Handling adaptation policy choices in Sweden, Germany, the UK and the Netherlands
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ABSTRACT
Attention is increasing in academia towards the governance of adaptation, specifically how state and non-state actors are defining the adaptation ‘problematique’ and crafting public policies to address it. Adaptation is the ‘adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities’. The challenge for governments is taking this rather vague concept and turning it into viable and implementable public policies. This implies that they have to make choices as to the types of polices to create, the sectors they should cover, ministerial jurisdictions and funding. This article contributes to the discussion on the adaptation governance by presenting a conceptual framework that outlines policy choices governors need to make, by applying this framework to a number of countries, and starting the debate on which choice or choices were particularly instrumental in shaping adaptation policy in particular countries as a whole. It focuses on four countries traditionally seen to be adaptation leaders: Germany, the Netherlands, Sweden and the United Kingdom.

Key words | adaptation governance, climate change adaptation, European environmental policy, governance choices, public policy, water governance

INTRODUCTION
Parallel to growth in climate change adaptation policies and procedures in Europe, so too has attention been increasing towards the broader governance of adaptation; how, why and under what circumstances both state and non-state actors have begun to define the adaptation ‘problematique’ and craft public policies to address it (Massey & Bergsma 2008; Swart 2009; Aakre & Rübbelke 2010; Keskitalo 2010; Rayner & Jordan 2010; Bauer et al. 2011). It can be argued that this interest in adaptation is a direct result of its rapid expansion across the EU: in the period between 2005 and 2010, the number of policy measures addressing climate change impacts has more than doubled and to date every member state has some form of policy framework geared towards it (Massey 2010). Additionally, current research has shown a convergence of adaptation
policies in various countries and that adaptation is emerging into its own, separate policy field (Massey & Huitema 2013; Massey et al. submitted).

The movement of adaptation onto and up the agendas of EU member states has been due to both internal and external forces. On the one hand, the European Commission (as well as international organizations) have been heralding the need for immediate adaptation given that the global mean temperature will continue to rise despite the most stringent mitigation measures and that all countries will be affected. On the other hand, experience with past extreme weather events coupled with increasing public awareness of climate change impacts has pressed the need for concerted domestic policy responses (Massey et al. submitted).

Adaptation to climate change is defined as the ‘adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities’ (IPCC 2001). The challenge for governments has been in taking this rather vague concept and turning it into viable and implementable public policies. This implies that they have had to make certain choices as to the types of policies to create, the sectors they should cover, ministerial jurisdictions with responsibility, and how to fund activities. The purpose of this article is to contribute to the growing discussion on the governance of adaptation by presenting a conceptual framework that outlines which policy choices governors need to make in setting up policy arrangements, by applying this framework to a number of countries, and starting the debate on which choice or choices were particularly instrumental in shaping adaptation policy in particular countries as a whole. Working within an adapted framework for studying climate policy offered by Jordan et al. (2010), we look specifically at: (1) how countries have defined the problem; (2) the administrative levels they have applied it to; (3) the timing and sequencing of their activities; (4) the instruments and implementation methods employed; and (5) the costs and benefits. We focus on four countries: Germany, the Netherlands, Sweden and the UK. The choice of countries was based upon their similarly high level of adaptation activities, their early involvement in establishing adaptation policies, and the fact that they have been seen as adaptation ‘leaders’ (Massey & Bergsma 2008; Swart 2009).

The remainder of this article is structured as follows. In the next section we review the current literature on adaptation governance and policy-making and introduce our theoretical framework. This is followed by the section presenting our data collection and methods, and then the results section looking at how our case countries have addressed the five policy choices. In the discussion section, we highlight which choice or choices we believe were the most instrumental in shaping adaptation policy in each country, and this is followed by our conclusions.

BACKGROUND AND CONCEPTUAL FRAMEWORK

The literature on adaptation governance and policy-making began with the proposition of normative frameworks on how adaptation could/should be carried out by governments, socially, politically, administratively and economically, resulting in a substantial amount of scholarship on the topic (see e.g. Klein & Tol 1997; Smit et al. 2000; Burton et al. 2002; Adger et al. 2005, Berkhout 2005; Lim et al. 2005; Yamin 2005; Moser 2009; Aakre & Rübbelke 2010; Hinkel et al. 2010; Farber 2011). Once governments began actually formulating adaptation actions, the focus shifted towards taking stock of what was going on. This movement towards cataloguing activities was driven in large part by the EU’s need to bring some order and consistency to activities as promoted by their 2009 White Paper and help incentivize those member states who had yet to engage in adaptation (see Hulme et al. 2009).

Using the UN Framework Convention on Climate Change (UNFCCC) National Communications as their primary source, some of the first few forays into an empirical accounting of adaptation practices and procedures (Gagnon-Lebrun & Agrawala 2006; Massey & Bergsma 2008) sought to capture what countries were doing by looking at the level of attention given to adaptation across a range of sectors, the types of policies being designed, and the state of progress in implementing activities. Seeking to expand upon the existing state of knowledge about adaptation in Europe, Swart (2009) conducted a study assessing various elements of existing national adaptation strategies. Their focus was on outlining the creation of national strategies; describing the research programmes that aided in their design; cataloguing activities for knowledge dissemination; and looking at how responsibilities were shared across different scales.
of governance. Delving deeper into the scales approach, Keskitalo et al. (2010, 2012) frame their studies of adaptation in the light of multi-level governance. In it they look at what programmes and policies exist at various governance levels in different countries, the relationships between these across levels, and how adaptation came to be an item on the political agenda. Additionally, they look at how different political systems of countries have shaped adaptation and what specific policies could be potentially transferred across countries. Similarly, Juhola & Keskitalo (2011) employing a social constructivist approach, look at how adaptation has been framed across countries in terms of vulnerabilities, calculation of risks, costs for adaptation and planning measures. Bauer et al. (2012) structure their work in terms of the challenges governments face when implementing adaptation policies, stating that each country must take different actions given that climate effects will vary from country to country.

With each new study, a richer picture of how governments are handling the adaptation ‘problematic’ emerges; from the framings they choose, the challenges they face and/or institutions they develop. In an effort to expand upon this scholarship we believe that there is also value in looking at their choices governments have made in creating their adaptation policy frameworks. Governing and, subsequently, policy-making, as Jordan et al. (2010) argue, are about making choices. Governors, through their rationally bounded lenses, must gain sufficient support of various stakeholders with different (often conflicting) values to take purposive actions to solve public problems and manage public issues. Broadly speaking, this entails making decisions and confronting dilemmas on when, how and where to act (or not). More specifically, the choices governors face can be categorized into a set of overarching themes (Jordan et al. 2010). Below we detail these choices and how they can specifically relate to climate change adaptation.

**Problem choice**

Policy problems are social constructs in that they are created, framed and defined by governors and larger society alike. Causal stories are created in an effort to assign agency and meaning to a problem so as to ultimately devise ‘effective’ solutions (Parsons 1995; Stone 2002). Policy problems can be framed and defined in a myriad of ways and the manner in which they are, shapes how subsequent policy choices will be made. Arguably, the choice of problem definition is the most important given that if the ‘wrong’ or improper definition is taken, then implementation of an effective solution can be hampered or entirely neglected (Peters & Hoornbeek 2004). Nevertheless, problem framing is but one step in the formulation of public policy and while it has a major influence on design it might not necessarily be the ultimate determinant for how the policy will look (Birkland 2011).

Looking specifically towards adaptation, governments have had a range of options on how to frame and define it. More than one framing may be evident in government policy documents. For beginners, looking at the IPCC’s characterizations, adaptation could be framed as a problem of minimizing risks and sensitivity of people and nature to expected climate impacts, or as a problem of developing the capacity to cope with just extreme weather events, or conversely a problem of developing ways to take advantage of new climatic conditions, or all three (IPCC 2001). Even working within these frames, the choice could be made to define adaptation as a matter of ‘private good’ or as a ‘collective good’. It is either an issue that can be dealt with by the market place requiring little government intervention or an issue that will affect large portions of the populace with a limited capacity to act (Mendelsohn 2006; Osberghaus et al. 2010). In addition, it could be seen as a problem for only a limited number of key socio-economic sectors or a large enough issue requiring attention in all sectors. It might also be framed in terms of interstate competitiveness where early adapters were able to gain some form of economic advantage over slow-movers (IFC 2010). Lastly, it might be characterized as an issue of equity and justice, either within countries where disadvantaged groups may be particularly vulnerable, or between the developed and developing world whereby northern countries are obliged to invest in the protection and economic development of southern countries (for an explanation of this framing, see Paavola & Adger 2006)).

**Level choice**

Once a decision has been taken on how to frame a policy problem, governors must decide on which administrative level they should apply their efforts. Should emphasis be
placed on the national, regional local or international level? To be sure, while every policy will in one form or another manifest itself at the lowest possible level, perhaps even an individual citizen, the level that the policy is designed for and implemented at will have an impact on its possible success. A common adage in the adaptation literature is that while climate change is a global problem its impacts will be felt locally. This suggests that the development of adaptation policies be carried out at multiple levels (see e.g. Adger et al. 2005; Galarraga & Markandya 2011). Already adaptation is embedded at the international level with the UNFCCC and the European Commission. The choices left for nation-states are deciding what roles national, regional and local governments can play; the degree of their involvement; and the interactions between them. Is there a need for a national level policy framework or should the central government act in a more advisory, support role to the lower levels? Does primary responsibility for design and implementation reside with municipalities or the regions in which they reside? What are the roles and responsibilities for local citizenry?

Timing choice

Following the choice of where to act, comes the decision of when to engage policies and for how long such policies will be valid. Issues of timing and sequencing have direct consequential impacts for governments and societies, especially related to costs and benefits as well as efficacy. Another common adage in the adaptation discourse is that ‘we’ must adapt now before climate impacts fully manifest themselves; a view that is heartily proclaimed by the EU. Nevertheless, uncertainties over the magnitude, type, timing and location of climate impacts abound (IPCC 2007). Thus, despite the classical dilemmas policy-makers face in terms of timing and sequencing of policies, for adaptation, issues of uncertainty further compound the issue. In some cases, even though climate impacts are expected the degree and timing of the impacts remains uncertain. Should policy-makers thus take a ‘wait and see’ approach – waiting for better scientific assessments; for better attributable impacts; for other countries to take a lead they can follow? Additionally, should countries invest in long-term structural measures whose usefulness may only become apparent in 20, 50 or 100 years, or focus on more short-term immediate issues, at the risk of locking in to investments that may prove maladaptive (Stafford Smith et al. 2011)? Can solutions be developed that are flexible enough to respond to evidence as it improves? Are there priority sectors that require immediate attention?

Instruments, implementation and enforcement

Regardless of when policies are enacted, bringing them to bear effectively on problems requires choosing suitable instruments and a means of implementing and enforcing them. Salamon & Lund (1989) define policy instruments as, ‘a method through which government seeks a policy objective’. Traditionally, policy instruments are categorized as being regulatory, financial or hortatory (Birkland 2011). Moreover, regulation was the instrument of choice for environmental policy, but over the years a new range of so-called new environmental policy instruments (NEPIs) have emerged (market-based instruments, voluntary agreements, information and persuasion tools) (Jordan et al. 2005). Even with these NEPIs entering into the mainstream looking specifically towards adaptation other choices to be made are between so-called hard and soft measures (Klein & Tol 1997; Hallegatte 2009). Surrounding the choice of instrument(s) is the method in which they should be implemented – the process of enacting policy (Birkland 2011). Is adaptation to be engaged in a hierarchical manner, or a bottom up, networked fashion? In terms of enforcement, should governments follow a deterrence or compliance oriented approach to ensure that policy goals are met? What sanctions, if any, should there be for non-compliance? Moving beyond these standard distinctions, another choice presents itself for adaptation in particular. Should adaptation actions be mainstreamed into existing policies across sectors or can it be implemented through standalone policies? The EU has been making a concerted effort to have their member states adopt a mainstreaming approach and it would appear that this is the path many countries are following (Biesbroek et al. 2010).

Cost/benefit choices

The nature of climate change impacts, as stated above, is rife with uncertainty, therefore deciding how much to spend on adaptation is a daunting challenge. Economic integrated
assessment models show that under a scenario of a 2 °C rise in temperature adaptation could cost some $5 billion in the year 2020 for Western Europe, increasing to $35 billion by 2050 (Aaheim et al. 2010). For a temperature increase of 2.5 °C, the costs are even higher (Agrawala et al. 2010). Even so, these cost estimates are themselves also surrounded by a certain level of uncertainty (Watkiss 2011). Additionally, given the expected variability of impacts and their distributional unevenness, not only will different countries be affected differently but also sub-national regions. This implies that there will be winners and losers as a result of climate change within national borders (Adger et al. 2006). Governors, when choosing to implement adaptation policies, must be cognizant of these dynamics in choosing where, how and how much resources could be allocated. Lastly, there is the issue of investment: do countries choose to invest potentially costly long-term hard, structural changes or short-term, soft economical ones? (Green infrastructure or ecosystem-based adaptation however might be considered long-term soft measures.) In the following section we outline our methods of data collection and analysis used to address the questions presented in the above framework.

DATA COLLECTION AND METHODS

In regards to our data collection and methods we undertook a stepwise approach. First, the authors were divided up and assigned to study the country of their national origin. This was done so that they could access more and critically review documents in their original language. Second, the authors were given the responsibility to collect open source documents from their country that pertained to national level adaptation policy-making. Such documents included inter alia national adaptation strategies, ministerial reports, workshop summaries, budget documents, academic literature, etc. On average, 30 documents were analyzed per country. In doing the analysis, the authors attempted to answer the five questions (and sub-questions) that form the basis of our conceptual framework by interpreting what the documents stated in relation to each point. Third, the authors created a draft report for their country of some 4,000 words summarizing their findings organized into sections that covered each of the points of our conceptual framework. For the German report, the authors also conducted 21 informal interviews of people in various sectors, such as water management, flood control, civil protection and spatial planning (see Garrelts et al. 2013). Fourth, a summary was made of the national reports; this summary provided the zero order draft for this article. Fifth, in an effort to go into more detail than the initial summary provided, it was decided to conduct semi-structured interviews with government officials and academics actively working in the field of adaptation in their country. In order to encourage more open responses, especially from government employees, we assured interviewees that they would remain anonymous. In total eight people were interviewed, two per country. The surveys were based on a questionnaire of 22 questions (see the Annex for a copy of the questionnaire, available online at http://www.iwaponline.com/jwc/006/110.pdf). The questionnaire itself was structured into sections reflecting our conceptual framework (e.g. a set of questions regarding Problem choice, Level choice, etc.) The specific questions were derived from information from the summary report and issues related to adaptation governance and policy-making found in academic literature. The duration of the interviews ranged between 60 and 90 minutes, were held either in person or by telephone, and were recorded by the interviewee. The interviews were subsequently transcribed, the responses were summarized and integrated into the text of the summary report.

RESULTS

Below we outline our results – for an overview please see Table 1.

Problem choice

Following from our interviews we found that no country defined adaptation as a problem requiring the radical rearrangement or restructuring of society so as to avoid harm or reap benefits (see Question 4 of questionnaire); nor, with the slight exception of Germany, is there a discussion around the larger issues, of equity, fairness, justice or resource management as is found in the literature on adaptation in developing countries (German interviews 1 and 2)
If anything, the problem of adequately responding to climate impacts is largely seen as a technical or technocratic problem, although with varying degrees. As such, each country: (1) firmly subscribes to the IPCC’s AR4 perspective that adaptation is ‘the result of a deliberative policy decision, based on an awareness that conditions have changed or are about to change and that action is required … ’ (IPCC 2007: 869); and (2) that it is the primary

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(Paavola & Adger 2006).
responsibility of the national and lower levels of government to formulate adequate policies: that the need for adaptation is based upon a ‘market failure’. Nevertheless, such a broad framing does not encapsulate how decisions have been taken thus far. Moreover, given the relative novelty of adaptation policy, specific problem formulations under the IPCC’s characterization have been evolving along different (but similar) pathways in each respective country.

In the UK, for example, following a recent nationwide risk assessment, the problem of adaptation is now primarily being framed as ‘a problem of water management’ (UK interview 2), either over or under abundance. While it is recognized at the national level that a range of socio-economic sectors will be affected (energy, agriculture, households/physical infrastructure, human health and the natural environment), the main entry point for managing impacts on these sectors lies with improved control over water. In this sense, adaptation is a layered or graduated issue with one central focus that serves as a key to wider adaptive actions, the focus having been defined via a structured and systematic risk assessment process (UK interview 2).

Similar to the UK, the problem of adaptation in the Netherlands has been reduced over the years fundamentally to a problem of water management (NL interviews 1 and 2). Unlike the UK however, this constriction and problem definition of adaptation largely excludes impacts on other socio-economic sectors and was largely political. While the first national adaptation program ‘Adaptatie, Ruimte & Klimaat’ (ARK), which actively ran from 2006 to 2008, covered a broad range of issues and was to be the country’s flagship adaptation programme, this was through political wrangling dismantled and replaced by the so-called ‘Delta Programme’ with a heavy focus on sea-level rise and flooding (NL interview 2). The logic here being that the Netherlands has extensive and historic expertise in dealing with hydrological issues and that the greatest threat to the country would come from the sea. Therefore, adaptation can be seen as an extension and reframing of an already existing problem. Also the framing of adaptation as essentially water management allows the Netherlands to market its ‘adaptation’ expertise abroad to other countries that potentially face similar impacts (NL interview 1).

In Germany, the framing of adaptation is still very fluid as it continues to go through a process of discovery of priorities according to interviewees. There is broad acknowledgement that climate change will impact a range of sectors but as yet there are still several uncertainties and knowledge gaps to be resolved before the government can define a concrete path of action. All national ministries and agencies are in a systematic process of assessing risks and vulnerabilities with the help of the Ministry of Education and Research, whereupon once completed, a joint inter-ministerial decision will be made on how to proceed (German interview 1). Thus, there is, at least from the interviewee responses, the characterization that adaptation or the means to address it, is a highly scientific, technical problem that at present can be resolved through strict methodological processes.

While the problem of climate impacts in Sweden is seen as one requiring proactive attention, the dominant framing for adaptation is that it is a local problem that requires little coordination or steering from the central government (Sweden interview 1). By and large, given the diversity of expected impacts sector wise and geographically, coupled with the autonomy enjoyed by the 290 municipalities and 21 regions, there is the view at the national level that the adaptation problematique can be defined according to sector, regional and municipal authorities. One sector however that does stand out and has received national attention is spatial planning and building, where the government has amended the National Act (2010: 900). From 2008 it is stated that climate impacts must be considered in any planning and building activities (Boverket 2009).

Level choice

National level attention towards the impacts of climate change on the UK has been in effect since the establishment of the UK Climate Impacts Programme in the 1990s; nevertheless, a dedicated policy response by the central government to address those impacts only began with the passing of the UK Climate Act in 2008 (Massey & Huitema 2013). Moreover, the inclusion of an adaptation provision into the National Act, as two interviewees state, was not based on a deliberative decision-making process as much as an adaptation lobby in government seizing the opportunity to forward their agenda. If there was to be legislation on climate change, then it should be comprehensive and not simply cover mitigation activities. The supporting logic
for their involvement was that adaptation covers a variety of socio-economic boundaries and all administrative levels, therefore the enormity of the issue required a centralized coordinating body. The Act itself mandates a national level risk assessment every 5 years. Armed with this nationwide overview of risks and vulnerabilities and as the primary budget holder for implementation, the central government can advise and support regions and local governments achieve/implement their own adaptation policies. In the areas where the national government has its own jurisdictional powers, such as the Environment Agency, they remain the primary responsible body for implementing adaptation (Massey & Huitema 2013).

Originally, the motivation behind the first Dutch national level framework on adaptation (which resulted in the now defunct ARK programme) was single-handedly promoted in the Senate in 2005 by Senator Wolter Lemstra, who argued that climate change could have significant impacts across the country, especially where spatial planning was concerned, and that the central government had a role to play in providing knowledge, financing and facilitating adaptation for lower levels of government (VROM 2007). The national government, acknowledging that the regions and municipalities were themselves primarily responsible for implementing adaptation actions, agreed with them that they would begin to do so (NL interview 2). However, as adaptation has now been reduced into primarily an issue of water and the 2007 Delta Programme established itself as the primary adaptation policy, the administrative governing structure for ‘adaptation’ mirrors that of traditional water management (NL interviews 1 and 2). The central government is responsible for maintaining nationally owned infrastructure such as dykes and dams and ensuring protection against potential national disasters. The regions, water boards and municipalities continue with their traditional responsibilities with the addition of taking climate impacts into consideration.

Unlike in the Netherlands or the UK, the genesis for national level involvement in adaptation in Germany did not find its origins strictly at the national level. On the contrary, it was the German states (Länder) as well as insurance companies, such as Munich Re, that lobbied the federal government to create a national framework for adaptation (German interview 1). On the one hand, Munich Re was seeing an increase in natural disasters and wished the government to step in and attempt to mitigate impacts. On the other hand, the Länder, also concerned with previous disasters and cognizant that climate change impacts could potentially become worse, asked for climate projection models and financial support in order to design and implement adaptation strategies, arguing they lacked the requisite scientific and monetary capacity to act alone. Therefore the federal government entered into adaptation with the understanding that their role was to be primarily supportive and assistive; that adaptation would work on the principle of subsidiarity (Federal Government 2008) and that, ultimately, the Länder and municipalities were responsible for developing and delivering concrete adaptation measures. Where federal involvement in adaptation trumps those at lower levels is embedded into pre-existing jurisdictional legislation and responsibilities, such as spatial planning, building codes, water resources and management of federally owned lands and infrastructure (Federal Government 2008). The federal government has also explicitly stated and is involved in delivering adaptation advice and expertise at the international level especially in developing countries (German interview 2).

In Sweden, the principle of subsidiarity, which is evident in all the case countries, is at its most extreme. According to interviewees, national government involvement in adaptation is not centralized in any one governing or administrative body as with the UK, Germany or the Netherlands. National level responsibilities are fragmented across the government with each ministry and agency responsible for incorporating adaptation into their own portfolio (Glaas & Juhola 2015). The closest entity to a centralized body is the Swedish Meteorological & Hydrological Institute which serves as a national knowledge centre collecting data and conducting impact studies to support the government and the regions (Sweden interview 1). Primary responsibility for coordinating adaptation activities lies at the regional level and each of the 21 regions has a so-called adaptation co-ordinator – interestingly, these posts were created at the behest of the national government (Prop 2008/2009: 162). In theory, the regions are to work with municipalities in providing knowledge and recommendations for actions. Financially, national support from the central government for specific adaptation projects would come via the relevant ministry. The decision to structure adaptation policy in such a
fragmented and devolved manner was very much a conscious one and is couched in how the Swedes frame the problem of adaptation (see above) and their style of governance (Sweden interview 1). Adaptation, first, is a cross-cutting issue that has different implications for the various sectors, therefore each sector (ministry) must act how they see fit. Second, because climate impacts are not geographically homogeneous and each municipality has primary responsibility for their own spatial planning and infrastructure, they will have to adapt in different manners.

Timing choice

In their systematic review of adaptation activities in developed countries, Ford et al. (2011) conclude that the majority of observable measures taking place fall under the guise of ‘building adaptive capacity’ as opposed to concrete interventions. Where such few interventions are taking place they attribute to work of early adopters in the early stage of implementation. For them, as well as Adger & Barnett (2009), this pace of implementation seems worryingly slow given the ‘speed of climate change’ (Ford et al. 2011: 334). While this may be the case, our research shows that to a degree, in many of the countries, there is a certain and defined logic to the choice of timing, one that is echoed in the normative scholarship of adaptation (e.g. Burton et al. 2002) and process of public policy (Birkland 2011); namely, that before implementation can take place there needs to be an adequate understanding of what feasible interventions to make as well as the financial and political support. More plainly, countries need to know what to adapt to before they do it.

In the case of the UK, these sentiments were made clear from the interviews and the 2008 UK Climate Act itself. There was to be a systematic nationwide risk assessment so as to identify priorities and measures. Concurrently, there was the understanding that despite uncertainties about future climate projections and impacts, low/no regret measures could be taken based on an assessment of current and near future vulnerabilities so as to reduce immediate risks, especially in the realm of water efficiency, flood damage and heat waves. Given the devolved responsibilities for adaptation implementation (see Levels section above), it is up to the municipalities to take these measures forward. Long-term planning and investments though, at the local level, appear to be limited (ASC 2011). Nationally, there is a long-term focus on investing in resilient infrastructure and flood defense programmes, although given the current uncertainties and large monetary outlays concrete measures have still not yet begun (UK interview 1).

As adaptation in the Netherlands is largely defined at the national level as water management and that is historically well embedded into the governing structure of the country, there are several ongoing project and programme interventions running. Additionally, according to NL interviewee 1, the Delta Commission, ‘does not see climate change as an urgent problem’ (NL interview 2) requiring much additional action or investments than are already being taken under the Delta Programme. Specifically, the measures under the Programme are divided from the present until 2050 and then 2050–2100 and should be sufficient to deal with projected climate impacts (NL interview 2). Outside of the water sector and with the exception of a handful of municipalities taking concrete small-scale measures for water storage, sewer system improvement and heat mitigation, the national government is taking a ‘wait and see’ approach. It prefers to foster adaptive capacity within regions and municipalities while improving scientific knowledge of climate impacts on other socio-economic sectors (NL interviews 1 and 2).

The German federal government has invested heavily in building adaptive capacity through increasing the scientific knowledge base surrounding future climate impacts as is reflected in both their 2008 Adaptation Strategy and 2011 Adaptation Plan. By all accounts this is the logical outcome of the role the federal government assigned for itself within adaptation, primarily advisory to the Länder and municipalities. Also, it will be recalled that the Länder requested national level intervention on adaptation due to their limited capacity in developing knowledge. Thus implementation of actual interventions at the national level is restricted to their areas of jurisdiction (spatial planning, building codes, water resources and management of federally owned lands and infrastructure). While proposed measures for these sectors take both the short- and the long-term view, implementation has been hindered by the current political environment (German interview 1).

Given the devolved and fragmented nature of climate change adaptation in Sweden, aspects of timing are dependent upon the regions and municipalities. While some
municipalities have completed their risk assessments and are implementing concrete actions against sea-level rise and flooding, with a 50–100-year time frame, others appear to be taking a wait and see approach given the lack of understanding of what they actually need to adapt to (Sweden interview 1). This uncertainty appears to have arisen over the diversity of risk assessments conducted. Thus questions such as what flood levels and scenarios of sea-level rise it is reasonable to adapt to and what a good-enough safety margin is for municipalities (experienced floods, 100-year flows, worst-case scenarios, etc.) arise. In many municipalities it has been difficult to legitimize measures beyond what is practically experienced every 5–10 years in terms of for example, floods (Storbjörk 2007). The issue is further compounded in that the time perspectives in climate scenarios at hand are often made in a longer time perspective than local plans resulting in possible interventions that do not go beyond low/no regrets (Sweden interview 1).

Instruments, implementation and enforcement

The issue of instruments, implementation and enforcement mainly revolves around the discussion of mainstreaming (also see Brouwer et al. 2013). When asking the interviewees which instruments their countries used to deliver adaptation policy, in one form or another they all responded that, traditionally speaking, there were no existing instruments specifically for adaptation. In all cases, delivering adaptation was an extension of already ongoing sector efforts and responsibilities. In effect, the policy objectives for adaptation are to strengthen existing instruments across a range of sectors so that they could respond to existing and future climate impacts. The mode for achieving that objective, it was stated, is mainstreaming (Urwin & Jordan 2008). Digging deeper however, and despite the interview responses, we find some evidence that traditional policy tools have been employed in some countries.

In the UK, as both interviewees state, mainstreaming is seen to reduce regulatory burden and thus there is little need for a ‘stand-alone’ adaptation policy. Despite these statements, the Adaptation Sub-Committee has been charged with monitoring adaptation mainstreaming in the various sectors and is working to develop indicators of adaptation progress in the priority areas of water management, land-use planning and physical infrastructure (UK interview 1). In addition, the Environment Agency monitors and advises on the integration of adaptation in the bodies it oversees (UK interview 2). Neither body though has the power to impose sanctions. Under the legislative framework for adaptation the Government is periodically required to report to Parliament on progress being made to tackle climate risks (UK Climate Act). Furthermore, DEFRA has the authority to demand climate risk assessments from businesses and statutory undertakers (UK Climate Act). (Statutory undertakers are public and private entities which provide essential public services, e.g. utility firms.) At present though it is unclear what, if any, penalties there are for non-compliance. Thus we find for a country that avows not to have a stand-alone adaptation policy, there is an established, albeit rudimentary, structure of instruments to implement and enforce some form of adaptive actions. The logic behind such a framework harkens back to how the problem of adaptation has been defined; namely, that it is a technical problem requiring government attention to collect knowledge, understand risks and build capacity to promote adequate responses. When interviewees were asked about the overall style of implementation they responded that they sought to employ a networked form, that in order to build the capacity to adapt among municipalities, firms and citizens this could not be achieved via command and control.

For the Netherlands, at least at the national level, the instruments, implementation and enforcement patterns reflect the dominant problem definition of adaptation. Adaptation is primarily about water management falling under the jurisdiction of the Delta Programme. This sector has its own pre-existing logic of which concerns about climate impacts will be integrated; although how this will be monitored is uncertain. Interestingly, the Delta Programme commissioner has statutory veto power over other parts of government in times of crisis (which he or she can determine) to implement any necessary measures (NL interview 2). At the provincial level, seven provinces have integrated the adaptation work into existing sectoral departments or matrix organizations. Five provinces have each formed a separate adaptation team, with the ultimate aim to make these teams redundant after a certain period of time. In these latter provinces, vulnerabilities to climate change are more pronounced, as well as the interest of the provincial governors (Frederiks et al. 2011). At the
municipal level, adaptation policy activity is to be integrated into other policy domains, such as water management and spatial planning. To our knowledge, only the municipality of Rotterdam has formed a separate climate adaptation team. At the beginning of 2008 a separate Rotterdam Climate Proof (RCP) team was created. The most important goal of RCP was to ensure that adaptation is considered in every policy division in the city by 2012 and integrated into the municipal planning processes. In order to achieve this, RCP is developing the ‘Rotterdam Adaptation Strategy’ (RAS 2011), meant to integrate adaptation measures into urban planning at different spatial scales (Mees & Driessen 2011). As with the UK, the logic behind the push for mainstreaming adaptation (inside and outside the water sector) is that it should be seen as an extension of existing activities and responsibilities and not something new. In terms of the style used for achieving integration it was reported that a networked mode was favoured (NL interview 1 and 2).

In Germany, given the federal government’s primary role as advisor and supporter of adaptation activities to the Länder, they employ a range of financial and hortatory instruments to that effect. Nevertheless, given still the nascent stage of adaptation and the need to determine sector priorities, implementation at the national level is still a work in progress (German interview 1 and 2). The 2011 Adaptation Plan will form the basis for implementation of activities and promotes four concrete pillars of action (Bundesregierung 2011: 15ff.):

- pillar one: providing knowledge, informing, enabling;
- pillar two: modifications of the legislative and norm-related framework (aim: to foster standardization) by the federal government;
- pillar three: activities in immediate responsibility of the federal government, referring to the adaptation of government-owned infrastructure;
- pillar four: international responsibility.

So far, the majority of activity has revolved around pillar one (much in keeping with the federal government’s key defining role in adaptation) and pillar four (German interview 1). Domestically, mainstreaming again is seen as the primary vehicle for delivering adaptive action. According to German interviewee 1, there is an aversion to creating new policies and institutions rather than improving current practices and policies. Also, as with other countries, there is the belief that a more networked style of implementation will more easily foster the uptake of adaptive actions within the Länder and socio-economic sectors (Garrelts et al. 2013).

In Sweden, despite the central government’s avowed abstention from coordinating adaptation activities (Sweden interview 1), apart from requiring each region to have its own adaptation coordinator, they are required to conduct an assessment review of adaptation activities in their respective municipalities and develop comprehensive regional adaptation plans so as to guide future adaptation policy. (Interestingly, the criteria of these assessment reviews has not been detailed.) In general though, adaptation activities are highly fragmented, each ministry and sector is responsible for incorporating adaptive actions into their portfolios. In terms of implementation, municipalities are seen as the key agents for change, albeit with the knowledge support from regional and national authorities. The role of municipalities in climate adaptation is particularly pointed out in the Planning and Building Act 2010: 900 and in the contingency legislation. As regards planning, the regions have a monitoring role in respect of both master plans and detail plans at the same time as the monopoly of planning rests with municipalities. Some regions have used their monitoring role to point out risks when they have not been called attention to by municipalities. Some regions have used their monitoring role to point out risks when they have not been called attention to by municipalities, for example, ‘have you considered the risks of climate change’ and, indeed, some municipalities experience greater pressure from the regional authorities and those municipalities have been made to comply with regional demands (Ugla & Storbjörk 2012). Still, however, the local monopoly of planning is strong in Sweden which creates difficulties for regional actors (Storbjörk & Hedrén 2011).

Cost/benefit choices

In terms of addressing this choice, thus far only the UK and Sweden have attempted to determine costs and benefits for adaptation, albeit the analyses are aggregated by socio-economic sector as well as on a project by project basis for large infrastructure investments (SOU 2007; EAC 2010). In the UK, an adaptation economic analysis, aiming to identify the overall costs and benefits of adaptation to the economy, is being undertaken alongside the first Climate Change Risk Assessment. The Government says this work
will enable it to: compare the risks of a changing climate with the other pressures it faces; prioritize adaptation policy geographically and by sector; and support the case for resources for adaptation (UK interview 1). While distributional effects (inequalities) are certainly relevant in the analysis (Watkins et al. 2009; 2), how far ‘fairness’ across regions will figure remains to be seen.

In framing its 2010 inquiry into government policy on adapting to climate change, the House of Commons Environmental Audit Committee highlighted two dilemmas that remain in effect unresolved:

- ‘How do we define the public liability for climate change in a way that assists those hardest hit by the impacts but simultaneously controls costs, and encourages people and organizations to take responsibility for addressing the risks they face?’
- How should the burden of adapting to climate change be shared between the current population, and future generations? … For adaptation, there is a genuine dilemma over how to apportion the responsibility fairly across generations’ (EAC 2010: 7).

It notes that while some costs, like adapting offices, factories and homes and paying for insurance, fall to businesses and private individuals, the taxpayer will also have to meet higher costs. For example, the Environment Agency has predicted that, to maintain current levels of protection from river and sea flooding, real terms spending on flood defences in England will need to increase from its current level of around £600 (€753) million per annum to around £1 (€1.25) billion in 2035. The Environment Agency also reports that from around 2035 to the end of the century, around £7 (€8.8) billion may need to be invested in the Thames estuary’s tidal defences (EAC 2010).

In Sweden, the Commission on Climate and Vulnerability has presented a sector-wide accounting of expected costs and benefits for climate adaptation. For example, the costs for damaged roads and bridges due to landslides, erosion and flooding are estimated to amount to a total of between 9 and 13 billion SEK (€0.97 and €1.4 billion) up until 2100 (not including large-scale flooding. Flooding of Lake Vänern is, for example, approximated to cost 900 million SEK (€97 million) concerning 100-year flows and 1.9 billion SEK (€0.2 billion) for maximum flows) while the costs for preventing up to 50% of these damages amount to between 2.0 and 3.5 billion SEK (€0.21–€0.57 billion). Estimations are also made for railroads, aviation and maritime industries, telecommunications, electrical systems, dams, heating and cooling, drinking water and wastewater, buildings, forestry, agriculture, fishing, tourism, health, etc. (SOU 2007: 60). The Commission expects heat-related deaths to represent the largest increase in costs but high costs are also expected related to increased need of cooling systems and increased infections (SOU 2007: 60). Who is expected to carry the burden varies across sectors. In regards to the extent geographical fairness is considered, the Commission of Climate and Vulnerability has stated that, ‘a certain reallocation of state funding can be seen as motivated as climate change strikes differently across the country and in different sectors. Some municipalities will be burdened by increased costs while others will benefit’ (SOU 2007: 60, p. 581). What this could mean in practice is not made clear however. At the local level, some of the more proactive municipalities, for example, the city of Gothenburg have, within a cross-sectoral working group, made calculations of costs for local adaptation measures in particular areas (Göteborgs Stad 2009).

In Germany, the question about the costs and benefits is still a work in progress due to the issue of setting priorities (German interview 1). Hence, the German Action Plan on Adaptation formulates the need for further research on the issue. The NAS presents the following aspects with regard to climate change adaptation:

- the costs and benefits (of possible) impacts of global climate change without adaptation, which depend directly on the scale and speed of future global climate change and its national, regional and local effects;
- the costs and benefits of alternative adaptation methods;
- the cost of the residual damage (Federal Government 2008: 63).

One key area of attention for the federal government is the development of funding options and investment strategies to fight climate change and take advantage of future market potentials at the same time. Therefore the ‘Climate Change’ Financial Forum has been set up involving Germany’s leading financial providers. The idea is to prepare the financial sector for climate change and to prepare the
sector for its role in implementing adaptation and mitigation strategies (Federal Government 2008: 60; Bundesregierung 2011: 25).

In the Netherlands, considering water management is the main vehicle for adaptation and an issue that enjoys high competency in the country, the issue of costs and benefits is well articulated (NL interview 2). Water management costs for the national water system are largely paid for by national taxes. Regional water management is paid for by levies from the water boards. Levels vary per category of inhabitant (industry, property owner, farmers and ordinary residents). Decisions about acceptable flood risk levels taken in the 1950s, are largely motivated by the economic worth of various areas. Infrastructure in the west of the country is assumed to be able to withstand a 1/10,000 year event. In the north, the infrastructure is weaker and can only withstand 1/1,000 or 1/250 year flood events. The same is true for the main rivers (NL interview 2).

Costs of floods are not insurable in the Netherlands. Damages are born by the private sector (own risk), unless the event is declared a national disaster (Bouwer & Vellinga, 2007). For such situations, a large fund has been created with hundreds of millions euros that could be used to help affected parties. Costs of droughts can be insured at present but there is very little interest as these risks are unevenly distributed and premiums for those who could use the insurance are prohibitively high (Bouwer et al. 2007).

DISCUSSION

Having looked at what choices countries have made, it could be asked if any particular choice or choices stand out as having a significant influence on shaping the current governing structure of adaptation in the countries and how those might differ across countries. To be sure the default position stating that in all cases ‘Problem framing’ precedes any other governing choice could be taken. However to do so would negate the purpose and perhaps relevance of exploring policy choices in the first place. Additionally taking such a position presumes that government policies are fully constructed and formulated based upon choices made in a completely linear and rational manner: a dynamic that is highly contested (Nakamura 1987). So while problem framing may be the starting point for the construction of policy it will not in all cases determine ultimately how that policy will look. This can be seen in the case of the UK where ‘Instruments, implementation and enforcement’ appears to have significantly shaped adaptation policy, specifically the UK Climate Act. It should be recalled that the inclusion of adaptation into the Act was more a matter of chance with the adaptation lobby in government seizing the opportunity to forward their agenda. Nevertheless, once included, the Act created a quasi-regulatory framework around adaptation investing the central government with powers to monitor and implement any so-called adaptation activities at various jurisdictional levels. The national level risk assessment, as mandated by the Act, helped to reveal that water management and the impacts of climate on water resources would have subsidiary effects for almost all other socio-economic sectors thereby framing the problem of adaptation as one of improved water management. In terms of timing, the Act created the Adaptation Sub-Committee which has recommended, following the assessment, that immediate attention of interventions should be on low/no regret measures based on current and near future vulnerabilities. As such, the country will be able to begin to mitigate existing impacts. Given that this is the focus the costs and benefits of such actions have been estimated.

In the case of Germany, the dynamics surrounding Levels has largely given shape to adaptation’s governing structure. It will be recalled that the federal government was asked by the Länder to help them begin addressing future climate impacts via scientific and financial support. As such, the subsequent choices the Federal government made are framed in this light. Seeing adaptation as a highly scientific and technical problem stems from the request to provide data and models on impacts and vulnerabilities. The choice of hortatory and financial instruments as well as a networked style of consultation with the Länder also reflect the federal government’s belief that adaptation is primarily a state and local issue.

‘Levels’ choices would also appear to be the dominant factor shaping broader adaptation structure in Sweden. Historically, municipalities have held strong autonomy from the central government, especially for issues such as spatial planning and development. Coupled with the problem
framing by the national government that adaptation should not be seen as a separate, stand-alone policy issue but integrated into the competencies of all governmental actions at all jurisdictional levels has created a system where adaptation is fragmented and the choices surrounding it dispersed and devolved. The only centralized role of the national government is to collect scientific data on climate data, disseminate information to relevant stakeholders and adjust legislation, most notably the Planning and Building Act, to reflect the need to integrate climate impacts.

It is only in the Netherlands that ‘Problem framing’ appears to be the driving choice behind structuring adaptation. The political decision to abandon its broader ARK programme in favour of the Delta Programme has allowed the government to frame the adaptation problematique and its subsequent choices in a very straightforward manner and reduce it largely to an issue where they have extensive expertise and well-established governing norms. To paraphrase one interviewee, adaptation is nothing new and does not require anything new but rather doing what we already do better. Such a formulation also allows regions and municipalities to pursue, where they see fit, their own responses to climate impacts on other sectors. This problem framing while borne out of a political decision was bolstered by empirical knowledge that the greatest climate threat to the country was sea-level rise and inland flooding.

CONCLUSIONS

In this article, we have attempted to highlight how a select number of countries have addressed certain policy choices when constructing their adaptation policy frameworks. Additionally, we sought to pinpoint which choice, if any thus far, might have had a significant influence in shaping the current adaptation policy profile. As we have seen, each country has taken a different (but at times overlapping) pathway leading to a divergent approach to adaptation. To be sure, while this is not overwhelmingly surprising, given the varied political structure, available resources and degree of problem pressure for each country, a more detailed analysis on how countries make policy choices based upon the above factors would prove interesting. For example, what is the relation between the political structure of a country and the administrative levels they choose to act on? How do available resources in a country affect the allocation of costs and benefits? Or how does perceived problem pressure from climate impacts determine the choice of when to implement adaptation policies? The answers to these questions can only be alluded to within the scope of this paper, not fully answered. Nevertheless, our findings do help pave the way for a more structured and robust study on policy choices and adaptation governance as a whole.

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