

# Governance of Wicked Climate Adaptation Problems

Catrien Termeer, Art Dewulf and Gerard Breeman

**Abstract** Climate change adaptation has been called a “wicked problem par excellence.” Wicked problems are hard to define because ‘the formulation of the problem is the problem; they are considered a symptom of another problem; they are highly resistant to solutions and extremely interconnected with other problems. Climate change problems are even more complex because they lack a well-structured policy domain, and knowledge about climate change is uncertain and contested. Given the wicked characteristics of the climate issue and its particular challenges, the question is which theories are useful starting points for the governance of climate adaptation? The chapter distinguishes between theories and concepts that focus on reflexivity, on resilience, on responsiveness and on revitalisation. Instead of integrating these theories in one overarching governance approach, the chapter suggests an approach of theoretical multiplicity. It proposes that exploiting the variety of concepts and strategies based on the different theories can increase the governance capacity to deal with climate change. Finally, it addresses the moral dimension of wicked problems, which suggests that it is unacceptable to treat a wicked problem as though it were a tame one. Governance scholars nowadays risk raising expectations far beyond their ability to deliver, and thus enhance confusions over whether wicked problems are in fact tame ones.

**Keywords** Adaptation · Climate change · Wicked problems · Governance · Strategies

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# 1 Introduction

There is increasing recognition of the need for society to adapt to the impacts of climate change. Climate change adaptation is defined as “the adjustment in natural or human systems in response to actual or expected stimuli, which moderates harm or exploits beneficial opportunities” (IPCC 2007). Adaptation to climatic impact involves both infrastructural adjustments, such as enhancing 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.

Climate change adaptation poses many complex governance questions and has therefore been called a “wicked problem par excellence” (Davoudi et al. 2009; Jordan et al. 2010). This has serious consequences for the governance questions that emerge in connection with climate change. This chapter provides a theoretical analysis of the governance of wicked climate problems. It describes the characteristics of wicked problems and the specific challenges of climate adaption policies. Subsequently, a broad overview of theories is given that are useful for addressing wicked climate problems. It concludes with reflections on selecting theories and with addressing the moral responsibilities of scholars.

Rittel and Webber (1973) introduced the concept of wicked problems to distinguish between problems that are tameable and those that are intractable. The adjective ‘wicked’ does not refer to witches with malicious intentions, but is used to characterise a problem, in a meaning akin to malignant, vicious, tricky or aggressive (Rittel and Webber 1973: 160). The concept has been used and elaborated upon by many governance scholars (Head 2008; Roberts 2000; Van Bueren et al. 2003; Weber and Khademian 2008; Wexler 2009). They developed a number of characteristics that can be summarised in four main categories (Rittel and Webber 1973):

First, wicked problems are hard to pin down because “the formulation of the problem is the problem” (Rittel and Webber 1973: 161). There is no consensus on how to frame the problem or the solution. Rather than being a single problem, a confusing mess of inter-related problems presents itself. Depending on how you look at the situation, different aspects of this “mess” emerge as triggers, root causes, effects, priorities, side effects or leverages for intervention. The clarity created by one analysis of the problem can easily be blurred by new developments or by asking other actors to present their analysis of it. Paradoxically, each attempt at creating a solution changes the understanding of the problem.

Second, every wicked problem can be considered a symptom of another problem (Rittel and Webber 1973: 165). Through their multi-dimensional and interconnected characteristics, wicked problems involve causes and effects at multiple scales of time and space. These waves of consequences cannot be anticipated beforehand, and correcting their negative effects can become a wicked problem in itself. Every action can have unpredictable consequences due to the inherent incomplete understanding

of problems. Surprises, fluctuating conditions, sudden changes and irreducible uncertainties are fundamental aspects of wicked problems.

Third, wicked problems are highly resistant to solutions. New problems and solutions will emerge continuously. Often, today's wicked problems emerge as a result of trying to understand and solve yesterday's problems. The speed and the amount of topics discussed in wicked problem domains has been increasing due to the onset of the 'information era' in which the media appears to be a major player.

Fourth, wicked problems can induce wicked experiences amongst ambitious governance actors that aim at influencing societal problems. The messiness, uncertainties, interconnectivities and the endless associations that can be made with wicked problems can be overwhelming (Weber and Khademian 2008: 336) and may be experienced as being "frustrating as hell" (Roberts 2000: 2). Governance actors see themselves confronted with wicked problems to which a single solution is the answer. They never know if they are doing well because wicked problems have no stopping rules, and actors can always try to do better. Especially when the situation becomes stressful, actors can revert to more defensive patterns and strategies. This can be counterproductive because strategies that fit within existing policy routines may have served their purpose for tame problems, but do not result in lasting solutions for wicked problems. Instead, they can even result in making things worse.

## **2 Complicating Characteristics of the Climate Adaptation Problem**

Governance of adaptation faces all the usual difficulties, hindrances and opportunities involved in dealing with wicked problems. On top of that, however, adaptation to climate change poses some specific, particularly demanding governance challenges and dilemmas (see, for example, Stripple et al. 2009; Termeer et al. 2011).

### ***2.1 A Context of Fragmentation***

Realising successful adaptation strategies depends upon the involvement and collaboration of many interdependent actors with their own ambitions and preferences, responsibilities, problem framings and resources. These actors are to be found in various policy sectors, because climate adaptation affects many different domains as varied as water management, spatial planning, infrastructure, agriculture, energy supply, industry and other economic activities, and in the domains of nature and health. If changing local climates push certain species into new territories, activities such as nature conservation policies, spatial planning and agricultural practices may all be significantly affected. Climate change impacts provoke new interdependencies

between these domains. The problem of heat stress in cities, for example, induces new linkages between urban planning and urban health care. A confounding complexity is that climate vulnerabilities are often not easily separated from economic or social vulnerabilities and therefore need to be linked to other societal domains. Furthermore, because climate adaptation cannot be neatly packaged as a uniquely local, national or international task, actors at different administrative levels have to be mobilised. Whilst the variety of local conditions and impacts point towards a prime role for local authorities and regions in climate change adaptation, many impacts require national or international responses as well. Changes in peak discharge levels of transboundary river basins are a case in point.

A dilemma arises when the involvement of an array of stakeholder networks is perceived as giving rise to opposition or delay. In response, more centralised and top-down forms of governance may appear attractive. The key argument in their favour is that fragmented governance structures will never be able to provide the capacity required to tackle such an important issue as climate change. However, this multi-actor, multi-sector and multi-level governance world forms the inescapable context for climate adaptation, because the ramifications of climate adaptation stretch across different policy domains and institutional levels. Furthermore, fragmented networks can also provide the governance capacity to enable climate adaptation (Huitema et al. 2008). Where hierarchical arrangements may ignore bottom-up approaches, and horizontal arrangements may lack the authority to accelerate adaptation processes, operating in the ‘shadow of hierarchy’ might be a promising concept (Scharpf 1997: 202). This implicates that central government influences the policy processes of decentralised decision-making without being actively involved in it (Gupta et al. 2010).

## ***2.2 The Lack of a Well-Structured Policy Domain***

The emergence of adaptation as a new domain of policy and practice is in itself an important process. The emerging field of climate adaptation lacks a well-institutionalised policy domain. Within this institutional void, adaptation is an emerging field with, at least for the time being, only weakly-defined ambitions, responsibilities, procedures, routines and solutions. As a result, a series of basic governance dilemmas have to be (re)addressed in developing the governance of adaptation to climate change. Which ministry or agency is given the responsibility for climate policy in general, and climate adaptation policy in particular? Are existing divisions of responsibilities adequate for tackling climate adaptation issues? Do we need national, international or locally formulated adaptation strategies, or all of these? Is climate adaptation defined as an urgent problem that requires immediate action or as a long-term issue that can be tackled in a step-by-step approach while learning along the way? Should it wait until more knowledge becomes available? These kinds of questions play a role in establishing the emerging policy domain of

climate adaptation, and can become the object of bureaucratic struggles about jurisdictions and budget allocations.

Calls for improved policy integration or ‘mainstreaming’ provoke the question of whether a separate adaptation policy domain is necessary, or whether it is more effective to align adaptation ambitions with existing policy domains and strategies. A related question is whether adaptation programmes are temporary, or whether they have to be structurally anchored and embedded within public bureaucracies. Both seem to be true: specific adaptation policies are necessary, especially to tackle the backlog that has built up in recent years (in, for example, urban retention capacity, river discharge capacity and fresh water supply), but much has also to be invested in making existing policies with regard to mobility, transport, housing, and so on, ‘climate proof’.

### ***2.3 Inherent Uncertainty in a Knowledge-Intensive Domain***

Decision-making in relation to climate change is knowledge-intensive, and important uncertainties about the nature and scale of risks, and about the effectiveness of solutions will persist. In addition, controversy is inevitable when the many actors involved bring with them a variety of perspectives to make sense of an issue like climate change where the stakes are high (Hulme 2009).

Without systematic observations and advanced mathematical models, awareness of climate change would be very limited. At the same time, important uncertainties about the nature and scale of risks and the effectiveness of solutions will persist (Arvai et al. 2006). Climate change knowledge has, due to its complexity and uncertainty, a particular feature: as data and models are mainly gathered and constructed at a global, or in some cases, at continental or national level, applying this to the level of affected regions requires a huge effort in which one risks multiplying the uncertainties, which can lead to either over-reaction or insufficient action.

As noted above, the many actors involved bring with them a variety of perspectives or frames. Their backgrounds cause them to differ in their overall causal conception of climate change; the assessment of its seriousness and urgency; its risks and impacts at the geographical and political level concerned; the burdens and benefits it may cause, and the normative and political questions of how to legitimately pool or allocate these risks, burdens and benefits. Conflicting frames were thrown into particularly sharp relief in the recent international climate science controversies dubbed ‘climategate’ (Nerlich 2010), which affected national climate debate and potentially complicated regional climate policies. Both traditional and new media played an important role in giving voice to climate sceptics (called climate ‘deniers’ by their opponents), creating the particularly challenging situation for climate adaptation policy that the very existence of climate change and/or human influence were called into question.

Clearly, both the uncertainties and ambiguities ascribed to the climate change issue affect the perceived legitimacy of climate science and climate adaptation policy in particularly challenging ways. In spite of these inherent uncertainties, decisions about adaptation strategies need to be taken or prepared now. This may be referred to as the timescale dilemma. On the one hand, it is necessary to anticipate future developments, which are (highly) uncertain. On the other hand, there are strong pressures to give priority to economic interests in the short term. Therefore, to combine long-term ambitions with short-term urgencies is an important challenge. A further complication is the different timeframes of physical, economic and political processes, which are difficult to align. And, finally, short-term interventions based on a long-term vision demand a specific and enduring commitment by taxpayers, politicians or residents.

### **3 Useful Theories for Addressing Wicked Climate Adaptation Problems**

Given the wicked characteristics of the climate issue, and the particular challenges of dealing with fragmentation, an emerging policy domain and unpredictable changes, which theories are useful starting points for the governance of climate adaptation? In the realm of academia, there has been a sizeable growth in the number of publications dealing with wicked problems (Head 2008; Klijn and Koppenjan 2000; Roberts 2000; Termeer and Kessener 2007; Weber and Khademan 2008) and on the governance of adaptation to climate change (for an overview, see Nieuwaal et al. 2009, Termeer et al., 2011). We distinguish between theories and concepts that focus on reflexivity, on resilience, on responsiveness and on revitalisation. These four concepts address the four different aspects of wicked problems.

#### ***3.1 Theories About Reflexivity***

Reflexivity refers to evaluating the variety of problem perspectives, to continuously reconsidering dominant problem frames and to bringing about a redefinition of action perspectives. Without reflexivity and, thus, without addressing this variety, there is a risk of tunnel vision further contributing to the wickedness of the situation (Gray 1989).

Framing theories provide insights into reflexivity. Framing studies the process by which decisions, policy issues or events acquire different meanings from different perspectives (Schön and Rein 1994; Chong and Druckman 2007; Dewulf et al. 2009). By highlighting certain aspects of the situation at the expense of others, by drawing different boundaries around the issue and by putting different elements at the core of the issue, people from different backgrounds construct

frames about the situation that may differ considerably from how others frame the issues. Confusion, misunderstanding, disagreement or even intractable controversy (Schön and Rein 1994) are likely in situations where participants frame the issues in divergent ways.

Theories like collaborative governance (Gray 1989; Huxham 2000) and network governance (Klijn and Koppenjan 2000; Van Bueren et al. 2003; Roberts 2000) explicitly pay attention to the diversity of perspectives, and both aim to provide strategies to find workable techniques for taking these multiple positions into account and thus to prevent intractable controversies.

Network governance stems from public management, and is defined as governing with and through networks. Networks had been frequently evaluated as barriers to effective, innovative and democratically legitimised policies. The concept of network governance advocates that the potentials of networks could also be used in order to arrive at better policies (Klijn and Koppenjan 2000). Therefore it devised a set of strategies to do so: process management and network constitution. Process management focuses on improving the process within the network, by organising interactions between actors, by seeking the convergence of frames and perceptions, creating temporary organisational arrangements or by managing conflict. Network constitution focuses on changing the institutional characteristics of the network, by changing the actor constellation, redistributing resources, changing the network rules or reframing dominant ideas.

Multi-actor collaboration theory is rooted in organisational theory (Gray 1989; Huxham 2000), and addresses cooperation and negotiation between multiple interdependent actors in the context of a 'wicked' problem domain in which they all have a stake. Gray (1989) defines collaboration as "a process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible" (p. 5). It shares some features with process management, but provides much more detailed and advanced insights on how to facilitate collaborative processes.

### ***3.2 Theories About Resilience***

Resilience refers to adapting to changing and highly unpredictable circumstances, without losing identity and reliability. Without resilience, the governance system can be eroded to the point that a small disturbance provokes a failure to keep fulfilling basic functions. Resilience is a central concept in theories of adaptive governance (Brunner et al. 2005; Folke et al. 2005); resilience management (Walker et al. 2002); adaptive management (Arvai et al. 2006; Pahl-Wostl 2007) and high-reliability organisations (La Porte 1996, Weick and Sutcliffe 2001). These theories assume a world that changes continuously in unpredictable directions. Therefore, the ability to observe well and in a timely fashion is considered as key to governance, as weak signals can predict upcoming disturbance. Through a

combination of different types of knowledge (scientific, professional, experiential, indigenous, and so on) and multiple ways of understanding, the awareness of the unexpected can be improved (Brugnach et al. 2009: 3–4, 9).

Adaptive management literature has the ambitious goal of accounting for the inherent complexity and unpredictability of ecosystem dynamics in new governance or management concepts (Folke et al. 2005; Pahl-Wostl 2007). Attempts at managing or steering have to take into account uncertainties and both gradual and abrupt changes. Therefore, learning plays a central role in adaptive management, as a way of keeping knowledge up to date with continuously changing conditions. As not all uncertainties can be ‘learned away’, another focus of adaptive management is on devising measures or strategies that are robust (remaining functional under a range of different scenarios) or flexible (can be adjusted as needed, or applied only when necessary). Adaptive governance can be seen as the governance context that enables, or at least legitimises, adaptive management strategies. Much attention is paid to improving the adaptive capacity of such governance systems (Gupta et al. 2010). Critical factors for adaptive governance include social networks, social memory, learning to live with change and uncertainty, combining different types of knowledge for learning, creating opportunities for self-organisation and nurturing sources of resilience for renewal and reorganisation (Folke et al. 2005).

### ***3.3 Theories About Responsiveness***

Responsiveness refers to dealing with continuously changing policy demands wisely. Applying wisdom means that actors have to balance their responses between different values, such as democracy, effectiveness, continuity, integrity and fairness. Without responsiveness, though, governance actors run the risk of not addressing citizens’ concerns and losing their legitimacy.

Responsiveness is a key concept in agenda-setting theories. These theories show that popular interest in policy issues is usually stable and does not change much, but they also show that these stable periods are occasionally interrupted by abrupt major policy changes (True et al. 2007). Although agenda-setting theory highlights the largely unpredictable nature of these fluctuations, they also show some regularity. A sudden rise of attention in media or politics about a certain issue is very often caused by a so-called focusing event, such as a crisis or big organisational failure. Once the policy is changed, or other issues have captured the attention of media and politics, the policy is likely to be drawn back into a new period of stability and incremental adjustments.

If certain issues appear more often in the media and move from the inner pages to the front page, the pressure on politicians to take action increases, and new actors may be mobilised to attack existing policies. However, responding to all kinds of calls for attention, or trying to please all parties in one round of deliberation only increases the input to the policy process, which in turn does not help to cope with the wickedness of the policy problem. It is a challenge to governance



actors to discern substantive policy problems, behind the dramatised stories in media and the one-liners in political debates (Stone 2002).

### ***3.4 Theories About Revitalisation***

Revitalisation refers to recognising and unblocking counterproductive patterns in policy processes, and thus re-animating actors and enhancing the innovative process needed to cope with wicked problems. Without revitalisation, there is the risk of regression, of futile attempts to apply “more of the same” solutions, and of escalating discussions between people who stick to their own routines (Termeer and Kessener 2007).

Weick’s work on sensemaking offers interesting starting points for understanding how governance actors can become stranded in their attempts to cope with wicked problems differently. He considers sensemaking as the root activity when people are dealing with an unknowable and unpredictable world (Weick and Sutcliffe 2001). Faced with wicked problems, people collectively try to understand what is happening, adopt some ideas to deal with it, start to act, create experience through these actions, make sense of it, and so on. However, these social and ongoing processes of sensemaking can become disrupted. Meanings and rules can become self-evident so that it is no longer possible to reflect on them, and we talk about fixations.

Revitalisation is a painstaking process, above all because actors are often not even aware of the stagnated pattern they have fallen into. It requires a systemic perspective to understand patterns, and where they come from, with a focus on details of actual interactions (Putnam 1993). Such patterns can be detected by studying how actors deal with the process, what they say about other actors or groups, what they do not say, who they include and exclude, and how they act towards other groups. This information can be used to construct cause maps (Weick and Westley 1996) or action maps (Putnam 1993) that display the—intended and unintended—interlocking interactions and how mutual actions reinforce each other. Symptoms of stagnation are, for instance, the presence of taboos, repetition of moves, vicious circles, exasperating delays or escalated conflicts.

## **4 The Value of Theoretical Multiplicity**

The aforementioned theories cover a broad terrain, where they partially overlap and potentially conflict. A logical next step would be to try and integrate this variety into a single theory, thereby drawing upon concepts and methods from each of the theories. However, a very complex theory would seem to be needed to face the enormous challenge of coping with the overwhelming wicked problems. We question whether trying to integrate everything into one theory is feasible or desirable. Another option we would like to put forward is an approach that rests on

the multiplicity of theories (Termeer and Dewulf 2012). The basic argument is that multiple theories (the ones we discussed here and others) will continue to be needed simultaneously for dealing with the complex societal sustainability issues. Only variety beats variety, also at the theoretical level, which functions as a box of conceptual tools to analyse situations and to design interventions. This does not mean that each of the theories should proceed as if the others did not exist.

This approach can be understood as a meta-paradigmatic approach (Gioia and Pitre 1990) which recognises the value of the distinctiveness of each individual theory and the value of exploring zones where theories overlap or can inform each other, but does not try to integrate everything into one paradigm. We propose that exploiting the variety of roles and strategies based within the different (and partially overlapping) theories can increase the capacity to deal with climate change. This perspective relates to the writing on clumsy solutions that rests on the idea that more ways of organising and thinking exist: each with its particular strengths and weaknesses, none of which should ever be allowed to gain the upper hand” (Verweij et al. 2006: 840).

After all, wicked problems cannot be solved and have no stopping rules. No non-governmental organisation (NGO), business or government will ever be able to definitively solve the climate problem. More realistically, we expect continuous policy change in the climate problem domain with delays and acceleration, with barriers and small wins, rather than sudden change. Accordingly, we believe that the theoretical multiplicity we propose can help to achieve clumsy solutions or small wins, which in the end can transform old routines into new learning (Weick and Westely 1996: 454).

#### ***4.1 Reflective Conclusions***

This paper conceptualised climate adaptation as a wicked problem par excellence. It showed how many governance scholars (including ourselves) try to develop devices to cope with the wicked climate change problems. However, this development of theories and concepts risks violating the moral principle of wicked problems. This principle reads that it is unacceptable for policy-makers to treat a wicked problem as though it were a tame one or to refuse to recognise the inherent wickedness of a social problem (Rittel and Webber 1973: 161).

The climate change issue shows similarities with what Wexler called the development of a knowledge market surrounding the hype of wicked problems. Building upon Churchman’s (1969) work on the moral dimensions of wicked problems, Wexler (2009) argues that these moral aspects are increasingly neglected in this market. Governance scholars nowadays risk causing more confusion in practice over whether wicked problems are in fact tame. They can raise expectations far beyond their ability to deliver. Therefore Wexler (2009: 539) pleads for more responsibility from these scholars who can pose additional risks through false

assurances and for more humility regarding the claim of being on the frontier of knowledge.

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