the practice of local land-use planning, particularly the extent to which land-use plans can be used to guide development rather than merely recording development initiatives or existing land uses.

The recommendations in the second report were made in the light of the discussion surrounding the launch of a new, more far-reaching legal reform. Experiences with the Spatial Planning Act reveal a need for institutional stability and greater attunement with local planning practice.

The findings of the reports have been presented on several occasions. 15 April 2012 – Edwin Buitelaar was an invited speaker on the forthcoming Environmental and Planning Act ('*De nieuwe Omgevingswet en de praktijk van gebiedsontwikkeling: gaat het werken?*' [The new Environmental and Planning Act and the practice of area development: Will it work?]) during a conference

called 'De Nieuwe Omgevingswet' organised by the Netherlands Construction Institute (*Nederlands Instituut voor de Bouw*) in Nieuwegein.

2 November 2010 – Edwin Buitelaar gave a lecture at a one-day course on the Dutch Spatial Planning Act (given with Professor Jan Struiksma, VU University Amsterdam) organised by the Institute for Construction Law (IBR) in The Hague.

7 October 2010 – Edwin Buitelaar was an invited speaker on the evaluation of the Dutch Spatial Planning Act for the planning and land development department of the city of Rotterdam.

21 April 2010 – Edwin Buitelaar was an invited speaker at a conference on strategic spatial planning organised by Croonen Adviseurs / Gerrichhauzen en partners in Den Bosch.

25 November 2011 – David Evers presented the findings of the second report relevant to the provincial authorities at a meeting of the provincial authorities on legal spatial planning instruments (*Interprovinciaal Vakberaad Ruimtelijke Instrumentarium*) in Utrecht.

6 September 2011 – David Evers presented a masterclass entitled 'Hoe hebben provincies de Wet ruimtelijke ordening (Wro) opgepakt?' [*How have the provincial authorities implemented the Spatial Planning Act?*] at the Groene Golfenget Conference on regional planning and the countryside at Radio Kootwijk [<http://www.groenegolfenget.nl/wp-content/uploads/2011/09/Groene-Golfenget-MC-ggl11-Rode-ontwikkeling-David-Evers.pdf>]

9 September 2010 – David Evers presented the findings of the first report to the Provincial Council of Flevoland.

23 September 2010 – David Evers and Niels Sorel presented the first report at a PBL internal lecture in The Hague.

26 March 2010 – David Evers presented the findings of the first report relevant to the provincial authorities at a meeting of the provincial authorities on legal spatial planning instruments (*Interprovinciaal Vakberaad Ruimtelijke Instrumentarium*) in Utrecht.

- *References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an impression of how products were valued by clients, target audience(s) and other stakeholders ('impact monitoring data')*

Valuation of the ex-durante evaluation by the Minister

In a letter to the Dutch House of Representatives, the Minister of Infrastructure and the Environment complimented PBL on the 'thorough manner in which the evaluation of the Spatial Planning Act was conducted'. Also, Senator Smaling, who had submitted the motion on conduction the ex-durante evaluation, thanked the authors by email for a 'thorough and professional piece of work'.

References to the reports

The citations below give an impression of references to the report in the House of Representatives and the Senate:

... reports were submitted by the Minister to the members of the Senate and so giving effect to the Smaling motion. Dutch Senate (Eerste Kamer) 2011-2012, 30 938, L

... used by the opposition

to ask the Minister for a reaction to the findings. Dutch House of Representatives (*Tweede Kamer*) 33 135 no. 6 minutes

... used by the Minister to recommend voting against a motion

because research had already been done. Dutch House of Representatives (*Tweede Kamer*) 32127, no. 147

.. used by the Minister to answer questions by Members of Parliament

Dutch House of Representatives (*Tweede Kamer*) 32 500 XI No. 8

... to answer questions by members of the Senate

Letter of 23 November 2009.

... used by the Senate to ask questions to the Minister

regarding the new Environmental and Planning Act (*Omgevingswet*) and advising the Minister to take the practical experience since the last change of law into account. Letter of 16 May 2012

... as a data source

In the midterm review of the National Spatial Strategy (*Nota Ruimte*) of the Ministry of Infrastructure and the Environment, the ex-durante evaluation of the Spatial Planning Act was used as source of information for an overview of the application of the legal instrument by central government.

... to base new policy on

In her letter to Parliament (ENM/BSK-2012/21699) of March 2012, the Minister of Infrastructure and the Environment, on behalf of the government, referred to the second 'Ex-durante Evaluation Wro' (PBL, 2012). In this letter to the Dutch House of Representatives, the Minister informed the Members of Parliament about the procedure for preparing the forthcoming Environmental and Planning Act. With regard to the evaluation of the Spatial Planning Act (Wro), the shortening of formal procedures was mentioned as a positive gain. Also, the Minister was satisfied with the progress the provincial authorities had made in moving from a reactive style of government to a more proactive approach to achieving spatial planning goals. Finally, attention was given to PBL's concerns about introducing all kinds of new legal instruments and the uncertainty this will cause. Issues that need to be addressed when implementing the forthcoming Environmental and Planning Act are providing clear explanations on the substance and implementation of the new Act and creating institutional stability.

The evaluation reports have been referred to in a range of reports, publications and other media, as illustrated below:

... interviews were held:

Binnenlands Bestuur (a Dutch weekly magazine for government employees) interviewed Edwin Buitelaar (project leader) three times on the various PBL publications:

- Interview with Edwin Buitelaar in *Binnenlands Bestuur*, 17 February 2012: 'Nut Crisis- en herstelwet beperkt' [on the limited usefulness of the Crisis and Recovery Act]. <http://www.binnenlandsbestuur.nl/ruimte-en-milieu/nieuws/nieuws/nut-crisis-en-herstelwet-beperkt.4055560.lynkx>

- Interview with Edwin Buitelaar in *Binnenlands Bestuur*, 4 June 2010: 'Planologische procedures aanzienlijk bekort' [on the shortening of formal planning procedures].
- Interview with Edwin Buitelaar in *Binnenlands Bestuur*, 10 July 2009: 'Grote verschillen in ruimtelijk beleid' [on emerging differences between provincial spatial policies].

... the reports were quoted in several magazines, journals and other reports, for example:

- RLI (2011). Essaybundel over decentralisatie ruimtelijk beleid [Essays on decentralised spatial policies]. <http://www.rli.nl/publicaties/2011/advies/toekomst-ruimtelijk-beleid>
- Gerritsen, H. (2011). Sturen en afrekenen. Mogelijkheden ruimtelijke regie en kostenverhaal nauwelijks benut [Steering and settling up. Little use of possibilities for coordinating spatial development and recovering costs], *ROM Magazine* 1: 26–28.
- Rademaker, B. (2011). De Wabo werkt! [The Environmental Licensing (General Provisions) Act works!], *Tijdschrift voor Bouwrecht* [journal by the Institute for Construction Law (IBR)] 1: 24–31.
- VROMraad (2011). *Ruimtelijke kwaliteit*. Verkenning [Spatial Quality. Review, analysis and recommendations]. The Hague: VROMraad [former Dutch Council for Housing, Spatial Planning and the Environment]. <http://www.rli.nl/sites/default/files/aongenummerdverkenningruimtelijkekwaliteit1.pdf>
- Bregman, A. (2010). Het bestemmingsplan stuurt, maar niet bij gebiedsontwikkeling. Naschrift bij het artikel van T.H.H. van der Schoot [The local land-use plan gives direction, but not for area development. Postscript to article by T.H.H. van der Schoot] , *Tijdschrift voor Bouwrecht* [journal by the Institute for Construction Law (IBR)] 7.
- Van Buuren, P.J.J. (2009). De relatie tussen projectbesluit en bestemmingsplan onder de Wro [The relation between the project decision and the local land-use plan under the Spatial Planning Act], *Tijdschrift voor Bouwrecht* [journal by the Institute for Construction Law (IBR)] 6: 585–591.

... additional research was conducted by the VROM Inspectorate, a government agency responsible for enforcing compliance with national spatial planning legislation and monitoring use of the planning system, for example:

- VROM Inspectorate (2011). Wettelijk vooroverleg bij ruimtelijke plannen. Ex-durante onderzoek Wet ruimtelijke ordening [Statutory preliminary consultation on spatial plans. Ex-durante research Spatial Planning Act]. http://ilent.nl/Images/VI-2011-100%20Wettelijk%20vooroverleg%20bij%20ruimtelijke%20plannen_tc_m334-321903.pdf
- VROM Inspectorate (2010). De vrijstelling voorbij. Evaluatie onderzoek Wro [No more planning exemptions. Evaluation research Spatial Planning Act]. http://www.ilent.nl/Images/0086%20De%20vrijstelling%20voorbij_tc_m334-320271.pdf

... the evaluation has been used by provincial and local authorities to compare performance against other Dutch provinces/municipalities, for example:

- Municipality of Heerenveen (2012). http://www.heerenveen.nl/fileadmin/website/bestuur_en_politiek/Gemeenteraad/Mei_2012/13_Deregulering_-_raadsvoorstel.pdf

- Province of Gelderland (2010). Eerste Evaluatie Wro-agenda [Initial evaluation Wro agenda]. http://sis.prv.gelderland.nl/brondoc/PS/2010/NOTITIE/SIS_9162B2.PDF
- Province of Overijssel (2010). Eerste ervaringen met de Omgevingsverordening Overijssel 2009 [Initial experiences with the Overijssel environmental and planning ordinance]. www.overijssel.nl/sis/16301036658088.pdf

... interest groups have used the findings to support their arguments for or against particular policies, for example:

- NEPROM (27 February 2012). Wetsvoorstel permanent maken Crisis- en herstelwet en enkele verbeteringen op het terrein van het omgevingsrecht [Letter to the Minister of Infrastructure and the Environment containing legislative proposals to make the Crisis and Recovery Act permanent and suggestions to improve the environmental and planning legislation. NEPROM is the Association of Dutch Property Developers]. <http://www.neprom.nl/viewer/file.aspx?fileinfoID=1566>
- NEPROM (15 July 2010). Regeling plankosten exploitatieplan [Letter to the Minister of Infrastructure and the Environment containing suggestions to improve the system of cost recovery via the public development plan]. <http://www.neprom.nl/viewer/file.aspx?FileInfoID=1347>
- Milieufederatie Drenthe (13 September 2010). Reactie op de structuurvisie ondergrond [Letter from the Drenthe provincial environmental federation raising objections to the proposed policy for the subsoil]. www.nmfdrenthe.nl/handlers/i.aspx?id=4712

... the reports are mentioned on several websites and blogs on law and/or spatial planning, for example:

- IKCRO (<http://www.ikcro.nl/>): a daily email newsletter (more than 10,000 subscriptions) with links to news on planning, environment and water mentioned the publication of the three ex-durante evaluation reports in its email alert.
- *Cobouw* news article (7 February 2012). PBL: Crisiswet blijft goeddeels ongebruikt [PBL: Crisis and Recovery Act remains largely unused]. *Cobouw* is a newspaper and website for the construction sector. <http://www.cobouw.nl/nieuws/algemeen/2012/02/17/pbl-crisiswet-blijft-goeddeels-ongebruikt>
- <http://www.eiffel.nl/blog/blog.aspx?id=11782>
- <http://www.kei-centrum.nl/pages/28476/Ex-durante-evaluatie-Wet-ruimtelijke-ordening-tweede-rapportage.html>
- <http://www.moraal.nl/laatste-artikelen-wabo/item/1838-ex-durante-evaluatie-wet-ruimtelijke-ordening-tweede-rapportage>
- <http://www.actueelruimte.nl/2012/02/nieuwe-omgevingswet-moet-aansluiten-bij-de-bestaande-werkpraktijk/>
- <http://www.omgevingindepraktijk.nl/grondzaken/nieuws/2012/02/nieuw-e-omgevingswet-moet-aansluiten-bij-de-bestaande-werkpraktijk.html>
- <http://www.boerderij.nl/Home/Nieuws/2012/2/Wetenschap-uit-kritiek-op-permanente-crisiswet-1005674W/>

.. the reports have been cited in students' master's theses, for instance:

- Vandenbussche, J. (2012). *Plan-led versus development-led. De mogelijkheid om af te wijken van lokale ruimtelijke plannen: een rechtsvergelijkend onderzoek tussen Nederland en Engeland* [Plan-led versus development-led. The possibility of departing from local land-use

plans: A comparative legal study between the Netherlands and England]. Master's thesis, Constitutional and Administrative Law, Leiden University.

- Kwint, G.H.M.M (2010). *Is de Wet voorkeursrecht gemeenten in het licht van de nieuwe regie- en verhaalsmogelijkheden van de Grondexploitatiewet nog effectief?* [Is the Municipalities Preferential Rights Act still effective in the light of the new coordination and cost recovery powers in the Land development Act?] Master's thesis, Amsterdam School of Real Estate. <http://www.vastgoedkennis.nl/docs/mre/10/Kwint.pdf>
- Liefverink, I. (2011). *De gemeentelijke structuurvisie: doorwerking van een strategisch beleidsinstrument. Een onderzoek naar de doorwerking van het verplichte instrument 'structuurvisie' naar het gemeentelijk bestuursniveau* [The municipal's spatial strategy: The effect of a strategic policy instrument. A study of the effect of the compulsory 'spatial strategy' at the executive level of the municipal council]. Master's thesis, urban planning, Utrecht University. <http://igitur-archive.library.uu.nl/student-theses/2011-0714-200628/MasterThesisIvoLiefverink.pdf>
- Rijnberg, P. (2010). *Verdichten, Verbeteren, Vernieuwen... Verevenen? De werking van de afdeling grondexploitatie van de Wet ruimtelijke ordening bij binnenstedelijke gebiedsontwikkeling* [Densification, Improvement, Renewal...Settlement? The impact of the land development section of the Spatial Planning Act on city centre area developments]. Master's thesis, Master City Developer (MCD), Erasmus University Rotterdam. http://oathesis.eur.nl/ir/repub/asset/10341/0615_MCD6_Peter%20Rijnberg.pdf
- Soetens, M.F. (2011). *Een zoektocht naar multifunctionaliteit. Multifunctioneel ruimtegebruik als nieuwe formule voor stedelijke problemen* [A search for multifunctionality. Multifunctional land use as a new formula for urban problems]. Master's thesis, urban planning, Utrecht University. <http://www.scribd.com/doc/58964226/27/Bestemmingsplan>
- *Possible follow-up activities that emerged as a result of this project*

First, the study on the impact of environmental law on the length of formal procedures for spatial developments is a continuation of PBL's effort to improve the level of knowledge about the interaction between law and practice in spatial development. This research was published in October 2011.

- Sorel, N., E. Buitelaar, L. van den Broek, M. Galle & F. Verwest (2011). *Omgevingsrecht en het proces van gebiedsontwikkeling* [Environmental and planning legislation and the process of area development]. The Hague: PBL Netherlands Environmental Assessment Agency.

Second, in collaboration with Urhahn Urban Design (urban design and strategy consultants) a study is being carried out on the 'spontaneous city' or 'organic urban development'. The research seeks to identify the conditions needed for private entrepreneurs to develop bottom up urban initiatives. PBL's focus in this research is on the role of the government as an 'enabling state'. The legislation, and in particular environmental laws and the Spatial Planning Act, is being evaluated on how well it provides a legal framework for such developments.

- Publication is foreseen in the autumn of 2012.

Information that is relevant for evaluating the scientific quality of the research:

With regard to the **publication(s)** about this project:

- *Which publication(s) have been produced?*
Reports, articles and papers, see above under "The various products of the project".
- *Which publication(s) are/is peer reviewed, which are/is not?*
See above, under "The various products of the project".
- *How many references to these publications have been made in scientific literature?*

Source of scientific references: Elsevier's SciVerse Scopus.

Buitelaar E, M. Galle & N. Sorel (2011). Plan-led planning systems in development-led practices: An empirical analysis into the (lack of) institutionalisation of planning law, *Environment and Planning A* 43(4): 928–941. <http://dx.doi.org/10.1068/a43400>

Was cited by

- Alfasi, N., J. Almagor & I. Benenson (2012). The actual impact of comprehensive land-use plans: Insights from high resolution observations, *Land Use Policy* 29(4): 862–877.

Buitelaar, E. & N. Sorel (2010). Between the rule of law and the quest for control: Legal certainty in the Dutch planning system, *Land Use Policy* 27(3): 983–989. <http://dx.doi.org/10.1016/j.landusepol.2010.01.002>

Was cited by:

- Alfasi, N., J. Almagor & I. Benenson (2012). The actual impact of comprehensive land-use plans: Insights from high resolution observations, *Land Use Policy* 29(4): 862–877.
- Roodbol-Mekkes, P.H., A.J.J. van der Valk & W.K. Korthals Altes (2012). The Netherlands spatial planning doctrine in disarray in the 21st century, *Environment and Planning A* 44(2): 377–395.
- Nadin, V. (2012). International comparative planning methodology: Introduction to the Theme Issue, *Planning Practice and Research* 27(1): 1–5.
- Tu, J. & J. Qiu (2011). Delimitation of urban land flexible planning areas based on the spatial analysis technique of GIS, *Gaojishu Tongxin/Chinese High Technology Letters* 21(9): 992–996.
- *Which presentations of the research findings were held for a scientific audience, for example at conferences?*

10 February 2012 – Edwin Buitelaar presented the paper 'Third-party rights in the regulatory state: Understanding the reduction of planning appeal options in the Netherlands' at the Planning, Law and Property Rights (PLPR) conference in Belfast (Ireland).

7 July 2010 – Edwin Buitelaar presented the paper 'Paper versus reality: The Dutch plan-led system in a development-led practice' at the Association of European Schools of Planning (AESOP) conference in Helsinki (Finland).

10 February 2010 – David Evers presented the paper 'Provincial diversity: A preliminary assessment of the implementation of the Dutch Spatial Planning Act of 2008' at the Planning, Law and Property Rights (PLPR) conference in Dortmund (Germany).

7 May 2009 – Niels Sorel presented the paper 'The quest for control in de Nederlandse ruimtelijke ordening: Rechtszekerheid in het plannersparadijs' [The quest for control in Dutch spatial planning: Legal certainty in the Dutch 'planners paradise'] at the Plandag conference in Brussels (Belgium).

- *Is the publication the result of collaboration with other research institutes? If so, what is the scientific ranking of these institutes?*

For this project, a collaboration was entered into with the Institute for Construction Law (*Instituut voor Bouwrecht* (IBR)). IBR is a high-profile research institute in the field of environmental and construction law. Its predecessor was founded in 1959.

The statutory purpose of the institute is to independently promote the scientific knowledge and practice of construction law and the study of legal and social issues and phenomena, in general, insofar as they are significant for the knowledge of construction law. The institute's managing director is Professor M.A.B. Chao-Duivis. The executive committee is chaired by Professor J. Struikma.

- *How does the publication deal with methodological questions and uncertainties?*

See above under "Which methodological difficulties were encountered?"

- *What is the Hirsch score of individual researchers?*

Edwin Buitelaar:	5
David Evers:	4
Maike Galle:	2
Niels Sorel:	1
Others:	0



Project information

Nature Outlook 2010-2040: visions on the development of nature and landscape

Authors: Rijk van Oostenbrugge, Petra van Egmond, Arjen van Hinsberg and Ed Dammers

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Date 2012-10-15

General comments on the project 'Nature Outlook 2010-2040'

- Every four years, PBL publishes a Nature Outlook under statutory obligation.
- The Nature Outlook 2010-2040 is published at a time of important changes in nature and landscape policies. Since 1990 national policy aimed at protecting national landscapes and realizing a National Ecological Network (EHS) which should consist of 275.000 ha newly created habitats added to the 450.000 ha of existing natural areas. Now, targets are discussed, finances reduced and policies on nature, landscape, environment and spatial planning are decentralized.
- In the implementation of the current policy on nature and landscape, the focus has been directed to the National Ecological Network (EHS) in a way that has resulted in complex procedures. This applies also to the Dutch implementation of the EU Natura 2000 policy. An implication of the current approach is that few people still understand the policy on nature or feel any commitment to it.
- With this Nature Outlook, PBL aims to present perspectives for a new nature and landscape policy that is well based in society. A policy to which policy makers, experts as well as NGOs and businesses may contribute. The perspectives were analyzed using four different normative scenarios, a new approach in PBL outlooks. Learning from former outlooks, much effort was made to incorporate insights provided by stakeholders into the scenarios. Given the fact that discussions on the future direction of nature policy were ongoing during the project, PBL presented preliminary results during the project. Information was given to the ministries involved in the evaluation of the EHS policy and parliament was informed about consequences of the policy for the EHS as defined by the minister.

Information about the project itself

- *Time frame of the project*
January 2009 – Spring 2012
- *Project structure, sub-activities, and project management*

A project group consisted of 4 PBL researchers and 4 WUR (Wageningen University & Research centre) researchers. Project leaders were Rijk van Oostenbrugge and Petra van Egmond (both PBL).

The project was supervised by an external board and an internal board. The external board was headed by Maarten Hajer (director PBL), the internal board by Keimpe Wieringa (head of the department of Nature and Rural Areas). The internal board consisted of 6 members of the PBL management board (Maarten Hajer, Pieter Boot, Frank Dietz, Guus de Hollander, Dorien Manting, Ries van der Wouden) and Paul Hinssen (WUR). The external board consisted

of representatives of departments (Ministry of Economic Affairs, Agriculture and Innovation: Barto Piersma, Henk de Jong; Ministry of Infrastructure and the Environment: Cees Moons, Renske Peters; Ministry of Finance: Bart van Nierop) and CPB (Netherlands Bureau for Economic Policy Analysis: Herman Stolwijk).

The resulting publication was also reviewed by the PBL chief scientist, Arthur Petersen and the PBL head of communication, Jacqueline Timmerhuis, before publication.

In addition to the main publication a website was made (<http://themasites.pbl.nl/natureoutlook/>) and several background reports and articles were and still are published.

The scenarios of the outlook are the result of an interactive process with policy makers, NGOs and other stakeholders. Several (> 10) stakeholder workshops were organized in order to define scenarios, discuss scenario analyses and policy recommendations. Presentations (> 25) and the website were important for the interaction with public organisations on different levels, NGOs and business.

The focus was on delivering a report for national policy. However, several reports for policy decisions along the line were delivered (3 reports in 2010, 3 reports in 2011, 1 report in 2012; all in Dutch). In addition several underlying reports, articles and presentations were produced.

- *Researchers involved in the project*

Members of the project team were: Rijk van Oostenbrugge and Petra van Egmond (PBL, project leaders), Ed Dammers (PBL, scenario methodology, policy strategies, stakeholder participation), Arjen van Hinsberg (PBL, scenario outline, modeling), Wim Wiersinga (Imares-WUR, marine biodiversity), Janneke Vader (LEI-WUR, stakeholder involvement), Dick Melman (Alterra-WUR, Ecosystem services), Irma Jorritsma (Alterra-WUR, communication & coordination WUR research).

Members of the project team collaborated with numerous scientists from PBL and other research institutes during the project.

- *Researchers' experience with working at the science-policy interface*

The members of the project team all have an extensive experience in working at the science-policy interface. For example former project leaders of evaluation reports about the progress of the Dutch Nature policy (Rijk van Oostenbrugge and Petra van Egmond). Rijk van Oostenbrugge worked at the former Ministry of Agriculture, Nature and Fisheries. Wim Wiersinga worked at the environmental department of the University of Groningen and for the administrations of the province of North-Holland and the former Ministry of Agriculture, Nature and Food Quality. Ed Dammers has a lot of experience in scenario building, policy analysis, and stakeholder participation, Arjen van Hinsberg in the policy relevant use of models and data. Janneke Vader has made several publications on the commitment of people with nature (policy). Dick Melman focused on (the policy on) ecosystem services.

- *Resources (money, facilities)*

In total 5.2 m€ (3.3 m€ PBL, 1.9 m€ WUR). More than 90% for personnel costs.

- *Collaborations with other research institutes*

- Wageningen University and Research (Alterra, Imares, Agricultural Economics Institute, Centre for marine policy);
- University of Groningen;
- Centre for Agriculture and Environment (CLM).
- Bureaus specialised in communication, organisation of workshops and visualisation of results: Bureau De Heer, Wing Wageningen, Terra Incognita.

- *Method(s) of integrating knowledge from different sources*

The project was transdisciplinary in character, integrating insights from several scientific disciplines and practical insights from policy makers and stakeholders. The assessment was based on a scenario cycle in which the scenarios were developed and elaborated in an iterative and gradual way. During the approach the scenarios were built up by organising scenario workshops, doing interviews, writing essays, making maps, and modeling the expected effects. Instead of commonly used descriptive scenarios normative scenarios were built. During the scenario building insights from policymakers, stakeholders, and scientists were integrated. The outcomes were reported in various ways; i.e. scientific papers and meetings, workshops, presentations, policy reports and discussions with parliament.

- *Which models were used (and why)?*

Earlier reviews of outlooks showed that the complexity of the assessments models of PBL limited options of the use by policy makers. These complex models or 'model chains' were considered to be black boxes which didn't shed light on policy choices and their effects. Additionally, recent literature drew attention to the balance between legitimacy (relevance), salience and credibility in (model) assessments. The use of the complex models in former outlooks limited the possibility for stakeholder involvement. By using simplified models instead of complex model chains, the team tried to solve these problems. By using simplified models, the trade-off between credibility, legitimacy, and salience was changed. More attention was paid to incorporate stakeholder insights in the models and to focus on (policy) relevant driving forces and indicators. The simplified models made it easier to integrate model output with insights generated by workshops, literature review, and design activities. Furthermore, the models made it possible to integrate maps of terrestrial nature (based on model calculations) with maps of maritime nature (based on sketches). The question remains as to whether the current trade-off is an optimal one.

- *Which methodological difficulties were encountered?*

It was difficult to find a right balance between stakeholder involvement (to improve the relevance and salience of the products for policy making) and scientific analyses, since not all stakeholders ideas could be incorporated in the modeling. This problem was solved by integrating these insights into the storylines of the scenarios. The process of deriving policy messages from the scenarios in a systematic way could be improved. More efforts could have been made to further specify and elaborate the policy messages. Another aspect was finding the right balance in assessing the four perspectives with a limited number of indicators, e.g. an indicator for 'biodiversity' could easier be found than an indicator for 'ecosystem use'.

- *What were the main research findings?*

The Nature Outlook 2010-2040 shows that there are different visions and possible objectives for future nature policy. The four scenarios on nature and landscape may have a great impact on the territorial development of the Netherlands. They lead to different policy options but also identify opportunities for new coalitions and show where decisions have to be made since not all objectives can be realised on every location at the same time. An important conclusion from the Nature Outlook is that nature and landscape policies matter.

A more instrumental conclusion is that the concept of a National Ecological Network (EHS) is still very useful. The more robust such a network is, the more opportunities there will be for different objectives and combined use. Metaphorically, the network can be presented as a tree: the stronger the trunk, the bigger the crown it can wear. However, since not all uses can be combined without drawbacks, government, NGOs and business will have to make choices and priorities. The Natural Outlook indicates were combinations can or can't be found.

- *What were the conclusions from the project evaluation?*

Persons (internal as well as external), involved in the making of the Nature Outlook were interviewed and the use of the products was monitored. The results of the evaluations are published in the report 'Evaluation project Nature Outlook' (Eerdt & Kunseler, 2012; in Dutch) and the paper 'Challenges of dealing with plurality' (Kunseler, 2012; in English).

The main finding of the evaluation was that the Nature Outlook was a success because of the interaction with stakeholders. Moreover, there was influence on policy making and discussions in society. External persons who have been interviewed, asked for further, more concrete analyses and results which could be used for more specific purposes. The role of the PBL in bringing together policymakers, NGO's and business was also appreciated by external persons. The balance between stakeholder involvement and scientific analyses (see above at 'methodological difficulties') also was mentioned in the interviews. Lessons for future Outlook studies were identified and are listed in the appendix. In an additional external review the use of 40 PBL reports were investigated by the method of Contextual Response Analysis. Three of these reports were products from the 'Nature Outlook'. In the review parliamentary

use, scientific use, use in printed media (newspapers) and general societal use was evaluated. The three reports ended at the 1st, 14th and 19th place of the mostly referred studies. See the Appendix for further information "Lessons learned".

Information that is relevant for evaluating the societal quality of the research

- *Motivation for the activity*

Publishing a Nature Outlook every four years is one of the statutory obligations for the PBL.

Another reason for making the Nature Outlook (specially the focus on normative scenarios) is that important changes in nature and landscape policies and in related policy fields were initiated.

Nature policy is broadening its scope. Until recently, the focus was on biodiversity. Since MEA, TEEB, and the recent EU biodiversity strategy, the focus is broadening towards ecosystem services.

- *Target audiences, interested parties, client(s) and knowledge demand by the client(s)*

Main target audiences are politicians (Parliament) and policy makers on the national level. Other target audiences are regional politicians and policy makers, non-governmental organisations and business. Interested parties are the (scientifically oriented) press and local policy makers.

- *To what extent and for which purpose has interaction with the client and target audiences taken place?*

The project was supervised by an internal and an external board (see above, 'project structure'). Several stakeholder workshops were organised. Interim results were published in reports and on the website and were discussed during several presentations and workshops. The results were presented to the parliament, departments, provinces and NGOs.

- *The various products of the project; their availability (e.g. from the website) and the language of publication(s); the number of hard copies of publications; (possibly:) publications to present research findings to a wider audience*

- Interdepartemental research of nature policy (NL)
- Rethinking Nature Policy in the Netherlands 2 reports (NL)
- Popular edition ecosystem services (NL)
- Food, biodiversity and climate change (report) (NL)
- Website Nature Outlook 2010-2040 (NL and EN)
- Final Report Nature Outlook 2010-2040 (NL)
- Special edition journal Landscape (NL:Landschap) (reviewed). (NL)
- Summary and Findings (EN, also available from the website).

- *How research findings and conclusions were communicated to the client and whether or not recommendations to policymakers and other target audiences were made*

(Interim) findings and conclusions were communicated by presentations, intermediate reports, workshops, a final symposium, a newsletter and the website. The outlook was also presented in the Senate; the final report was offered to the State Secretary. Studies that were produced during the making of the outlook were discussed with parliament.

- *References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an impression of how products were valued by clients, target audience(s) and other stakeholders ('impact monitoring data');*

The special website was visited 62.000 times. After the presentation of the final report in January 2012 several (> 5) newspaper articles were published. Besides, newspaper articles were devoted to interim products such as Rethinking Nature Policy in the Netherlands (first version), several submitted letters, discussions in newspapers.

The House of Representatives (Parliament) asked for a reaction of the Government on the Nature Outlook.

- *Possible follow-up activities that emerged as a result of this project*

Workshops are organized for the Department of Economic Affairs, Agriculture and Innovation (EL&I); they are part of a process to renew the nature and landscape policy of the national government.

Specifications of the Nature Outlook are asked for by the provinces of Gelderland and Drenthe and for the Southwestern delta region.

The methodology of calculating biodiversity by using specific indicators has also been used in recent evaluation of the election manifestoes of the various Dutch political parties.

Information that is relevant for evaluating the scientific quality of the research

With regard to the publication(s) about this project

- *Which publication(s) have been produced?*

Final Report Nature Outlook 2010-2040 (NL)

Website Nature Outlook 2010-2040 (NL en EN)

Special edition of the journal Landschap with background articles on the Nature Outlook 2010-2040. (NL).

- Oostenbrugge, R. van, 2011. Kijkrichtingen van de natuurverkenning. In: Landschap 28/4: 160-161.

- Wit, A.J.F. de, K. Wieringa & M.A. Hajer, 2011. Natuur als strijdpunt. Veranderende politiek-maatschappelijke context en de Natuurverkenning. In: Landschap 28/4: 163-171.
- Lijster, E. de, 2011. Strijd om natuurbeleid. Op zoek naar nieuwe verhalen, symbolen en coalities. In: Landschap 28/4: 173-180.
- Dammers, E., A. van Hinsberg, J. Vader & W. Wiersinga, 2011. Scenario-ontwikkeling voor het natuurbeleid. In: Landschap 28/4: 183-191.
- Hinsberg, A. van, W.G.M van der Bilt, B de Knecht, F.J. Sijtsma & H. Leneman, 2011. Modelgebruik in de Natuurverkenning 2010-2040. De uitdagingen van het natuurbeleid geschetst en doorgerekend. In: Landschap 28/4: 199-208.
- Egmond P. van, R. van Oostenbrugge, E. Dammers, A. van Hinsberg, D. Melman, J. Vader en W. Wiersinga, 2011. Beleidsboodschappen Natuurverkenning 2010-2040, In: Landschap 28/4: 211-219.
- Wit, A.J.F. de & M.A. Hajer, 2011. De Natuurverkenning en de rol van het PBL in beleidsprocessen. In: Landschap 28/4: 221-229.

Bredenoord, H. et al (2011 and 2012): Rethinking Nature Policy in the Netherlands (in Dutch: Herijking van de Ecologische Hoofdstructuur). (NL).

Dammers, E. et al: Making scenarios for nature policy in the Netherlands. In 26th AESOP Conference 2012 Proceedings, Ankara, AESOP, p. 5430 – 5444.

Dirkx, J. (2011): Choose or share in nature policy. In: Landwerk, December 2011, pag. 5-8. (NL)

Eerdt, M. van & E. Kunsteler (2012). Evaluation of the project Nature Outlook. Internal evaluation with focus on three renewals. (NL)

Egmond, P. van & R. van Oostenbrugge (2011): Choices for the future. In: Environment, November 2011, pag. 64-65. (NL)

Grevers, A. (2011) 'Three questions about the Nature Outlook 2010-2040'. In: Building Business sustainable, june 2011. pages.14-16 (NL)

Heide, M. van der & A. Buijs (2010): The importance of TEEB for the Netherlands. PBL-Publicatienummer 500414005. (NL)

Kunseler, E.M.: Challenges of dealing with plurality. A process evaluation of the Nature Outlook of the PBL Netherlands Environmental Assessment Agency. In: 2012 Berlin Conference on the Human Dimensions of Global Environmental Change; Evidence for Sustainable Development, Berlin: 5th-6th October 2012.

Oostenbrugge, R. van et al (2010): Nature a luxury or a necessity; movements in nature policy. In: De Levende Natuur, september 2010, pag. 208-210. (NL)

Oostenbrugge, R. van et al. (2010): What nature offers to people: ecosystem services in the Netherlands. PBL-Publicatienummer 500414002. (NL)

PBL (2010): Pathways to a new nature policy; a contribution to discussion. (NL)

PBL & CPB (2010): Judgement of proposals for cutbacks in the fields of environment and nature. (NL)

Sijtsma, F.J. et al (2011): The effects of choices in nature policy. ESB, 96(4621s), pag. 29-35. (NL)

Sijtsma, F. J. et al (2012): Does 'grey' urban living lead to more 'green' holiday nights? A Netherlands Case Study. In: Landscape and Urban Planning, Volume 105, Issue 3, 15 April 2012, pag. 250–257. (NL)

Westhoek, H.J. et al (2011): Food, biodiversity and climate change. Mondial tasks and national policy. (NL)

See also <http://themasites.pbl.nl/natureoutlook/>.

- *Which publication(s) are/is peer reviewed, which are/is not?*

From the above mentioned products are reviewed: Sijtsma et al (2x) and the articles in the special edition of the Dutch journal Landschap.

- *How many references to these publications have been made in scientific literature?*

No data available.

- *Which presentations of the research findings were held for a scientific audience, for example at conferences?*

Ed Dammers: scenario method.

Dick Melman: ecosystem services.

- *Is the publication the result of collaboration with other research institutes?*

As mentioned before, PBL collaborated with Wageningen University and Research and the University of Groningen.

Scientific ranking:

Leiden ranking 2011/2012: Wageningen UR 69, University Groningen 148.

The Times Higher Education World University Ranking 2011-2012:

Wageningen UR 75, University Groningen 134

- *How does the publication deal with methodological questions and uncertainties?*

Building normative scenarios is a rather new experience for PBL. A methodology has been developed to gradually and systematically develop and work out the elements of the scenarios: scenario base, perspectives, context scenarios, policy messages. Much attention was paid to integrate the results from the different methods that were used (scenario workshops, modeling, essays mapping). This was done by brainstorming, co-writing, open discussions etc. Uncertainty related to the impacts of societal and physical developments on the possibilities to realise the perspectives were explored by

confronting the perspectives with the context scenarios. This was only done in a qualitative way and could be improved by doing it in a quantitative way. The methodology was presented in an international scientific workshop (see Dammers et al.), published in scientific papers (Dammers et al. 2x), and discussed with Belgian colleagues who work on outlooks and write scientific background reports.

Choice of indicators and modeling is also new and object of scientific discussion. The indicators and modeling have, until now, only been published in Dutch scientific papers (articles in Landschap and ESB) and underlying reports. International papers are still being written.

Uncertainties in model calculations have, until now, also been reported in underlying reports.

With regard to individual researchers, what is:

- *Their position within research networks (possible university affiliations)*

Dick Melman: Member of CoP ecosystem services.

Ed Dammers: member of the Network Foresight

Arjen van Hinsberg: Member of Expert group on critical limits and critical loads for nitrogen deposition of UN/ECE. Member of EU Expert group on Biodiversity Indicators. Dutch National Focal Centre (NFC) on effects of long range transboundary air pollution, with extensive network of other NFC's in Pan-Europe.

- *Their membership of scientific groups, advisory committees, etc.*

Dick Melman: Member of Kenniskring weidevogellandschap (knowledge-community on Waders and their landscape); Member of NWC (natuurwetenschappelijke commissie, scientific committee) Zuid-Hollands Landschap.

- *Their presentations as invited speakers*

Arjen van Hinsberg: Several presentations on Biodiversity indicators, Effects of air pollution on biodiversity, Biodiversity Modelling in international meetings of SEBI (Streamlining European Biodiversity Indicators) and CCE (Coordination Centre of Effects).

Dick Melman: several presentations on ecosystem services (national meetings).

Rijk van Oostenbrugge: several presentations for parliament and provinces on nature policy.

Ed Dammers: several presentations of the scenarios for ministries and provinces.

- *Their scientific background (PhD. or other title)*
 - Arjen van Hinsberg: PhD. (Royal Netherlands Academy of Arts and Sciences/ University of Utrecht).
 - Petra van Egmond: Ir (Environmental Economics Wageningen University).
 - Rijk van Oostenbrugge: Drs (Biology, University of Utrecht).
 - Dick Melman: PhD. (University of Leiden).
 - Wim Wiersinga: Drs (Biology, University of Groningen), forthcoming (Ph. D) University of Wageningen: The role of political advisory committees in marine controversies’.
 - Janneke Vader: Drs (social geography, University of Amsterdam).
 - Irma Jorritsma: Ir (Biology, University of Wageningen).
 - Ed Dammers: PhD (Public administration, University of Leiden).

- *Their Hirsch index score*
 - Arjen van Hinsberg: H- index 7
 - Ed Dammers: H-index 2
 - Rijk van Oostenbrugge: H-index 2
 - Petra van Egmond: H-index 1
 - Dick Melman: H-index 1
 - Janneke Vader: H-index 1
 - Wim Wiersinga: H-index 1
 - Irma Jorritsma: unknown

Appendix: Lessons for future Outlook studies

The lessons for future Outlook studies were identified as part of the project evaluation of the Nature Outlook. Suggestions were brought forward in conversations and discussion meetings with the project team of the Nature Outlook, the management board of the PBL, with the external interviewees and with a wider group of PBL researchers. The lessons reflect suggestions based on positive experiences with the Nature Outlook and suggestions based on experiences of difficulties in the Nature Outlook and other Outlook studies. The latter resulted in suggestions for improvement. The lessons have been grouped around three topics: normative scenario building, interaction with stakeholders and interplay with policy.

Normative scenario building

1. In normative scenario building, the PBL explores the value diversity in society. The PBL takes an unbiased stance towards the plurality of societal opinions and perspectives.
2. The conditions for successful normative scenarios are:
 - a. The PBL operates independently of its clients and other stakeholders in society.
 - b. To prevent misinterpretation and selective use of the scenario study, the PBL - at all times - presents the different scenarios alongside one another in their relative positions.
 - c. There should be room for societal discussion about the policy objectives and their underlying values. The PBL keeps track of societal developments and conducts explorative conversations with societal actors to identify whether this room is available.
3. Conducive conditions for generating policy and societal impact are:
 - a. Normative scenarios are effective when they are demonstrative for and connect to ongoing societal debate. The saliency of scenarios may improve through the use of stakeholder interaction, concrete cases and visual presentation. Whereas abstractly formulated and expert-invented scenarios do not appeal to society.
 - b. Policy alignment to ongoing policy processes and appropriate timing of publications enable for acting upon 'policy windows'.
4. A set of criteria for the quality assessment of normative scenarios would be helpful. The criteria should for example address the rate of variability among stakeholders, the intensity level of stakeholder deliberation and the societal robustness of the scenarios.
5. Peer reviewed publications are useful to enhance the credibility of the applied methods and tools for normative scenarios.
6. Openness and timely publication of the methodology can accommodate criticism about the scientific quality of the study.
7. A website offers a transparent medium for (interim) reporting and extended peer review.

Interaction with stakeholders

1. Normative scenario building requires interaction with stakeholders for the purpose of obtaining input and generating discussion about the societal diversity of values and opinions.

2. It is important for experts to be explicitly aware of the aim of stakeholder involvement. They need to inform the stakeholders about their role and the use of their input in the research process.
3. The role of stakeholders in scenario building varies with the respective policy phase. In the agenda setting phase, for example, discussion about alternative policy directions and targets is useful. Whereas in the option appraisal phase, the discussion may center on the identification of concrete policy actions. In an outlook process, it is essential to be aware of the transition from one phase to the next, and the different requirements it brings for the organization of the stakeholder participation process.
4. It is recommended to make use of the Guidance for Stakeholder Participation (Hage and Leroy 2008) for specification of the purpose, focus and procedures for participation.
5. It is crucial to take enough time for the operationalisation of the stakeholder trajectory. Involvement of experienced discussion facilitators is a key for successful stakeholder interaction.
6. Conducive conditions for stakeholders to participate are:
 - a. Sense of urgency. The PBL can accommodate this condition by making reference to ongoing societal developments.
 - b. Possibility of having an (indirect) influence on the policy process. The PBL can accommodate this condition by making the role of the PBL and the outlook study explicit with respect to the policy process.
 - c. Personal knowledge gain. The PBL can accommodate this condition by putting effort in personalised knowledge transfer (in presentations and meeting).
 - d. Networking opportunities. The PBL can accommodate this condition by bringing a great variety of stakeholders together and offering room for exchange during meetings.
7. The attractiveness of scenarios for the stakeholders is enhanced with the use of concrete visual materials, such as graphics and (spatial) images.
8. Stakeholder input is one of the data sources in a scenario study and stakeholder participation is one of the methods for obtaining data. To enhance the credibility of scenarios, a combination of several data sources and methods is needed, e.g. literature review, storyline building and modeling.
9. Educational trainings are helpful to improve the interactive skills of PBL researchers.

Interplay with policy

1. Strategies for safeguarding PBL's independent position at the policy table are:
 - a. Applying a seemingly paradoxical strategy of alignment to and arguing against prevailing policy frames. The PBL always challenges policy-makers to think; in a more inclusive and integrated manner.
 - b. Communicating the set of normative scenarios in a balanced and impartial way.
 - c. Continuous reflection upon the role of the PBL at the policy table. This requires critical mass from peers both inside and outside of the PBL.
 - d. The role of the PBL at the policy table may vary in different policy settings and this may cause confusion if not explicitly addressed.
2. Interim knowledge transfer can serve to support ongoing policy processes. The risk of making irreversible knowledge claims can be prevented by

using generic expressions and making transparent and explicit what the (remaining) uncertainties are.

3. Both publications and presentations can serve as interim products, each with its specific purpose. Publications serve the goal of knowledge reporting and dissemination. Presentations serve as means for the exchange of ideas, improvement of formulations, targeting the message to different audiences and testing the level of support.
4. A variety of interim products helps to trigger the interest of policy-makers and societal actors via different pathways.
5. Awareness of the developments in ongoing policy processes is essential for a timely dissemination of useful information to policy makers.
6. Experts need to consistently formulate policy messages in line with the outcomes of previous PBL studies.

Project management at the PBL

1. Make choices explicit about the publication of interim products and prioritise the work plan accordingly.
2. Openly reflect and communicate the adjustments to the work plan and revise the priority list accordingly.
3. Improve the manageability of the project by allocating time to each separate project element and organize the time reporting accordingly.
4. More attention to the impact assessment of the benefits of projects is needed.



October 2012

Rio +20

Project information

Rio +20

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Date 2012-10-15

Information about the project itself

In 1992, countries worldwide agreed to work towards a more sustainable development that would eradicate poverty and conserve ecosystems. Although progress has been made in some areas, actions have not led to trend reversals in other, critical areas of sustainable development. These areas include providing sufficient food and modern forms of energy, preventing dangerous climate change, conserving biodiversity and controlling air pollution. Without additional effort, these sustainability objectives will also not be achieved in 2050.

This report adds to the existing literature by analysing how combinations of technological measures and consumption changes may lead to achieving these sustainability objectives simultaneously, taking into account their inter-linkages. Sufficient potential exists for achieving all of the objectives. A fundamental question is which governance structures could support the transformative changes required to meet the sustainable development objectives. We suggest a pragmatic governance approach that consists of a shared vision for 2050, consistent short-term targets, and strong policy actions by governments, building on the strength of civil society and business.

- *Time frame of the project*
late Summer 2011 - June 2012
- *Project structure, sub-activities, and project management*

	agriculture	energy	model runs	governance	management
Core team					
Detlef van Vuuren		+	+		+
Marcel Kok				+	+
Anne Gerdien Prins	+		+		
Paul Lucas		+	+		
Michel Jeuken	+		+		
Stefan van Esch	+				
Extended team					
Elke Stehfest	+		+		
Tom Kram					
Rob Alkemade	+		+		
Bert de Vries					
Stefan Slingerland		+		+	
Lex Bouwman					
Maurits van den Berg	+		+		
Jasper van Vliet		+	+		
Sebastiaan Deetman		+	+		

Outside contributions					
LEI					
ODI					
VU					

- *Researchers involved in the project: See above*
- *Researchers' experience with working at the science-policy interface*

High – most researchers have been involved in earlier projects, including interaction with policymakers, e.g. OECD Environmental Outlook, Growing within Limits
- *Resources (money, facilities)*

Overall budget 800,000 euros, including 110,000 euros for external contracts and 20,000 euros for travel and meetings
- *Possible collaborations with other research institutes*

Cooperation in project: ODI, LEI, BU
Related projects: OECD (OECD Environmental Outlook, UNEP/GEO-V partners (Global Env. Outlook), SEI (Energy Report) and IIASA (Global Energy Assessment).
- *Method(s) of integrating knowledge from different sources*

Integrated assessment modeling, combined with governance analysis
Integration in writing process (reviewing by experts from different disciplines, ample discussions among authors).
- *Which models were used (and why)?*

IMAGE model suite – Integrated Assessment Model at the right scale. Covers relevant issues of the report. Link to GISMO especially important to make connection between environment and development.
- *Which methodological difficulties were encountered?*
 - Major uncertainties with respect to 1) potential yield improvement, 2) the speed of transition processes as a result of other factors than technical
 - How to relate governance science insights and integrated assessment model outcomes
 - Consequences of integrated model coupling: decisions or mistakes earlier in the model chain carry through.
 - Timing of response strategies turned out to be difficult. Handling of multiple topics is complex.

- *What were the main research findings?*
 - For key areas of sustainable development (food, biodiversity, energy, climate) little progress has been made. It is projected that without major policy changes, targets will also not be met in the future.
 - The potential exists to meet a set of sustainable development goals in these areas. However, major transitions are required to implement this potential.
 - Major changes in governance structures are needed. Probably a pragmatic combination of strengthening the long-term vision, the use of credible short-term targets, and stronger national and international policies; policies specifically oriented towards engaging society in action offer the most potential.

- *What were the conclusions from the project evaluation?*

Conclusions from the project evaluation were that the contents of 'Roads from Rio+20' compare fairly well against the criteria of BellagioSTAMP for integrated assessments in relation to sustainable development.

In retrospect, not including a separate chapter on fresh water and a one-page summary were missed chances.

The study seems to have reached Dutch audiences and was met with appreciation. Considering potential international users, it remains an open question whether the study could not have been more useful twelve to nine months earlier. This would have required a focused and active relation with a specific client group.

Team collaboration at PBL was smooth; the collaboration with SEI was useful and resource use remained in the order of magnitude as planned – though shifted in time. The study was delayed because the economic part of the OECD baseline suffered delays. Capitalizing on its co-ownership of the baseline remains a good idea for many reasons but PBL should find a way to do so without making the planning of key projects too dependent on OECD.

In PBL projects, the phase that integrates specific analyses into a coherent assessment, including statements of significance, is at risk of being viewed as 'only' editorial or even something mechanical. However, this phase, too, requires intellectual, hard work. In fact, it is the main challenge of integrated assessment. In future projects of this type, it might be considered dealing with this step as a distinct phase, separately budgeted and designed, requiring a conscious decision to scale up the project.

Publishing the main, full report of studies like this remains necessary, next to information carriers with concise messages. Such a main, full report is important for the transparency of PBL's assessments and helpful for PBL to remain sharp on its methods and findings. The main, full report serves an important user community and, contrary to fashion, is not at all bad for PBL's profile.

Information that is relevant for evaluating the societal quality of the research

- *Motivation for the activity*
 - In June 2012, 20 years of policy-making since the 1992 Rio Conference will be evaluated. The current report aims to contribute to this evaluation by an integrated analysis of the effort required to meet a set of goals. The report integrates various topics, including integrated assessment modeling and insights from governance science. The report takes a solution-oriented approach. The elements all add to current literature and information presented to policy-makers.
 - Inaction on key sustainable development issues may lead to high costs
- *Target audiences, interested parties, client(s) and knowledge demand by the client(s)*
 - Mostly national and international policy-makers on relevant issues. Organisations have shown interest during presentations throughout the project.
- *To what extent and for which purpose has interaction with the client and target audiences taken place?*
 - Regular contact with the Dutch civil society "platform sustainable development", the inter-ministerial taskforce for Rio+20 of the Netherlands Government, workshops at ministries on basis of our report
 - Contact with relevant people at UNCSO – among others at an event organised at IIASA.
 - Interaction with related projects.
- *The various products of the project; their availability (e.g. from the website) and the language of publication(s); the number of hard copies of publications; (possibly:) popularising publications to present research findings to a wider audience*
 - Main report : printed (300 hard copies) and available on the web (language : English)
 - Summary printed separately (1000 hard copies)
 - Website will be designed to communicate main findings of the report (as part of PBL website and as a stand-alone app)
 - Scientific articles
 - Presentations (e.g. Parliament, commissions of policy-makers, Planet Under Pressure conference).
 - As we complete this form, this effort is still underway
- *How were research findings and conclusions communicated to the client and whether or not recommendations to policymakers and other target audiences were made*
 - Presentations during the project
 - Presentation after finishing the report; reports; personal contact.
- *References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an*

impression of how products were valued by clients, target audience(s) and other stakeholders ('impact monitoring data')

In the contextual response analysis (by Ad Prins, 2012; Annex 2), Rio+20 – although a recent report – got a total number of 344 references on websites.

- *Possible follow-up activities that emerged as a result of this project*
 - Still early days. A presentation was given at hearing in parliament.
 - Parliamentary questions asked to the Minister to respond to the report.

Information that is relevant for evaluating the scientific quality of the research:

With regard to the **publication(s)** about this project:

- *Which publication(s) have been produced?*
See above

- *Which publication(s) are/is peer reviewed, which are/is not?*

Main report was reviewed internally and externally. It is also intended to publish scientific articles.

- *How many references to these publications have been made in scientific literature?*

Too early.

- *Which presentations of the research findings were held for a scientific audience, for example at conferences?*

Planet under Pressure; FAO

- *Is the publication the result of collaboration with other research institutes? If so, what is the scientific ranking of these institutes?*

Yes: ODI (development knowledge), IVM-VU (governance issues) and LEI (agriculture economy knowledge).

- *How does the publication deal with methodological questions and uncertainties?*
 - Publication has description of method (Chapter 2 + annex).
Uncertainties are handled via using multiple scenarios + indicating literature ranges where possible.

With regard to **individual researchers, what is:**

- *their position within research networks (possible university affiliations);*
- *their membership of scientific groups, advisory committees, etc.*
- *their presentations as invited speakers;*
- *their scientific background (Ph.D. or other title);*
- *their personal publication record;*
- *their Hirsch index score.*

Detlef van Vuuren

Detlef van Vuuren is a senior researcher at the PBL Netherlands Environmental Assessment Agency working on integrated assessment of global environmental problems and in particular climate change. On these topics, he has published around 120 papers in scientific peer reviewed journals. Detlef van Vuuren also works part-time as professor of Integrated Assessment of Global Environmental Change at the Utrecht Sustainability. The professor position is established as part of the strategic partnership between PBL and Utrecht University in the field of environmental sciences. Detlef van Vuuren has been strongly involved with the work of the Intergovernmental Panel on Climate Change (IPCC). He was a Lead Author of IPCC's Fourth Assessment Report and is currently involved in the development of new IPCC scenarios. Detlef van Vuuren also acted as Coordinating Lead Author in the Millennium Ecosystem Assessment and the World Bank-led International Assessment of Agricultural Science and Technology Development. Since 2001, he has participated in several projects of the Stanford University-based Energy Modeling Forum (EMF) and was involved in several projects for the European Environment Agency and the European Commission on climate change issues. Detlef van Vuuren is part of the board of the Integrated Assessment Modelling Consortium and the Joint-Committee on IAM/IAV analysis. Detlef van Vuuren is part of the editorial board of Climatic Change.

Marcel Kok

Marcel Kok is a senior policy analyst at PBL working on the governance of global environmental problems, including climate change and biodiversity. Over the years, Marcel Kok has been involved in many projects that analyse the relationship between governance issues and the progress in solving environmental problems. This includes experience at the Netherlands Climate Change research programme, advice to UNEP on the Global Environmental Outlook, involvement as lead author and coordinating lead author for Global Environmental Outlook (GEO), and as project leader of several PBL projects. Marcel has published several scientific publications and co-edited two books and two special issues.

Paul Lucas

Paul Lucas is an Integrated Assessment Modeler at PBL Netherlands Environmental Assessment Agency. His work focuses on international climate policy and the link between environment and human development issues. He has been the author of 11 scientific papers. Paul Lucas has been involved as the main representative of PBL in the EU funded FP-7 project POEM. He also participated as lead author for the fourth GEO from UNEP. Furthermore, Paul Lucas is contributing on an annual basis to the World Bank's Global Monitoring Report.

Anne Gerdien Prins

Anne Gerdien Prins has worked for about 5 years at PBL as part of the Integrated Assessment Modelling looking at global agricultural and its relations with climate change, biodiversity, and development. On these topics she has been the author of 3 scientific papers. Anne Gerdien Prins is graduated as MSc in crop sciences at Wageningen University. She participated in the model analysis for the OECD environmental outlook 2012.

Michel Jeuken

Michel Jeuken has worked as part of the GLOBIO group at PBL for about 5 years, focusing on implementation and application of the GLOBIO biodiversity model. Has contributed to 3 scientific papers, and many outlooks (OECD Environmental Outlook, Global Biodiversity Outlook).

Stefan van der Esch

Stefan van der Esch has worked as a policy researcher at PBL since 2009 as part of the International Biodiversity team. His main areas of work are the options to address the drivers of global biodiversity loss, and the role that biodiversity and ecosystems play in development, including topics such as land use and degradation and sustainable trade. Prior to PBL he worked at the Dutch Ministry of Housing, Spatial Planning and Environment, mainly on the design and effectiveness of economic instruments and incentives and on rules and regulations surrounding sustainable trade. He contributed to the TEEB D1 (National and International Policymaking) study.

Publications in peer-reviewed and h-index (SCOPUS)

Detlef van Vuuren: 116 publications, H-index	26
Marcel Kok: 7 publications. H-index	5
Anne Gerdien Prins: 3 publications. H-index	2
Paul Lucas: 11 publications. H-index	9
Michel Jeuken: 1 publication; h-index	0
Stefan van Esch: 0 publications; h-index	0
Elke Stehfest: 31 publication. H-index	10
Tom Kram: 21 publication; h-index	9
Rob Alkemade: 8 publication; h-index	7
Bert de Vries: 35 publications; h-index	16
Stefan Slingerland: 5 publications; h-index	2
Jasper van Vliet: 15 publications; h-index	7
Sebastiaan Deetman: 3 publications; h-index	1
Lex Bouwman: 99 publications; h-index	31
Maurits van den Berg: 7 publications; h-index	2



October 2012

The Energetic Society

Project information

The Energetic Society

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Date 2012-10-15

Information about the project itself

- *Introduction*

Outline of the aims and purposes:

The project aimed to be a new kind of product of PBL. It goes beyond describing the problems in the lived environment and their causes, synergies, trade-offs and possible future scenarios. It wants to give government a perspective on how to deal with these problems.

The idea of the project originated from discussions about sustainable urbanisation. What is sustainable urbanisation? Several opinions exist and theoretical debates may have the upper hand. The example of Robert Moses and Jane Jacobs, two New York city planners who had very different views on urbanisation, made us think about what we could do to make cities more sustainable and specifically what kind of governance arrangements are needed for that purpose. The technocratic way focuses on blue prints of future cities. An alternative way is to stimulate interaction of groups and people with ideas and linking together all kinds of bottom up initiatives. PBL could pay attention to these different governance styles and their possibilities to bring about more sustainable cities.

As at the same time, the decision came to publish the State of the Environment (Balans van de leefomgeving) once every two years, the idea came up to alternate these evaluative reports with essays on trends and developments in society that are important in spatial planning and environmental policy. Thus the first trends report was born, "The Energetic Society" and a new product in the portfolio of PBL.

- *Time frame of the project*

The project was carried from January to June 2011. The publication dates from June 2011. Preliminary discussions on sustainable urbanisation had been going on for some time.

- *Project structure, sub-activities, and project management*

The project leader was Sonja Kruitwagen, the lead author Maarten Hajer. The project was supervised by a board consisting of three members of the PBL management board (Ries van der Wouden, Frank Dietz, Pieter Boot). The resulting publication was evaluated by the PBL chief scientist, Arthur Petersen, and the PBL head of communication before publication.

- *Researchers involved in the project*

Researchers involved in the project were:

Sonja Kruitwagen
Albert Faber
Hiddo Huitzing
Anton van Hoorn
Daniëlle Snellen
Maarten Hajer

- *Researchers' experience with working at the science-policy interface*

Most are experienced researchers in the science-policy-interface Daniëlle Snellen for example worked on the Outlook on Spatial Developments (2011), Anton van Hoorn worked on the Outlook on Regional Airports, Albert Faber worked on innovations for sustainable development, Sonja Kruitwagen on tradeable emission permits. Hiddo Huitzing works for the national focal point (European Environment Agency). Maarten Hajer is known for his publications on authoritative governance and deliberative governance.

- *Resources (money, facilities)*

Resources used: 233 k€; hours: 220.

- *Possible collaborations with other research institutes*

No official collaboration with other research institutes, but informal discussions with other researchers. There were several meetings discussing the concept and ideas of the project with external and internal researchers, government officials, NGO's and other societal actors – amongst others professor Pieter Leroy of Raboud University Nijmegen, Erik Stam of Utrecht University and Marleen Stikker of the Waag Society, etc.

- *Method(s) of integrating knowledge from different sources*

Integration of qualitative knowledge, combining sociological knowledge and knowledge on governance. One reason for writing this report was the impression that integrated knowledge did not appeal enough and did not "land". The essay can be considered as an attempt to reframe the debate.

- *Which models were used (and why)?*

Mental models on modes of governance. A typology of governance is needed to address the question what type of governance is best suited in particular circumstances to try to solve an environmental problem.

- *Which methodological difficulties were encountered?*

Combining knowledge from sociological and political sciences with the results of PBL environmental assessments in order to use concepts of governance, transition and reflexive modernity thinking to give a signal of societal developments and a possible government reaction.

- *What were the main research findings?*

The creativity and innovative capacity of citizens and companies offers opportunities for "green growth". Making use of this potential in society requires a change of mind and a change of action by central government. PBL makes suggestions for a new role of government in the present society. Perspectives such as green growth, predicted (global) competition for resources, and the opportunities available to an energetic society for finding new technologies and solutions – these all result in a vision on how governance could be applied. A vision of a government that sets clear objectives then mainly facilitates, promotes learning and supports innovators. This vision on government steering includes at least five elements: (1) positioning, (2) infrastructure, (3) regulation, (4) financial instruments, and (5) monitoring and feedback. These elements are never employed in isolation. A governance philosophy uses them to create a coherent mix of governance tools. A focal point, therefore, could be the aim to mobilise the energetic society in order to achieve the objectives of sustainability.

- *What were the conclusions from the project evaluation?*

The Energetic Society is a trends report, an essay. A rather personal reflection of Maarten Hajer, PBL's director. The central theory on which the essay is based, is about the responsible citizen, who is eager to learn and energetic. There are no research results to underpin the supposition that an approach focused on the responsible citizen will be effective and deliver more than policy up till now.

For some, the question is whether the approach by civic governance is meant as a substitute for or as a supplement to present policies. What would be the aims of government if it would follow this approach?

The scientific underpinning of the report is weak as is often the case in essays that look at trends in society.

The results of the work of PBL are only to a limited degree shown in this essay. Last conclusion: the definition of a trends report needs more elaboration.

- **Information that is relevant for evaluating the societal quality of the research**

- *Motivation for the activity*

The motivation for the activity came from the observation that in the present society with its multilevel governance and complex, multi-stakeholder issues, the question becomes more and more how governments can respond to those complex problems and which options are available to governments. More specifically is the issue of how the knowledge, know-how and creativity available within society could be utilised more than currently for sustainable production and consumption to take root, and what this perspective means for government strategies. A new division of responsibilities is needed.

PBL is good at describing the present situation and possible future scenarios but the "how to"-question needs more attention in environmental analyses.

- *Target audiences, interested parties, client(s) and knowledge demand by the client(s)*

Target audiences are policy makers, politicians, people involved in policy implementation at various levels, citizens, societal actors such as environmental organisations, businesses, and scientists.

- *To what extent and for which purpose has interaction with the client and target audiences taken place?*

PBL has followed an active strategy of informing these target audiences ("getting landing rights"). PBL has an informal agreement with the ministries involved, to publish a trends report every other year, alternating with the publication of the "Balans van de Leefomgeving" (State of the Environment). The original ideas have been presented in meetings with top policy makers and have been discussed with them.

- *The various products of the project; their availability (e.g. from the website) and the language of publication(s); the number of hard copies of publications; (possibly:) popularising publications to present research findings to a wider audience*

The book "The Energetic Society. In search for a steering philosophy for a clean economy" has been published as the first of a new series on trends reports by PBL. It has a proper format and proper lay out, which differs from those of other PBL publications. It has also been translated and published in English. It got a record number of visitors and downloads from the PBL website. The report is also available as an E-book.

- *How research findings and conclusions were communicated to the client and whether or not recommendations to policymakers and other target audiences were made*

The report has been presented in the ICIM, the Interdepartmental Committee on Infrastructure and the Environment. Presentations in several meetings with departmental top officials. Maarten Hajer has also presented the report to the Prime Minister of the Netherlands.

Not all requests for presentation of the report could be granted.

- *References to newspaper articles, policy documents, parliamentary discussions, interviews, public discussions, blogs and website references, providing an impression of how products were valued by clients, target audience(s) and other stakeholders ('impact monitoring data');*

Interviews with Maarten Hajer on BNR news radio, article in the Financiële Telegraaf (newspaper, June), interview in NRC newspaper (October). Five articles appeared in the printed news media in total. There was an interview in Down-to-earth, the magazine of Milieudefensie (Dutch Friends of the Earth). References in various blogs, columns, newsletters.

See also: <http://vimeo.com/31424124>, Maarten Hajer on PICNIC Festival 2011

A total of 144 websites referred to the report on the internet (see report of Ad Prins¹, 2012). The report attracted most visitors (8623) and downloads (2275, plus 274 e-book) on the PBL website in the period 2010-2012.

- *Possible follow-up activities that emerged as a result of this project*

The Ministry of Infrastructure and the Environment has taken up the theme in its Strategic Knowledge and Innovation Agenda. The Ministry also requested PBL to help in the further elaboration of the ideas.

In PBL itself too, meetings have been organised to discuss the question how the ideas from the Energetic Society may be put into place. In various PBL projects, the ideas now get attention and a follow-up.

The project "Orde van Grootte" (order of magnitude) is a project started to see whether knowledge that is available at PBL can be used and presented in new ways.

- **Information that is relevant for evaluating the scientific quality of the research**

With regard to the publication(s) about this project

Which publication(s) have been produced?

'The Energetic Society' is the first of a new series of publications and, as such, is not representative of the standard repertoire of PBL publications. It differs from other PBL products in its investigative aspect and in the choice of governance philosophy as the central issue.

- *Which publication(s) are/is peer reviewed, which are/is not?*

A draft version of the report was subjected to peer review by a number of scientists.

- *How many references to these publications have been made in scientific literature?*

No data available

- *Which presentations of the research findings were held for a scientific audience, for example at conferences?*

No data available. See also the answer to the next question.

- *Is the publication the result of collaboration with other research institutes? If so, what is the scientific ranking of these institutes?*

The Energetic Society is not the product of cooperation with other research institutes, but a draft version has been subject of discussions with a number of scientists and with public administration officials and representatives of civil society

¹ Ad Prins, 2012. *Contextual Response Analysis of reports of the PBL Netherlands Environmental Assessment Agency. August 2012. Annex of the self-evaluation report of PBL*

- *How does the publication deal with methodological questions and uncertainties?*

The energetic society is written as an essay to provoke new ways of thinking. Methodological questions as such are not addressed. What is addressed, are the uncertainties and limitations of traditional thinking with respect to addressing global environmental problems and the lack of consideration of alternative governance arrangements

- ***With regard to individual researchers, what is:***
- *Their position within research networks (possible university affiliations)*
- *Their scientific background (PhD. or other title) and membership of scientific groups, advisory committees, etc.*

Maarten Hajer is professor of Public Administration at Amsterdam University (UvA) and honorary professor at Copenhagen University. Hajer holds MA degrees in Urban and Regional Planning (UvA, 1987 Cum Laude), Political Science (UvA, 1988 Cum Laude); as well as a D.Phil. in Politics (University of Oxford, 1993). During the 1990s he worked as researcher at the Leyden Institute for Law and Public Policy (1991-1993), as 'wissenschaftlicher Mitarbeiter' with Ulrich Beck at the Ludwig-Maximilians-Universität in Munich (1993-1996) and as senior researcher at the Scientific Council for Government Policy (WRR), The Hague (1996-1998), after which he was appointed Chair at Amsterdam University (UvA).

Sonja Kruitwagen is a senior researcher of PBL. She holds a degree in environmental economics. Her dissertation is about the economic analysis of tradeable emission permits for sulfur dioxide emissions in Europe. In 2000 she joined the Netherlands Environmental Assessment Agency. She has been involved in integrated assessment projects, cost-benefit analysis and scenario studies on emissions.

Hiddo Huitzing is researcher of PBL. Huitzing holds an MSc degree in Physical Geography (University of Utrecht, 2000) and is working on his master thesis for an MSc in Political Science (University of Amsterdam). From 2000 to 2006 he worked as a consultant and product manager of environmental software for two environmental consultancies. From 2006 onwards he is working at PBL, currently as a project manager data and information, national focal point for the EEA (European Environmental Agency) and researcher on information and the environment.

Anton van Hoorn is a senior researcher of PBL. He was i.a. a co-author of various reports on the State of Spatial Planning ("Staat van de Ruimte") and collaborates in the international Urban Age project.

Daniëlle Snellen is a senior researcher of PBL. She holds a degree in urban planning (Technical University of Eindhoven (TU/e) – 1995). Her dissertation (2002) is about urban form and activity travel patterns. From 2000-2002 she worked as a consultant with SGB0, primarily working for local government. In 2002 she joined the Netherlands Institute for Spatial Research (RPB), the predecessor of PBL. She is an experienced researcher in the field of mobility,

transport, urban planning and urbanization. Recent projects are the Outlook on Spatial Developments and the State of the Environment. She is a member of the organizing committee of the yearly Colloquium Vervoersplanologisch Speurwerk (conference on transport and spatial planning)

Albert Faber now works for the Scientific Council for Government Policy in The Hague (since 2012). He also works as a PhD. researcher at Utrecht University, on an evolutionary assessment of systemic barriers and opportunities for sustainability transitions

. *their scientific background (PhD. or other title)*

Sonja Kruitwagen has a PhD in environmental economics.

Albert Faber MSc, a PhD researcher at Utrecht University, on economy and transition science.

Hiddo Huitzing is MSc in Physical Geography (Utrecht University, 2000)

Anton van Hoorn is an urban planning engineer.

Daniëlle Snellen is an urban planning engineer and has a PhD in urban planning.

Maarten Hajer is professor of Public Administration at Amsterdam University

. *their membership of scientific bodies, advisory committees, etc.:*

Maarten Hajer is an advisory member of several committees and councils. For example the Advisory Council on Infrastructure and the Environment.

. *their Hirsch index score according to SCOPUS.*

(Note: SCOPUS is not very well equipped for the social sciences)

Maarten Hajer, H-index:	7
Sonja Kruitwagen: H-index:	3
Daniëlle Snellen: H-index:	2
Albert Faber: H-index:	2
Anton van Hoorn: H-index:	-
Hiddo Huitzing: H-index:	-

• *According to Google Scholar:*

Maarten Hajer, H-index:	30
Sonja Kruitwagen: H-index:	4
Daniëlle Snellen: H-index:	4
Albert Faber: H-index:	6