Applying a Discourse Approach to Understand the Local Mitigation Dominance over Adaptation

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This paper is prepared for the IGS-SENSE conference 'Resilient Societies: Governing Risk and Vulnerability for Water, Energy and Climate Change', Enschede, The Netherlands, 19-21 October 2011

DRAFT PAPER – PLEASE DO NOT CITE!

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Abstract. The climate change literature increasingly recognizes the need to link the domains of climate change and sustainable development. The IPCC suggested that both mitigation and adaptation are more effective if framed in a sustainable development context. In policy contexts, however, most priority is given to mitigation. This also counts for the Netherlands, where the landscape has been created by water engineers and whose political culture of consensus is said to have medieval roots as agreement was needed to find joint solutions for the "war against the water". Why has mitigation become the leading operationalization of sustainable development in a country where two-third of the territory is vulnerable to flooding, a risk that is only to increase by climate change? Applying the method of discourse analysis on empirical data from subnational governments in the Netherlands, this contribution tries to increase our understanding of the mitigation predominance in the sustainable development discourse.

Keywords: Sustainable development; discourse analysis; climate change policy; local government; the Netherlands

1 Introducing the local mitigation-adaptation dichotomy

Let alone the scenarios one prefers, losses from climate change impacts will only increase due to economic and population growth (Bouwer 2010). With civil protection traditionally being its major *raison d'être,* government should prepare their communities to limit the impacts of these events. Particularly in developed countries that run high-risk, one would expect a strong focus on adaptation as one of the major tactics for the transformation to a more sustainable society. The high adaptive capacity in these countries, however, does not correlate with a high level of action (Parry et al 2007). But why is that so?

Local governments have been address in several studies as key in the transformation process (Aall and Norland 2005; Granberg and Elander 2007; Lindseth 2003; Storbjörk 2007; Wilson 2006). Several arguments can be brought up for focussing at the local level. First, of all governments it is the level that has most contact with citizens and local businesses offering opportunities for making an example and for facilitating local action. Further, many transformative potential is present as many local decisions directly affect the environment, such as its authorities over local transportation, spatial planning and economical maters. In contrast to the global efforts on mitigation, adaptation is being presented as a typical local issue (VROM-raad 2007). Whereas mitigation is a global issue on with you as a small community have limited effect, adaptation directly concerns the protection of your own community. And while mitigation efforts are hardly visual, adaptation measures can be increasing the local support for these measures. But adaptation also has negative connotations (Pielke 1998). Whereas mitigation is seen as good, as it is about united action, adaptation can be seen as lazy, fatalist waiting. Adaptation is can be seen as 'against' mitigation, as one can limit its mitigation efforts and compensate this by adaptation, therefore limiting the importance of mitigation as the best method.

This study analyses the Netherlands, where half of the territory is flood prone and which is therefore considered to be one of the most vulnerable countries of the European

Union by the European Environmental Agency (EEA 2006). Recently, the national strategy *Deltaprogramma* was established to limit the impacts of this increasing risk including traditional measures such as strengthening dykes. In practice, however, particularly at the local level mitigation is seen as the ultimate climate change strategy, while adaptation is sparsely receiving attention and commonly lacking policy support. This paper explores this gap by addressing the following research question: *Why has mitigation become so dominant in the local arena in a country that is at increasing flooding risk urging for adaptation?* We hypothesise that this can be explained from the different backgrounds of the two concepts. Where adaptation is perceived as strictly belong to the water portfolio, mitigation is framed as an extension of the traditional energy saving policy that has already being well-settled in local policy making. The hypothesis can thus be formulated as: *The local mitigation dominance can be explained from its well-established roots in local environmental policy, while adaptation is 'hidden' in the local water portfolio where it is not being seen as part of climate policy.*

In the following, we explain why and how we apply discourse analysis as the general research approach. We then discuss our findings from analysing the discourses that adopted mitigation and adaptation in the Netherlands. The paper closes with the presentation of our conclusions and formulates some implications of the results from the study.

2 Applying a discursive approach on mitigation and adaptation

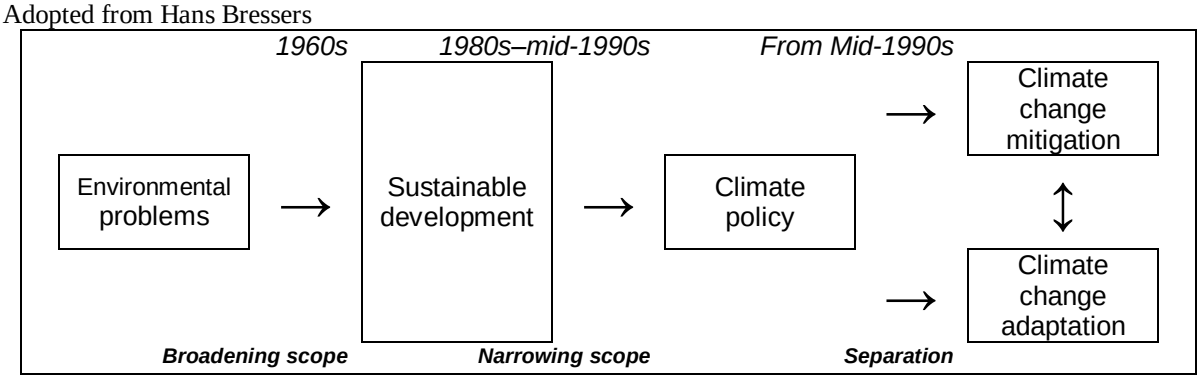
Concerns about environmental problems have generally started to commence in the 1960s. While being able to observe the planet as a whole blue and green ball from out of space, pollution had become a serious problem in developed countries. Being warned for the limits of the earth's capacity to sustain our society by the Club of Rome, environmental legislation came about to tackle the first obvious pollution problems. In the course of the 1980s, sustainability started to develop as a concept – and as a discourse. Although still not being able to reach consensus on its exact meaning, the discourse "attempts to dissolve the conflicts between environmental ad economic values" (Dryzek 2005: 16). Being introduced by the Brundtland report in 1987, the discourse on sustainability commenced in a period when ecological modernisation arose, seeing economic growth and environmental protection as inextricable connected.

Discourse in common language is usually used a synonym for discussion. In social science however, discourse is considered to be a much wider concept. Here, a discourse is seen as a shared way to see the world (Dryzek 2005). Embedded in language, a discourse represents a community united around a topic as it defines meanings and solutions enabling its members to understand news and information to construct their own interpretations. Like environmental problems, discourse is not to be placed in labelled boxes as their boundaries are unclear and as they are interconnected in many ways. In addition, discourses reflect political power. Depending on the political situation, discourses can have an open access or can be closed. They even can embody power themselves as a discourse defines the way its members perceptions and values bringing certain interests to the front, and suppressing others.

In his efforts on theorising the discourse approach, Hajer (1995) has introduced the concept of storylines which entail a certain interpretation or argument within the broader discourse. A discourse is something abstracted as it supported by its members who did not met and who all have different arguments to join the discourse. Yet, while each participant has his or her own motives to contribute, these motives together can support one storyline. Hajer (1995: 13) presents an example of the conservation of rainforests: while one is more concerned over their ecological values, the other can care about the indigenous people that rely on the rainforests, while another argues the moral problem of destruction.

As the understanding of environmental problems and – its "solutions" – change over time, analysing discourses enable us to understand how interpretations have changed. This

Box 1 *Interconnectedness of Sustainable Development, Mitigation and Adaptation*
Adopted from Hans Bressers



study focuses on the discourses on mitigation and adaptation in Dutch local governance as to explain why mitigation has become a settled concept, whereas adaptation lacks this local attention. Being rather separated discourses now, the issues of mitigation and adaptation have earlier been perceived as joint climate change strategies. What started as a combat to environmental problems from the 1960s, developed into on the struggles over how to realise sustainable development in practice in the 1980s until the mid-1990s when common "solutions" were explored for a transition towards a more sustainable society. This became then settled into the concept of climate policy which intentionally united mitigation and adaption, but later adaptation became a separated issue. This development is presented in Box 1. Using the current situation of two discourses, we will discuss how the pictures of mitigation and adaptation have transformed and how both concepts have become separated on the local agenda.

The study is based on expert interviews with representatives from local governments and policy scholars who have devoted a decade or more of their working live to either implement sustainable development or to investigate how the concept is being implemented. These interviews have been completed with primary and secondary material on the interpretation of sustainable development in the Dutch context. As primary material, policy documents and advisory reports offer substantive input for our reconstruction. This is being completed with secondary material on the efforts of many others that have explored the state of sustainable development in the Netherlands offering many discursive signals that we can incorporate in our work. The next section works towards testing the hypothesis we presented and answering the research question that has guided the study.

3 Discussing the discourses on mitigation and adaptation

3.1 Mitigation and adaptation at Dutch municipalities

Currently, environmental departments in Dutch communities – considerably differing in size as numbers of inhabitants of the municipality vary – are devoting many efforts to prepare and realise local emission cuts, to save on energy and to generate renewable energy supply. Next to some obligatory tasks, these mitigation efforts are now the leading interpretation of environmental policy. Yet it goes with another name as it is commonly interpreted as climate policy, which – as it locally is perceived – covers the local attempts to move towards a more sustainable society. In their climate policy plans, municipalities refer to the depletion of resources, changes in the climate and to national and international ambitions to cut emissions. The main goal of many recent climate policy plans is to cut emissions as to become a climate-neutral municipality in one or two decennia. Being largely a voluntary topic, many municipalities refer to the *Climate Agreement* between the State and the Association of

Municipalities as the major argument for establishing a climate policy plan. The lack of national regulation on mitigation is also shown by sequential subsidy programmes to support municipalities in their efforts. We see climate policy thus being constructed both national and locally as the prevailing local scope of action to climate change.

Adaptation, on the other hand, comes in from another angle. Municipalities are responsible for the urban sewer system and are obliged to provide for sufficient water discharges in their area, while water treatment and water quality are tasks of the local Water Board. Being a rather technical portfolio involving sewer modelling, knowledge of precipitation quantities and strict regulation, this department hires experts who have an engineering background and quite depends on consulting agencies to implement reforms and new regulation. The recent experiences with increasing precipitation quantities and the knowledge of more to come, has already inspired most municipalities to make adaptation by decoupling precipitation drainage from the sewer system. Storm water now more and more is being locally stored in channels, underground tanks or even an underground parking garage. In this community of water experts, adaptation as such is not considered. Anticipating the increasing rain is seen as just another rule that needs to be implemented like there have been many before. Many civil servants at the water department are quite sceptical towards the news on climate change, not always 'believing' the panic to be appropriate: "There was also so much fuss about acid rain", one respondent indicated, "and didn't we tackled that too?"

Of course, the sketches above show simplified pictures of local practices that do not resemble the reality in all 410 municipalities. There are some examples of front runners that have 'blown up' their local sustainably development portfolio. Interesting, for example, are initiatives like local energy companies where both the public and the private sector cooperate in generating renewable energy. Local realities very much depend on the actors involved in what interpretation is given to sustainable development: In municipalities where the environment is a green party portfolio, it is likely that the local interpretation of sustainability is broader than when another political party bears responsibilities over it (Van den Berg, Lafferty and Coenen 2010).

3.2 Analysing discursive shifts

The climate/mitigation discourse followed the traditional environmental discourse which was recently being broadened with the introduction of sustainability in the early nineties. Introducing Brundtland's report in the Netherlands, the National Institute for Public Health and Environmental Protection (RIVM) delivered its *Zorgen voor Morgen* report in 1988 telling us that the quality of the environment will deteriorate if the current (that is: 1988's) trends will be extended (RIVM 1988). The writers conclude with the alarming message that an emissions-cut of eighty per cent is needed to prevent future temperature rise. Next to this, the Minister of the Environment underlines in the foreword to the report is the difficulty that international negotiations are often not being characterised by their speed. The storyline of sustainability, in short, could only 'reshape' the environmental discourse as it only more emphasised the urgency that was already commonly felt among its members. Box 2 shows how the environmental discourse was 'blown up' to accommodate the broader sustainability concept. Sustainability was seized by the environmental discourse as its new strategy for strengthening environmental policy to prevent increasing polluting. In various following national plans, this new storyline was further elaborated for environmental policies.

This 'boom' soon reached the local level too. The Association of Municipalities (VNG) published a handbook on local environmental policy with the telling subtitle 'on the road to sustainable development' and emphasising the urgency of change by drawing in the drastically emission cuts which the *Zorgen voor Morgen* stressed out earlier (VNG 1990). From their discussion of local environmental policy examples, the VNG concludes that most

of the localities are more ambitious then the national government requires indicating that the local interpretation of environmental policy seems to differ among the layers of government.

But how to bring sustainability into practice? The 1990s were devoted to discuss whether sustainability should be taken as a continuing of the traditional interpretation of environmental decline as expressed in *Zorgen voor Morgen* or whether sustainability should be perceived as the broader system change combining environmental and economic values. In the end, in the early 2000s it was the traditional interpretation that 'won' which was concluded by renaming environmental policy into climate policy indicating that it had reoriented its scope from the environment into climate (for example, from 2006, the State of the Climate has been yearly published by the Dutch Platform Communication on Climate Change) – not implying that the broader interpretation was completely abandoned. This narrowing, as shown in Box 2, was also advised to the national government by the Scientific Council for Government Policy (WRR). The WRR, observing that the national government tended to apply the broader perspective, recommended focusing on the traditional, ecological interpretation as it considered the broader one to be an impossible principle for policy-making (Ministerie van Algemene Zaken 2002). In the early 2000s, it then was decided that mitigation was to be the leading interpretation of sustainable development.

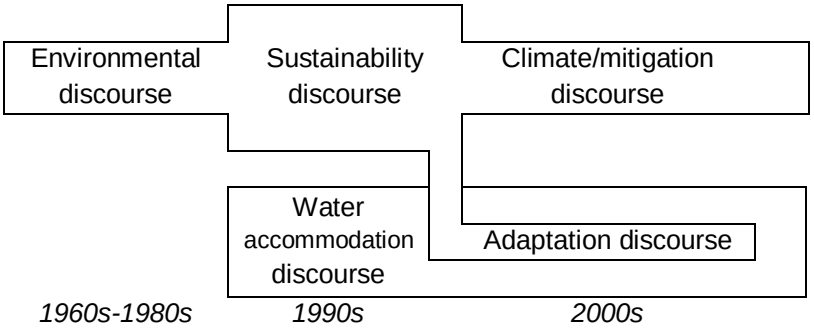
Adaptation, by contrast, came in from another angle. Having 'conquered' much of its territory from the sea, the Dutch have a strong tradition of post-event adaptation to flooding. When dykes breeched, they were rebuild and strengthened. After the 1953 North Sea Flood – killing 1,850 people – the general mood was that this should never happen again. After the realisation of an extensive water engineering programme closing off river mouths and sea arms and enforcing drastic exceeding norms of up to once per 10,000 years, the Dutch 'forgot' their vulnerable location (Terpstra 2009). Only in the mid-1990s – when the major rivers in 1993 and 1995 had to discharge unusual quantities of rain and melting water from the Alps causing huge financial and physical damage – 'water' rose again on the agenda. At the same time, the traditional water authorities - one of the major advocates in the new discourse - were searching for new ways to legitimise themselves as their independency was debated. Even since the middle ages, their position had been always secured being the leading authority to prevent from flooding.

With the fresh pictures of high water causing many grievances, a new storyline came into being urging for more space to accommodate future high water levels. At the turn of the century, this newly established 'water accommodation discourse' finds its legitimatisation for urgency: adaptation to climate change. In general, we see that increasing evidence for changes in the climate and intense coverage of this in the media – and their recent habit of connecting natural hazards to climate change – leads to a 'normalisation' of climate change. For the common people, climate change is no longer likely or not, but inevitable.[1]

Being used to carry through new norms, the local water departments directly implemented the new vision. Without exception, water accommodation is being realised in new spatial projects, where it has become the standard to have a separated precipitation discharge system connected to water storage facilities. Its representatives, however, do not directly perceive their additional water storage efforts being connected to climate change. Although many indicate that they observe precipitation patterns changing, most perceive the new method as a means to prevent from flooding that was experienced in the recent past. It was clear to the representatives that past flooding experiences should be prevented in the future. Having earlier experienced accommodating changing visions about how to manage

[1] In this context, the water safety discourse uses the argument that as climate change will bring higher river discharges and increasing precipitation quantities and that this water should be better accommodated (Deltacommissaris 2011).

Box 2 *Discursive shifts in water and the environment*



water, adaptation is considered to be one of those new insights. That climate change is used as a major argument for its legitimisation, does locally not always matter.

The situation sketched above indicates that the discourses covering mitigation and adaptation are separated. Further, we observed that adaptation is locally rarely linked to climate policy or sustainable development. Our research question addressed the observation that mitigation in Dutch municipalities is the predominant interpretation of sustainable development. We hypothesized that this could be explained from the well-established roots of mitigation in the local environmental policy, while adaptation was 'hidden' in the local water portfolio where it is not being seen as part of climate policy. As an explanation for this, we can thus confirm this hypothesis.

3.3 Explanatory factors for discursive shifts

Having discussed shifts we observed in the mitigation-adaptation dichotomy, this section will try to explain these changes from a discursive perspective. First, the *origins* of both discourses considers significantly. Where mitigation was able to build on a long tradition of local energy-saving, adaptation was only recently adopted for managing the local water system yet locally the linkages with adaptation are not always being made. Well-fitting in the storylines of depleting resources, anthropogenic climate change and explosive population growth, mitigation came in as a logic yet important and slightly new construction. The more we are able to save locally, the less our impacts on climate change will be, the story goes. Enschede municipality has now calculated the emissions footprint per policy programme, and the cuts that need to be generated per programme. Recent IPCC arguments that adaptation is needed in addition to mitigation (e.g. Parry *et al* 2007), have not reached most of the Dutch municipalities. Here it is still generally considered that mitigation is the best climate change approach.

Adaptation, as it was adopted by the water accommodation discourse, was to be seen as a water topic. It came in from the discussions in the 1990s on how to bring sustainability in practice. One of its storylines connected to the water accommodation discourse and realised the adoption of adaptation. In early 2000s, adaptation was then 'sealed' in the new water management approach of Water Policy 21st century (e.g. Unie van Waterschappen 2002). Both water boards and municipalities are now busy implementing this new approach which generally means that new standards need to be carried through.

A second explanatory factor for the adaptation-mitigation dichotomy is the issue of *conceptualization* of the issue in both respective discourses. Whereas mitigation is seen as the leading approach in the climate/mitigation discourse, adaptation as adopted by the water accommodation discourse is only one of the major storylines in aiming at more space for water. Mitigation, portrayed as a common moral obligation, is addressed to 'all' as all – from the public and private sector and all citizens – will be affected by climate change while all can

'still' contribute by limiting our impacts. Public campaigns therefore now have a strong focus at reaching the general public to inspire them to contribute to the communal efforts in 'saving the planet'. The national slogan 'A better environment starts with you' (Een beter milieu begint bij jezelf), as introduced in the early 1990s, thus still proves to be rather topical.

Adaptation, by contrast, is being conceptualised as one –if not the most urgent – argument for the more space for water claim, yet it hardly addresses to the general public. Carrying out their job in silence, the specialised experts of the water sector maintain a rather internal-focussed scope – and they are given this space to 'do their job'. This independence can probably be explained from a long tradition of being responsible for water management in the country – a situation to which both the sector itself and the general public have accustomed. The urge for more water storage (and increasing flood protection measures) is being framed in this tradition. As the Dutch water systems are now in good condition and it is a safe haven, the storylines argues that measures simply must be taken to ensure future disruption and safety – and who would be against that?

Thirdly, the *nature* of both discourses differs substantively. Mitigation is discussed in a rather closed discourse having focused on energy saving, emission cuts and renewable energy from its beginning, and also in its predecessors. This was its traditional focus and is only limitedly changed. The discourse is not too open for new and innovative solutions as it has its strong conviction that saving on fossil fuels is the best strategy for sustainable development. Being complicated already, not too many connections outside of the discourse are being made. Further, the storylines of the climate/mitigation discourse have been changing over time while continuing aiming at the goal of saving energy and cutting emissions. Storylines have been to reach the goal with fellow authorities through national and international networks such as ICLEI's Covenant of Majors or the national Climate Alliance. Another approach was to construct a clear picture of the saving targets by aiming at becoming 'CO_2-' or 'climate neutral' in one or two decades from now – a guidebook was developed defining steps and actions towards a climate neutral municipality or province (Van Vliet, Rovers and Van den Akker 2008).

The water accommodation discourse where adaptation is tackled has a much more open scope and easily accommodated new views and storylines. Having begun in the mid-1990s – after the 1993-1995 high-water events introduced in Section 3.2 – the water accommodation discourse sought to gather various arguments to support their claim. The high-water events funded various storylines on flood prevention, while adaptation functioned as an argument to accelerate the realisation of measures that were devised. While mitigation thus became the leading storyline for sustainability, adaptation came in as a part of the discourse –if not the most dominant part. Adaptation is constructed around the storyline of more water to enter the Dutch delta from increases of precipitation and river discharges, and of sea and groundwater levels. 'Solutions' to cope with these effects are quite uniform as they are generally being framed as traditional engineering measures which change over time due to advancing insights from research and science. Realising adaptation is sometimes being presented as an ultimate example of water innovation, which in the case of Rotterdam Climate Proof proves to be a clever marketing story.

3.4 Moving further

The mitigation-adaptation dichotomy is also institutionalised at the national level. Here, the origins of mitigation (divided into energy and environment) have traditionally been separated from the adaptation field of water. These divisions have not eased attempts for local integration of mitigation and adaptation at all, since both regulation and funding possibilities traditionally are being enforced top-down following the environmental, water of energy column. With a new ministry uniting water and the environment, the integration of the

mitigation-adaptation dichotomy could theoretically be bridges. The current political situation, however, is so that sustainability is not given much priority now with a climate sceptical political party supporting a liberal-Christian democratic minority government. Sustainability is now presented as an economical concept as was shown by the minister of Economic Affairs, Agriculture and Innovation recently presenting the Green Deal initiative to simplify regulation and processes. Green Deals, framed as a means for a 'sustainable economy', are to be concluded between citizens or businesses and the national government on proposals combining renewable energy and economic growth.

The national reorientation, however, did not directly affect the local mitigation efforts. Here, governors and policy-makers still feel great enthusiasm for 'sustainability' as its mitigation interpretation. Local dynamics proof to be feed by much local input and do not depend too much on national changes. From the local perspective, the implementation of 'sustainability' looks to only have just started. There is a strong drive for saving on energy and emissions to aim at a climate neutral municipality. The local level will probably continue in this, also because saving energy simply saves money and municipalities seriously need to cut their expenses these days (e.g. debits on land-prices). One major national level dependency is the funding for climate policy. It is being received as good news that the new climate policy subsidy programme will probably be not as strict as previous ones which prescribed a number of actions that need to be taken to receive the subsidy.

4 Conclusions

This contribution has addresses the question why mitigation has become so dominant in the local arena in a country that is at increasing flooding risk urging for adaptation. We hypothesised that this could be explained from well-established roots of local mitigation in local environmental policy, while adaptation was 'hidden' in the local water portfolio where it is not being seen as part of climate policy. We were able to confirm this hypothesis by showing that the mitigation predominance was developed into the

As to interpret the differences between the discourses on adaptation and the mitigation, we established three major explanatory factors. First, *origins* of the discourses differ: whereas mitigation could grow on fertile soil being a strong energy-saving tradition in Dutch municipalities, adaptation was adopted by a new water accommodation discourse needing arguments for their water accommodation claim. Second, as for the *conceptualization* of issue in the respective discourses mitigation soon became the leading concept for the climate/mitigation discourse addressing all in society to join its saving efforts. Adaptation, perceived as one – if not the most important – argument in the water accommodation discourse was interpreted by a rather independent community of water experts addressing the water sector and not aiming too much at the public. Third, *nature* of the discourses was observed to differ. Mitigation was adopted by a rather closed discourse still concentrating at its traditional scope of saving energy and cutting emissions, while the more open water accommodation discourse was gathering new views and storylines as it was used to.

We have shown how the issues of climate change mitigation and adaptation have been framed and how this affected the way how different communities adopted the issue. Our study illustrates the importance of how issues are being perceived and how perceptions influence the way solutions are being sought. These observations are of interest for the ones who design policies. As shown in this contribution, simply making policies as a means to 'solve' things can very well not be effective as it matters how an issue is being framed and interpreted. Good policies should therefore consider the previous history and the context of a particular issue before working towards defining actions and solutions.

References

Aall, C., and Norland, I. T. (2005). *Indicators for Local-Scale Climate Vulnerability Assessments*. Oslo: Program for Research and Documentation for a Sustainable Society (ProSus).

Bouwer, L.M. (2010). *Disasters and climate change. Analyses and methods for projecting future losses from extreme weather*. Thesis. Amsterdam: IVM, Vrije Universiteit Amsterdam.

Deltacommissaris (2011). *Deltaprogramma 2012. Werk aan de delta: Maatregelen van nu, voorbereiding voor morgen*. Den Haag: 2011.

Dryzek, J. S. (2005). *The Politics of the Earth: Environmental Discourses* (2nd ed.). Oxford/New York: Oxford University Press.

EEA (European Environment Agency) (2006). *Vulnerability and adaptation to climate change in Europe*. Copenhagen: European Environment Agency.

Granberg, M., and Elander, I. (2007). Local Governance and Climate Change: Reflections on the Swedish Experience. *Local Environment, 12*(5), 537.

Hajer, M. A. (1997). *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process.* Oxford/New York: Oxford University Press.

Lindseth, G. (2003). *Addressing Climate Adaptation and Mitigation at the Local and Regional Level: Lessons for Norway*. Olso: University of Oslo.

Ministerie van Algemene Zaken (2002). *Duurzame ontwikkeling : bestuurlijke voorwaarden voor een mobiliserend beleid* (Rapporten aan de regering 62). Den Haag: Sdu Uitgevers.

Parry, M. L., Canzani, O. F., Palutikof, J. P., van der Linden, P. J., & Hanson, C. E. (2007). *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge/New York: Cambridge University Press.

Pielke Jr., R.A. (1998). Rethinking the role of adaptation in climate policy. *Global Environmental Change, 8*(2), 159-170.

RIVM (1988). *Zorgen voor Morgen. Nationale milieuverkenning 1985-2010*. RIVM: Bilthoven.

Storbjörk, S. (2007). Governing Climate Adaptation in the Local Arena: Challenges of Risk Management and Planning in Sweden. *Local Environment, 12*(5), 457.

Terpstra, T. (2009). *Flood preparedness : thoughts, feelings and intentions of the Dutch public*. Thesis. Enschede: University of Twente.

Unie van Waterschappen. (2002). *Waterbeheer 21e eeuw. WB21: aanleiding, afspraken en maatregelen*. Den Haag. Retrieved from http://www.uvw.nl/producten-wb21-normering.html.

Van den Berg, M., Lafferty, W., and Coenen, F. (2010). Adaptation to climate change induced flooding in Dutch municipalities. In Martens, P. and Chang, C.T. (Eds), *The Social and Behavioural Aspects of Climate Change: Linking Vulnerability, Adaptation and Mitigation* (pp. 130-157). Sheffield UK: Greenleaf Publishing.

Van Vliet, R., Rovers, V. and Van den Akker, D. (2008). *Stappenplan klimaatneutrale gemeentelijke/provinciale organisatie: Een generieke benadering. Eindrapport* (Rapportnummer 0820). Delft: BuildDesk Benelux B.V.

VNG (1990). *Praktijkboek gemeentelijk milieubeleid: Op weg naar duurzame ontwikkeling*. Den Haag: VNG.

VROM-raad (2007). *De hype voorbij. Klimaatverandering als structureel ruimtelijk vraagstuk* (Advies 060). Den Haag: VROM-raad.

Wilson, E. (2006). Adapting to Climate Change at the Local Level: The Spatial Planning Response. *Local Environment, 11*(6), 609-625.