

Editorial: The governance of adaptation to climate change as a multi-level, multi-sector and multi-actor challenge: a European comparative perspective

INTRODUCTION

There is increasing recognition of the need for society to adapt to the impacts of climate change, especially in the water sector. Adaptation to climatic impacts involves both infrastructural adjustments, such as reinforcing dykes or creating water storage capacity, and broader processes of societal change, such as adjusting land use planning, more efficient water use or agricultural transitions. Because of the many uncertainties surrounding climate change issues, actors are facing the challenge of developing and implementing adjustments and transitions, and of increasing the adaptive capacity of society to deal with unexpected future changes.

Although climate ‘mitigation’ has traditionally received the bulk of European media and policy attention; since, a number of years, many European countries have been developing national adaptation strategies and concrete climate change adaptation policies to cope with the impacts of climate change (Biesbroek *et al.* 2010). More recently, the European Union has launched its strategy package on adaptation to climate change in April 2013. Different countries have taken different inroads into governing this relatively new policy issue over the past decade, so it seems timely and relevant to take stock and to assess what can be learned from comparing the different ways in which EU countries have approached the governance of adaptation to climate change.

The aim of this special issue is not to ‘assess’ the current state of play for adaptation strategies and policies in Europe (e.g. by evaluating policies in terms of progress or outcomes). This has been addressed in other studies (Biesbroek *et al.* 2010; European Environment Agency 2014; Massey *et al.* 2014), and this special issue has a different ambition. Our interest is in the many facets of the governance of climate change adaptation, referring to the interactions and

arrangements between public and/or private actors that are aimed at purposefully steering collective issues of adaptation to climate change (Kooiman 2003; Termeer *et al.* 2011).

For this special issue, we adopt a European comparative perspective on the governance of climate change adaptation – still largely a blind spot in the climate policy research, with a few notable exceptions (Bauer *et al.* 2012). The aim is not so much to systematically compare EU countries on a list of governance characteristics, but rather to generate in-depth insights into how various European countries deal with specific climate change adaptation governance issues.

PAPERS AND CROSS-CUTTING ISSUES

For this special issue, we invited empirical studies comparing arrangements and processes in the governance of adaptation to climate change between European countries. In their comparisons, collectively the six papers cover five countries in western Europe: Sweden (one paper), Belgium (one paper), Germany (three papers), United Kingdom (five papers) and the Netherlands (six papers). The governance issues addressed include adaptation policy choices (Massey *et al.* 2015), leadership in regional climate change adaptation (Meijerink *et al.* 2015), rationales of resilience in flood risk policies (Wiering *et al.* 2015), policy frames and governance practices (Crabbé *et al.* 2015), state traditions and deliberative governance initiatives (Vink *et al.* 2014) and collaborative action research (Termeer *et al.* 2015).

Rather than introducing each of the papers in much detail, we will give a birds-eye overview of the insights and discussion in this special issue, structured into three cross-cutting issues. These three issues are the multi-scale, multi-sector and multi-actor challenges in the governance of climate change adaptation. The multi-scale challenge refers to the multiple scales and levels over which the governance

of climate change adaptation plays out. This involves issues like framing the scale of the climate change adaptation problem, the institutionalization of responsibilities for climate change adaptation over different levels of governance, and dealing with the tension between the governance scale and the relevant climate change adaptation problem scales. The multi-sector challenge refers to the variety of policy sectors involved in the governance of climate change adaptation. Given the cross-cutting character of climate change adaptation, decisions on whether and how to mainstream climate change adaptation over different policy sectors are of key concern here. The multi-actor challenge refers to the roles and responsibilities of actors of public and private actors in the governance of climate change adaptation. This includes questions about modes of governance, the allocation of public and private responsibilities, public-private interactions, and about the specific roles of research institutes and non-governmental organizations.

THE MULTI-SCALE CHALLENGE: GOVERNANCE OF CLIMATE CHANGE ADAPTATION ACROSS MULTIPLE SCALES AND LEVELS

Even if we take the national level as the starting point for between country comparisons of climate change adaptation, other levels of governance quickly come into the picture. Not only does the problem of climate change adaptation have an important global dimension, in some countries there is a strong regional focus in the governance of climate change adaptation, often many local measures are involved, and recently also the EU developed a climate change adaptation strategy.

In April 2013, the European Commission presented its strategy on adaptation to climate change (European Commission 2013). Until that moment, the EU focus had been on encouraging and supporting Member States to develop and implement adaptation strategies. The overall aim of the 2013 adaptation strategy package is 'to contribute to a more climate-resilient Europe' (European Commission 2013), through: (1) supporting member states to develop national adaptation strategies and take concrete actions (via guidelines and funding); (2) ensuring better-informed decision-making by providing knowledge, methods and tools, as well

as further developing the CLIMATE-ADAPT portal; and (3) climate proofing EU actions via mainstreaming climate change adaptation into EU policies and programs.

The bulk of concrete climate change adaptation policies is to be found within member states, and the increase in climate change adaptation policies adopted by European governments has accelerated; since, the European climate change adaptation strategy was adopted. Between 2005 and 2010 the total number of recorded adaptation policy measures in the EU grew with a factor of six (Massey *et al.* 2014).

Within each of the EU countries, important choices have been and are being made with respect to: (1) how to frame the scale of the climate change adaptation issue and at which governance level(s) to institutionalize the responsibility for climate change adaptation; and (2) how to deal with the tension between the levels on the governance scale and the levels in the relevant climate change adaptation problem scales.

There are different ways to frame the scale of the climate change adaptation issue, which are linked to different approaches to institutionalize and address climate change adaptation in the governance system (Vink *et al.* 2014; Crabbé *et al.* 2015; Massey *et al.* 2015). Scale framing (Lieshout *et al.* 2011, 2014) refers to the process of framing a phenomenon on a certain scale. Climate change adaptation could potentially be framed as a global issue that needs to be addressed collectively, and where some countries (e.g. industrialized countries) have responsibilities toward other countries (e.g. developing countries) for addressing the impacts of climate change. Although the UNFCCC is trying to put adaptation on the agenda as a global issue, this framing is not very visible at the level of the European countries studied in this special issue. Climate change adaptation is framed as an issue of national importance, generally deserving of a national adaptation strategy, but at the same time the nature of the climate change adaptation problem is generally framed at the regional (e.g. the Netherlands, Germany) or the local level (e.g. Sweden, Belgium and UK). Scale framing is also an important factor in the different rationales for resilience underlying flood risk policies (Wiering *et al.* 2015). It makes a difference whether resilience is understood at the system level, as a collective responsibility for the whole of society, and/or at the

individual level, as a responsibility of the individual to be prepared for adversity.

The problem of fit or mismatch between different scales is an important challenge in water and climate governance (Cash *et al.* 2006; Young 2006). Distinguishing the problem scale, i.e. the different levels at which a problem plays out in time and space, and the governance scale, i.e. the different levels at which formal and informal governance arrangements are organized to address the problem, one can assess to what extent there is a fit or mismatch between the problem scale and the governance scale (Termeer & Dewulf 2014). An obvious challenge in the domain of flood risk management in a changing climate is the mismatch between the boundaries of river basins like the Rhine, Meuse or Scheldt (problem scale), and the boundaries of the countries who are developing adaptation strategies and policies (governance scale). A cross-scale issue that figures more prominently in the papers of this special issue is the mismatch within countries between the levels on the governance scale, and the levels of the problem scale of climate change impacts. These impacts can be quite variable between different regions within one country, and these regions may not coincide with the jurisdictions of the different governance levels. In the case of the Netherlands, for example, regional 'hotspot' areas in terms of climate impacts have been used as structuring principles for organizing both the research program Knowledge for Climate (Termeer *et al.* 2015), and the policy development Delta program (Vink *et al.* 2014). These hotspot areas cut across the jurisdictions of municipalities, provinces and regional waterboards.

THE MULTI-SECTOR CHALLENGE: POLICY SPECIALIZATION OR INTEGRATION INTO EXISTING POLICY FIELDS

Given that governments play an important role in the governance of adaptation to climate change, one of the associated governance challenges is the institutional shaping of climate change adaptation. Literature on the governance of climate change adaptation, and on climate policy integration in particular, suggest public policy problems can be addressed in a number of ways. A first approach is to

create new policy sectors, with specific objectives, resources, policy instruments and expertise. Alternatively, policy objectives are integrated into existing policy sectors such as spatial planning, water management and public health. These two approaches often emerge under the labels of a 'dedicated' or 'standalone' approach and a 'mainstreaming' approach to climate change adaptation (Werners *et al.* 2009; Runhaar *et al.* 2012, 2014; Brouwer *et al.* 2013; Massey *et al.* 2014 (this issue), 2015; Brouwer *et al.* 2013; Bulkeley *et al.* 2009; Kern & Alber 2008; Uittenbroek *et al.* 2013, 2014). Figure 1 characterizes both approaches.

The EU has chosen for a mainstreaming approach for 'climate proofing EU action' (European Commission 2013), implying that adaptation objectives will be explicitly integrated in specific policy sectors. The latest EU Multiannual Financial Framework (2014–2020) states that not less than 20% of the EU budget should be climate (mitigation and adaptation) related, by mainstreaming climate into all the major EU spending programs. The EU also encourages its Member States to adopt the mainstreaming approach in national adaptation strategies and actions (European Environment Agency 2013; Massey *et al.* 2015). Literature suggests that mainstreaming (and policy integration in general) can result in synergy effects; e.g. implementing adaptation measures such as more green areas or more open water in city centers contribute to climate proofing and to environmental and spatial quality (Runhaar *et al.* 2012). Although mainstreaming has also been critiqued, particularly because of the risk for diminishing issue attention, other advantages of mainstreaming include removal of contradictions between sector-specific and adaptation objectives; a more efficient use of human, physical and financial resources; and promoting innovation in sector-specific policies (Lafferty & Hovden 2003; Adelle & Russel 2013; Rauken *et al.* 2014; Runhaar *et al.* 2014).

Both approaches to climate change adaptation are not self-evident and in practice are confronted with specific problems. In the dedicated approach for instance, political commitment for adaptation as such is important, whereas in the mainstreaming approach it is important to find a particular framing of climate change adaptation objectives in such a way that it is well connected to the objectives of other policy sectors (Uittenbroek *et al.* 2013; Cashmore & Wejs 2014).

The issue of the institutional shaping of climate change adaptation is addressed in most papers in this special issue.

	Dedicated approach	Mainstreaming approach
<i>Objective</i>	Adaptation as main objective	Adaptation as one of the objectives
<i>Policy process</i>	Linear	Dynamic
<i>Criterion for evaluation</i>	Conformance	Performance
<i>Framing of adaptation</i>	Main objective (explicit)	Added value (implicit)
<i>Political commitment</i>	Direct	Indirect
<i>Agenda-setting arena</i>	Political arena	Policy department arena
<i>Resources</i>	New assigned resources supported by new organizational structures	Reallocating resources within existing organizational structures
<i>Policy design</i>	Specific policy	Synergies in policy objectives
<i>Implementation</i>	Fast	Erratic

Figure 1 | Theoretical differences between a dedicated and a mainstreaming approach to climate change adaptation (Source: Uittenbroek 2014).

In this section, we summarize the main insights, compare these with the wider literature and reflect on new questions that emerge regarding the multi-sector dimension of climate change adaptation.

Most of the papers in this special issue deal with climate change adaptation at the national level. In many of these papers, we recognize a mainstreaming approach (although this observation is not necessarily representative). The paper by Massey *et al.* (2015) for instance compares four European countries (The Netherlands, UK, Germany and Sweden) and shows that in three of these countries a mainstreaming approach dominates. Other studies conducted in the Netherlands, Denmark and Norway suggest that also at the local level, a mainstreaming approach climate change adaptation is observed (Runhaar *et al.* 2012; Uittenbroek *et al.* 2013; Rauken *et al.* 2014), although dedicated approaches are also reported (Wejs *et al.* 2013) as well as mixes, even within cities (Uittenbroek 2014). As stated before, at EU level the mainstreaming approach is favored over a dedicated approach.

In the papers of this special issue, mainstreaming centers around the integration of flood risk management into spatial planning. Climate change is expected to enhance the frequency and severity of flood risks in the countries examined (Flanders (Belgium), Germany, the Netherlands, UK and Sweden). In spatial planning proactive measures can be taken that reduce flood exposure (e.g. by reconsidering locational choices) or reduce its impacts (e.g. by flood proofing houses).

The Netherlands form an exception climate change associated flood risks primarily stay within the responsibility

of the state department for water management, despite the emerging paradigm of ‘multi-layered safety’ which broadens flood risk management to include not only the flood defense system, but also spatial planning and emergency planning (Crabbé *et al.* 2015; Massey *et al.* 2015; Wiering *et al.* 2015). Nevertheless, in other countries flood risk management seems to be already mainstreamed in more policy sectors (spatial planning but also emergency planning).

Massey *et al.* (2015) discuss various motives for the emergence of mainstreaming approaches, which basically are reasons for not choosing a dedicated approach: a reluctance to initiate new policy sectors because of attempts to reduce regulatory burdens (UK), a general aversion to create new policies rather than improve existing ones (Germany) and a very strong tradition of subsidiarity and a resulting ‘local monopoly of planning’ (Sweden), which apparently favors a mainstreaming approach to climate change adaptation. These cases also show that these motives restrict the degrees of freedom in choosing either a mainstreaming or a dedicated approach (see also Mees & Driessen 2011).

THE MULTI-ACTOR CHALLENGE: ROLES AND RESPONSIBILITIES OF PUBLIC AND PRIVATE PARTIES

A key question in analyzing and designing institutions for climate change adaptation is what are the roles of public and private parties in the development and implementation

of adaptation policies. Public parties are governmental actors on the national, regional or local level. Private parties can be market parties, who want to make a profit, or parties which are part of the civil society, such as citizens, home owners or NGOs (Meijerink & Dicke 2008; Mees *et al.* 2013).

The roles which are played by public and private actors are related to the 'mode of governance' which is chosen to realize climate change adaptation. The literature distinguishes between three such modes of governance or coordination mechanisms: hierarchies, markets and networks (Thompson 1991). State actors may steer hierarchically by developing and imposing adaptation policies. As an example, they may define legally binding flood risk standards or inhibit urban development in flood prone areas. Market parties may enhance societal coordination through the market mechanism. For example, individual homeowners may demand flood insurance, which is offered by the insurance industry. By offering flood insurance policies, the insurance industry may contribute to a society's capacity to adapt to climate change. Finally, civil society may develop self-organizing capacity, for example, in the form of flood risk communities who prepare for evacuation. When discussing the roles of private actors, we should also mention the option of individual, autonomous adaptation. As an example, farmers experiencing changing climate conditions may decide to change crops individually. Given the focus of this special issue on the governance of climate change adaptation, the issue of individual autonomous adaptation was not addressed in the papers.

In the following, we will address the questions what are the roles of public and private parties in climate change adaptation in the countries studied, and how could the main differences between these countries be explained? In answering these questions we make a distinction between the formal allocation of responsibilities between public and private actors, and the roles which parties actually play in the formulation and realization of adaptation policies.

The papers which are included in this special issue reveal that in practice, the three modes of governance are often combined, and both public and private parties play a role in climate change adaptation. Still, the countries studied show interesting differences in the allocation of public and private responsibilities for adaptation. As an example, whereas in the Netherlands the government

bears full responsibility for integrating climate change adaptation in the domain of flood management, in the UK individual citizens inhabiting floodplains share responsibilities with state actors and the private insurance industry (Wiering *et al.* 2015). Crabbé *et al.* (2015), comparing policy frames and flood management practices in the Netherlands and Belgium, point to the path-dependent nature of this 'public-private divide' in flood management. They demonstrate how a specific framing of flood risk management leads to a specific allocation of responsibilities which in turn may reinforce the dominant frame again. Because of such path-dependencies, the allocation of responsibilities between public and private parties cannot be changed easily.

Differences in the allocation of public and private responsibilities is but one entry point for analyzing the role of public and private parties. We may also study the actual roles which are played by public and private parties in adaptation processes and practices. As an example, even though the state is formally responsible for flood safety in the Netherlands, decision-making on the water adaptation strategies in the Netherlands has been a rather open process. Within the framework of the Delta program numerous sessions were organized in which non-governmental actors were given the opportunity to bring their ideas to the table, see for example the case study on the IJsselmeer area (Vink *et al.* 2014). Still, in the Netherlands: the general public is hardly involved and market (business) and civil society are awaiting the 'core Delta decisions' (Crabbé *et al.* 2015). According to them, Flemish adaptation arrangements in the water sector are slightly more open to non-governmental actors. Vink *et al.* (2014) make an in depth analysis of network-centered deliberations between public and private actors in the UK and the Netherlands, and conclude that deliberative governance initiatives work out differently within different institutional contexts. Whereas deliberative governance within a pluralist state tradition, such as the UK, allows for negotiation and action, deliberative governance within a corporatist state tradition, such as the Netherlands, may easily lead to apathy due to an unclear division of responsibilities and ambiguous understanding of climate change. This paper shows that differences in institutional context are not only relevant for understanding differences in the division of

responsibilities between public and private parties, but also for understanding public–private interactions.

A specific form of cooperation which has developed in several western European countries is the cooperation between universities, research institutes, governmental organizations and private actors on the development of (applied) knowledge on the governance of climate change adaptation. *Termeer et al. (2015)* compare programs for producing policy relevant knowledge on adaptation in Germany and the Netherlands, and discuss both programs' collaborative design involving governmental organizations, NGOs, business, research institutions and universities. They point to the 'institutional misfit' between the logics of policy and research which hinders fruitful interaction. Interestingly, in spite of institutional differences between Germany and the Netherlands, the authors found many similarities between the two cooperation processes studied. They suggest that the organization of the knowledge arrangement as a collaborative process, the construction of boundary objects (issues that are relevant to both scientists and policy makers), and an investment in bridging capabilities are helpful in improving collaborative research programs.

Non-governmental actors may not only become involved in adaptation initiatives at the invitation of governmental actors, they may also initiate public–private cooperation themselves. *Meijerink et al. (2015)* show how a university professor and two active citizens have played crucial roles in initiating new regional adaptation practices in the Netherlands and the UK, respectively. These parties did not bear specific responsibilities, nor were they asked to participate in a joined planning process. They took initiative primarily as they were critical about the government's adaptation policies. It is shown how these individuals successfully formed alliances, and managed to establish connections with the responsible government agencies.

CONCLUDING REMARKS

In this special issue the different dimensions of the governance of climate change adaptation are studied comparatively across western European countries. Such an analysis runs the risk of focusing on the relevance of

institutional differences only. We should be aware that there are important similarities between the countries as well. Whereas, the distribution of competencies amongst levels of government, policy sectors and public and private actors, and state traditions may differ between the countries studied, the papers included in this special issue all present examples of adaptation in high-income western democracies and state-structures. This can hardly be compared to the situation in low-income countries where the impacts of climate change often are more serious, but institutions for adaptation are largely lacking.

The papers in this special issue show that the governance of climate change adaptation in western Europe is still pretty much 'work in progress'. Theoretically, climate change adaptation as a new field could benefit from its infancy, creating room for experimentation and new forms of governance. Yet, regarding the cross-cutting themes addressed above, we observe that in many cases, governance of climate change adaptations takes the form of what governments are used to, suggesting that path-dependency plays a large role in the governance of adaptation to climate change. Given that this is a young field of both practice and research, the papers in this special issue take stock of what is currently happening, and we hope you will find them worthwhile and interesting to read.

ACKNOWLEDGEMENTS

The research reported on in this special issue has been carried out in the framework of the Dutch National Research Program Knowledge for Climate (www.knowledgeforclimate.org). This research program is co-financed by the Dutch Ministry of Infrastructure and the Environment.

Guest Editors

Art Dewulf

Wageningen UR, The Netherlands

Sander Meijerink

Radboud University, The Netherlands

Hens Runhaar

Utrecht University, The Netherlands

REFERENCES

- Adelle, C. & Russel, D. 2013 [Climate policy integration: a case of déjà vu?](#) *Environ. Policy Gov.* **23**, 1–12.
- Bauer, A., Feichtinger, J. & Steurer, R. 2012 [The governance of climate change adaptation in 10 OECD countries: challenges and approaches.](#) *J. Environ. Policy Plan.* **14**, 279–304.
- Biesbroek, G. R., Swart, R. J., Carter, T. R., Cowan, C., Henrichs, T., Mela, H., Morecroft, M. D. & Rey, D. 2010 [Europe adapts to climate change: comparing national adaptation strategies.](#) *Glob. Environ. Chang.* **20**, 440–450.
- Brouwer, S., Rayner, T. & Huitema, D. 2013 [Mainstreaming climate policy: the case of climate adaptation and the implementation of EU water policy.](#) *Environ. Plan. C Gov. Policy* **31**, 134–153.
- Bulkeley, H., Schroeder, H. & Janda, K. 2009 [Cities and Climate Change: The Role of Institutions, Governance and Urban Planning.](#) *Report prepared for the World Bank Urban Research Symposium on Climate Change* June 28–30, 2009, Marseille, France.
- Cash, D. W., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., Pritchard, L. & Young, O. 2006 [Scale and cross-scale dynamics: governance and information in a multilevel world.](#) *Ecol. Soc.* **11**, article 8 [online].
- Cashmore, M. & Wejs, A. 2014 [Constructing legitimacy for climate change planning: a study of local government in Denmark.](#) *Glob. Environ. Chang.* **24**, 203–212.
- Crabbé, A., Wiering, M. & Liefferink, D. 2015 [Adapting floods management to climate change: comparing policy frames and governance practices in the low countries.](#) *J. Water Clim. Chang.* **6** (1), 55–70.
- European Commission 2013 [An EU Strategy on Adaptation to Climate Change.](#) European Commission, Brussels, Belgium.
- European Environment Agency 2013 [Adaptation in Europe. Addressing Risks and Opportunities from Climate Change in the Context of Socio-economic Developments.](#) European Environment Agency, Copenhagen, pp. 1–132.
- European Environment Agency 2014 [National Adaptation Policy Processes in European Countries.](#) European Environment Agency, Copenhagen.
- Kern, K. & Alber, G. 2008 [Governing climate change in cities: modes of urban climate governance in multi-level systems](#) *Proceedings of the OECD conference on Competitive Cities and Climate Change, Milan, Italy, 9–10 October 2008.* OECD, Paris.
- Kooiman, J. 2003 [Governing as Governance.](#) Sage, London.
- Lafferty, W. & Hovden, E. 2003 [Environmental policy integration: towards an analytical framework.](#) *Env. Polit.* **12**, 1–22.
- van Lieshout, M., Dewulf, A., Aarts, N. & Termeer, C. J. A. M. 2011 [Do scale frames matter? Scale frame mismatches in the decision making process of a 'mega farm' in a small Dutch village.](#) *Ecol. Soc.* **16** (1): 38 [online].
- van Lieshout, M., Dewulf, A., Aarts, N. & Termeer, C. J. A. M. 2014 [The power to frame the scale? Analysing scalar politics over, in and of a deliberative governance process.](#) *J. Environ. Policy Plan.* 1–24.
- Massey, E., Biesbroek, G. R., Huitema, D. & Jordan, A. 2014 [Climate policy innovation: the adoption and diffusion of adaptation policies across Europe.](#) *Glob. Environ. Chang.* **29**, 434–443.
- Massey, E., Huitema, D., Garrelts, H., Grecksch, K., Mees, H., Rayner, T., Storbjork, S., Termeer, K. & Wings, M. 2015 [Handling adaptation policy choices in Sweden, Germany, the UK and the Netherlands.](#) *J. Water Clim. Chang.* **6** (1), 9–24.
- Mees, H. L. P. & Driessen, P. P. J. 2011 [Adaptation to climate change in urban areas: climate-greening London, Rotterdam, and Toronto.](#) *Clim. Law* **2**, 251–280.
- Mees, H. L. P., Driessen, P. P. J., Runhaar, H. & Stamatelos, J. 2013 [Who governs climate adaptation? Getting green roofs for stormwater retention off the ground.](#) *J. Environ. Plan. Manag.* **56**, 802–825.
- Meijerink, S. & Dicke, W. 2008 [Shifts in the public–private divide in flood management.](#) *Int. J. Water Resour. Dev.* **24**, 499–512.
- Meijerink, S., Stiller, S. J., Keskitalo, E. C. H., Scholten, P., Smits, R. & van Lamoen, F. 2015 [The role of leadership in regional climate change adaptation: a comparison of adaptation practices initiated by governmental and non-governmental actors.](#) *J. Water Clim. Chang.* **6** (1), 25–37.
- Rauken, T., Mydske, P. K. & Winsvold, M. 2014 [Mainstreaming climate change adaptation at the local level.](#) *Local Environ.* 1–16.
- Runhaar, H., Mees, H. L. P., Wardekker, A., van der Sluijs, J. & Driessen, P. P. J. 2012 [Adaptation to climate change-related risks in Dutch urban areas: stimuli and barriers.](#) *Reg. Environ. Chang.* **12**, 777–790.
- Runhaar, H., Driessen, P. & Uittenbroek, C. 2014 [Towards a systematic framework for the analysis of environmental policy integration.](#) *Environ. Policy Gov.* **24**, 233–246.
- Termeer, C. J. A. M. & Dewulf, A. 2014 [Scale-sensitivity as a governance capability: observing, acting and enabling.](#) In: *Scale-sensitive Governance of the Environment* (F. Padt, P. F. M. Opdam, C. J. A. M. Termeer & N. Polman, eds). Wiley, Oxford, pp. 1–19.
- Termeer, C. J. A. M., Dewulf, A., Rijswick, H., Van Buuren, A., Huitema, D., Meijerink, S., Rayner, T. & Wiering, M. 2011 [The regional governance of climate adaptation: a framework for developing legitimate, effective, and resilient governance arrangements.](#) *Clim. Law* **2**, 159–179.
- Termeer, C. J. A. M., Van Buuren, A., Knieling, J. & Gottschick, M. 2015 [Reconciling collaborative action research with existing institutions: insights from Dutch and German climate knowledge programs.](#) *J. Water Clim. Chang.* **6** (1), 89–103.
- Thompson, G. 1991 [Markets, Hierarchies and Networks: The Coordination of Social Life.](#) Sage, London.
- Uittenbroek, C. J. 2014 [How Mainstream is Mainstreaming? The Integration of Climate Adaptation in Urban Policy.](#) PhD thesis.

- Uittenbroek, C. J., Janssen-Jansen, L. B. & Runhaar, H. A. C. 2013 [Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies](#). *Reg. Environ. Chang.* **13** (2), 399–411.
- Uittenbroek, C., Janssen-Jansen, L., Spit, T., Salet, W. & Runhaar, H. 2014 The role of political commitment in organising municipal responses to climate adaptation. *Environmental Politics* (forthcoming; published online).
- Vink, M. J., Benson, D., Boezeman, D., Cook, H., Dewulf, A. & Termeer, C. 2014 [Do state traditions matter? Comparing deliberative governance initiatives for climate change adaptation in Dutch corporatism and British pluralism](#). *J. Water Clim. Chang.* **6** (1), 71–88.
- Wejs, A., Harvold, K., Larsen, S. V. & Saglie, I.-L. 2013 [Legitimacy building in weak institutional settings: climate change adaptation at local level in Denmark and Norway](#). *Env. Polit.* **23**, 490–508.
- Werners, S., Sandt, K. & van de Jaspers, F. 2009 Mainstreaming climate adaptation into water management in the Netherlands: The governance of the Dutch Delta Program. In: *Amsterdam Conference on the Human Dimensions of Global Environmental Change on Earth System Governance: People, Places and the Planet*. Amsterdam, The Netherlands, pp. 2–4.
- Wiering, M., Green, C., Van Rijswijk, M., Priest, S. & Keessen, A. 2015 [The rationales of resilience in English and Dutch flood risk policies](#). *J. Water Clim. Chang.* **6** (1), 38–54.
- Young, O. R. 2006 Vertical interplay among scale-dependent environmental and resource regimes. *Ecol. Soc.* **11**, 27.