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**Reflexive Governance and the Importance of Individual Competencies –
The Case of Adaptation to Climate Change in Germany**

By Torsten Grothmann & Bernd Siebenhüner

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Reflexive Governance and the Importance of Individual Competencies – The Case of Adaptation to Climate Change in Germany

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Abstract

Reflexive governance refers to a new practice of governance that can address long-term, highly complex and highly uncertain societal problems. We regard three areas of behavior as crucial for reflexive governance: Interaction (participatory goal formulation and strategy development among various societal actors), deliberation (transdisciplinary learning and knowledge generation, especially with regard to long-term systemic effects), and adaptation (iterative development of flexible strategies and institutions). As yet, scientific debates on micro-level aspects identified knowledge, cognitions and motives as important conditions of reflexive governance processes. Individual actors, however, also require the necessary competencies to effectively become involved in such governance processes. We differentiate between three general competencies (interaction, deliberation and adaptation competency), which seem relevant for all reflexive governance processes, and competencies that are problem specific (e.g., uncertainty competence). As this chapter maintains, these competencies are essential conditions for the functioning of reflexive governance processes and need to be developed and supported. We illustrate this micro-level perspective on reflexive governance with the case of adaptation to climate change, i.e. adjustments to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and associated extreme weather events. Empirically we base our analysis on data from an exploratory case study on climate change adaptation in Germany. Early adaptation initiatives show key elements of reflexive governance, but our data also indicate the lack of necessary competencies and capacity building efforts for the functioning of these reflexive governance elements in adaptation practice. Finally, we discuss practical strategies to address individual competencies in collective reflexive governance processes, such as systematic selection and training of participating actors, and identify questions for future research.

Introduction

Most problems of modern societies on local, domestic and global levels can not sufficiently be addressed by conventional forms of policy making where state agents collect the necessary expertise, develop a regulatory solution and implement it through legislative and executive processes. The uncertainties, complexities, interconnectedness, multiple layers and the numerous consequences of any (regulatory) solution necessitate a governance approach that recognizes these problem characteristics (Voß and Kemp 2006). As outlined in the contributions to this book, a reflexive governance approach particularly addresses these challenges.

However, the notion of reflexive governance implies considerable challenges for individual and collective actors to effectively become involved in these governance processes. They need to be able to generate, process, disseminate and store various forms and bodies of knowledge; they necessitate the ability to participate in interactive processes to acknowledge different claims and interests and to form and formulate preferences regarding potential solutions; and they require necessary resources to implement solutions and to start new governance processes.

The literature on reflexive governance identified knowledge, cognitions and motives as important conditions in complex and knowledge-intensive governance processes. But these characteristics on the micro-level are not dealt with systematically and sufficiently. As yet neglected are the necessary competencies of individual actors to effectively steer and participate in reflexive governance processes. The specific focus of this chapter, therefore, lies in an extensive analysis of these necessary competencies, that integrate different psychological factors – like knowledge, cognitions and motives – on a higher conceptual level.

The chapter includes an exploratory study on the role of competencies in the field of adaptation to climate change, which refers to adjustments to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and associated extreme weather events (Adger et al. 2007, p. 720). Potential, but highly uncertain short- and long-term impacts of climate change on different interlinked sectors and regions constitute a highly complex and uncertain problem sphere that requires knowledge intensive and cooperative adaptation processes. Early adaptation initiatives in Germany show key elements of reflexive governance, but our data also highlight the lack of necessary competencies for the functioning of these reflexive governance elements in adaptation practice.

The chapter is structured as follows. First, we present our theoretical considerations on reflexive governance and the role of individual competencies. This includes the presentation of key areas of human behavior relevant for reflexive governance, an analysis of previous research with regard to micro-level or psychological components involved in reflexive governance processes and a detailed description of competencies individual actors, who are involved in such processes, should possess. The second part of the chapter illustrates the importance of individual competencies by a case study on climate change adaptation in Germany. The third part of the chapter discusses practical strategies to address individual competencies in collective reflexive governance processes, such as systematic selection and training of participating actors. The conclusions identify questions for future research.

Reflexive Governance and Individual Competencies

Areas of Human Behavior relevant for Reflexive Governance

The discourse on governance on domestic and global levels gained prominence over the last decade. It emerged out of the various insights in ongoing changes in the political systems and in societal decision making processes at large. While past political science research largely focused on nation states and their internal processes and international interactions, the governance debate started out from three central changes in societal processes of rule-making and implementation (see Biermann & Pattberg 2008). Firstly, decision-making processes increasingly became internationally interconnected and influenced. They are no longer confined to nation states as central entities. It is the multiple interacting levels of decision making that form the first fundamental change in governance processes. Secondly, modern governance processes are characterized by a multitude of actors including trade unions, nongovernmental organizations, multinational corporations and scientific associations. Thirdly, new forms of institutions emerged that complement the traditional systems of legally binding documents negotiated by states and public authorities. Governance processes nowadays include a diverse set of processes and institutions such as multi-stakeholder processes, deliberative processes, private regulation, voluntary reporting schemes and alike (see Commission on Global Governance 1995, Dingwerth 2007, Pattberg 2005, Zürn 2000). Most of these governance processes have been designed for the deliberate inclusion of different forms and backgrounds of knowledge and interests. Even more so, many are intended to generate new knowledge and to facilitate more reflexive decision-making.

The particular role of knowledge within governance processes is increasingly discussed within the discourse on reflexive governance. Reflexive governance has been defined in various ways. Voß and Kemp (2006) explicitly draw on the concept of reflexive modernization as developed by Beck et al. (1994). This focuses explicitly on the awareness and adequate treatment of the resulting consequences of governance outcomes (first-order reflexivity) and on the reflection on the processes and functions of governance processes themselves (second-order reflexivity). In this perspective, “reflexive governance refers to the problem of shaping societal development in the light of the reflexivity of steering strategies – the phenomenon that thinking and acting with respect to an object or steering also affects the subject and its ability to steer” (Voß & Kemp 2006, p. 4). By contrast, in his notion of reflexive governance, Dedeurwaerdere (2005) highlights the elements of reflexive learning and the selection of alternatives under present and potential future rationales of action. He states, “instead of considering an independent action on either the learning

within a political environment or the selection principles governing the competition among the different social logics, a reflexive understanding of this process develops a joint action on the processes of learning and selection in order to create the conditions for their common transformation” (Dedeurwaerdere 2005, p. 486).

In this chapter, we will draw on these approaches in the effort to identify key elements of reflexive governance. More precisely, we define reflexive governance as a rule setting and rule implementation process that includes *interaction, deliberation and adaptation* as areas of individual and collective behavior. Each of the three elements highlights particular aspects of reflexive governance processes. In sum, they bring together an understanding of reflexivity that focuses on the role of knowledge in governance processes and on its generation, processes, re-reflection, dissemination and dynamic interaction with other bodies and forms of knowledge. In detail these elements are characterized as follows.

Interaction: Governance is a process involving a diverse set of actors including regulatory agencies, non-governmental actors as well as other stakeholders. All actors pursue individual interests, maintain particular rationales and avail of specific resources (Scharpf 1997). Reflexive governance thus integrates different actors in the governance process. Different stakeholders interact in the processes of policy goal formulation, strategy development as well as the implementation of solutions (Voß & Kemp 2006).

Deliberation: Reflexive governance acknowledges the fact that knowledge is being generated in various domains and communities. Hence, there is not one unitary knowledge and truth system but multiple. In addition, knowledge and truth claims are voiced by numerous different groups of society. It is no longer unanimously accepted that scientific knowledge is the only form of objective and true knowledge on which political decisions should rest. Different claims and bodies of knowledge often clash and struggle for greater attention in governance processes. Reflexive governance addresses this challenge by applying deliberative forms of knowledge generation. These involve transdisciplinary forms of learning where different bodies of knowledge from science and other societal groups such as business communities or non-governmental organizations bring together their knowledge, especially with regard to systemic long-term effects (van Asselt & Rijkens-Klomp 2002, Kasemir et al. 2003, Siebenhüner 2004, Voß & Kemp 2006).

Adaptation: Processes of reflexive governance need to be dynamic over time to allow for adaptation to novel developments inside or outside the governance system. Therefore, an iterative development of flexible strategies and institutions seems most adequate to encounter dynamic external and internal processes in particular with regard to social-ecological systems dynamics. These strategies can rather easily be

adapted or altered to new conditions such as hitherto unknown environmental threats or social dynamics (Gigerenzer 2000, Holling 1978). Reflexive governance thus cannot result in solutions that are deemed to be applicable indefinitely but it has to be aware that governance processes need to be adaptive and that actors have to regularly reassess the applicability of the policies they decided (Voß & Kemp 2006).

Reflexive Governance from a Micro-Level Perspective

Addressing the three areas of behavior in reflexive governance processes – interaction, deliberation and adaptation – from a micro-level perspective, reflexive governance can be characterized as a *psycho-social process*, in which individuals and collective actors think and learn about complex problems, communicate and cooperate, deal with conflicting interests and solve conflicts, make decisions and adapt decisions, implement and change strategies. In this chapter we focus on the psychological factors that seem necessary for describing, explaining and influencing reflexive governance processes from a micro-level perspective. We state that these psychological factors can be integrated in a list of competencies which actors involved in reflexive governance processes – especially actors in key positions of the reflexive governance process – should possess. We assume that without these competencies a reflexive governance process would be strongly elongated and in some cases discontinued. We therefore see these competencies as success factors for the functioning of reflexive governance processes.¹

As yet, scientific debates on reflexive governance dealt with characteristics on the micro-level not systematically and sufficiently. Often *knowledge* is identified as essential, including differentiations of knowledge types like specialized scientific knowledge versus synthetic kinds of knowledge gained from practical experiences (Voß & Kemp 2006). More or less undifferentiated *cognitions* are named: Rip (2006) talks of “cognitive patterns”, Voß and Kemp (2006) state, that “cognitive (...) structures need to be adaptive to allow for error and learning”, Loibl (2006) mentions “cognitive contexts”. In a psychological terminology, both constructs – knowledge and cognition – refer to what people know and how they process this knowledge.

Often *motives* are named as important in reflexive governance processes. Motives refer to what people want and pursuit. Stirling (2006) names “institutional interests, cultural values or economic priorities”. Voß, Truffer and Konrad (2006) recommend “sustainability foresight” including a “mapping of values” as a method for shaping socio-technical transformation. Wolff (2006) speaks of “adverse constellations of interest” and Spaeth et al. (2006) talk about “motivational constraints” on stakeholders engaging in participatory governance.

Some authors mention psychological constructs which reflect the fact that most knowledge and cognitions are motivationally biased. For example, Smith (2006) refers to “conflicting world views” and Wolff (2006) names “conflicting beliefs”.

Literature on reflexive governance so far neglected *emotions*. Emotions refer to subjective feelings, often accompanied by physiological changes that impel one toward action (cf. Scherer 2005). Due to the uncertainties, complexities, interconnectedness, multiple layers and the conflict potential of most problems of modern societies, actors involved in social processes of finding solutions for these problems often experience strong negative emotions: emotions of excessive demand, frustration, helplessness, stress and anger (e.g., Booth & Welch 1978). Especially the interaction characteristic of reflexive governance, which confronts actors with conflicting interests and beliefs, holds the potential for strong negative emotions. For example, one experience from many participatory processes is that people discontinue their participation when conflicts and anger arise. Also the adaptation element of reflexive governance can trigger strong emotions. Actors involved in reflexive governance processes have to regularly reassess and eventually change the policies they decided. This requires keeping a critical stance on one’s own decisions and overcoming feelings of frustration and blame when policies fail. Hence, it is essential to realize the importance of emotions and their effective “management” in reflexive governance processes.

Also as yet neglected in the literature on reflexive governance are the necessary *competencies* of individual and collective actors to effectively steer and participate in reflexive governance processes, whereas the discussion of civic and democratic skills has a long tradition in educational research and practice (e.g., Dewey 1916, Marshall 1955, Chawla & Cushing 2007). A competency qualifies as a concept that allows for the integration of different psychological factors – like knowledge, cognitions, motives, and emotions – on a higher conceptual level. In this chapter we focus on individual competencies, including civic and democratic skills like communication and cooperation competencies but also competencies like tolerance for uncertainty and complexity, systemic and long-term thinking and the ability for self-reflection. Such competencies seem necessary for individual actors to effectively become involved in governance processes of long-term and highly uncertain problems like climate change.

Individual Competencies for Reflexive Governance

In identifying and defining individual competencies to effectively steer and participate in reflexive governance processes we mainly draw upon the DeSeCo-project (Definition and Selection of Competencies, cf. OECD 2005, Rychen & Salganik

2003). This international and interdisciplinary OECD-project from 1998 to 2003 set a political standard for the discussion of competencies by bringing together a wide range of experts and stakeholders to produce a coherent and widely shared analysis of which key competencies are necessary for coping with the manifold challenges of today's world.

A competency involves the ability to meet complex demands, by drawing on, mobilising and managing psychosocial resources (including knowledge, motivations, emotions, skills, attitudes, values and social support) in a particular context (cf. OECD 2005, Rychen & Salganik 2003). For example, the ability to communicate effectively consists of the knowledge of language, practical IT skills, the motivation to communicate, and the ability to overcome potential negative emotions towards those with whom he or she is communicating.

A competency is more than just knowledge and skills. The competency concept also involves motivational and emotional components and therefore reflects more fully the psychological factors involved in reflexive governance processes than concepts like knowledge or cognitions. It might seem peculiar to include motivational and emotional aspects in a definition of competency, but like a car that needs fuel – and without it the car has no “competency” to drive – a competency of a human being depends on his or her motivation. In addition, a competence also involves emotions and their effective “management”. The exertion of every competence to deal with a complex task involves the appearance of emotions. As has been described above, this also applies to reflexive governance processes. It is essential for the involved actors to capitalize on their positive emotions and to be able to deal with the negative ones.

Compared to the psychological concepts discussed as yet in the reflexive governance literature – knowledge, cognitions and motives – the main advantage of the competency concept is its integrative power. A competency integrates different psychological factors on a higher conceptual level and therefore reduces the complexity of the description and explanation of reflexive governance processes (cf. Occam's razor). In addition, the competence concept holds a high practical value. By summarizing and reformulating different psychological factors, which are important for reflexive governance, competencies make these factors addressable for selection and training of “personnel” for reflexive governance processes.

Our main thesis is that specific competencies of individual actors involved in reflexive governance processes – especially of actors in key positions of the reflexive governance process – are one important fundament for the functioning and the effectiveness of these processes. We propose to differentiate between general competencies that seem to be relevant for all reflexive governance processes – independent from the specific governance problem they address – and competencies

that are problem specific. In the second part of this chapter we address the problem specific competencies in reflexive governance of adaptation to climate change. The following general competencies – interaction, deliberation and adaptation competency – seem to be essential for the functioning of every reflexive governance process. They overlap to a certain extent. A major component of all three competencies is the effective management of emotionsⁱⁱ.

(1) The interaction competency is an important micro-level fundament for the interaction component of reflexive governanceⁱⁱⁱ. In defining this competency we draw upon the definition of the competency category “interacting in heterogeneous groups” developed in the DeSeCo-project (cf. OECD 2005, Rychen & Salganik 2003). As societies become in some ways more fragmented and also more diverse, the interaction competency refers to the ability to interact in heterogeneous groups of different stakeholders and to build new forms of co-operation. “The building of social capital is important, as existing social bonds weaken and new ones are created by those with the ability to form strong networks” (OECD 2005, p. 12; see also Putnam 2000). The interaction competency is strongly related to concepts like “social competencies”, “social skills”, “social intelligence”, “intercultural competencies” or “soft skills”. It consists of three elements:

The ability to relate well to others: This competency element “assumes that individuals are able to respect and appreciate the values, beliefs, cultures and histories of others in order to create an environment where they feel welcome, are included and thrive” (OECD 2005, p. 12). The ability to relate well to others requires empathy, self-reflection, and effective management of emotions.

The ability to cooperate: Each individual “needs to be able to balance commitment to the group and its goals with his or her own priorities and must be able to share leadership and to support others” (OECD 2005, p. 13). Specific components of this competency element include: communication skills or the ability to present ideas in an understandable way and listen to those of others (cf. Cohen 1998); an understanding of the dynamics of debate and following an agenda; the ability to construct tactical or sustainable alliances; the ability to negotiate; and the capacity to make decisions that allow for different shades of opinion (OECD 2005). In addition, we include the sense of collective competence or confidence in one's ability to achieve goals by working with a group (cf. Chawla & Cushing 2007).

The ability to manage and resolve conflicts: “Conflict is part of social reality, an inherent part of human relationships” (OECD 2005, p. 13) and reflexive governance processes. “The key to approaching conflict in a constructive manner is to recognize that it is a process to be managed rather than seeking to negate it. (...) For individuals to take an active part in conflict management and resolution, they need to be able to: analyze

the issues and interests at stake (e.g., power, recognition of merit, division of work, equity), the origins of the conflict and the reasoning of all sides, recognizing that there are different possible positions; identify areas of agreement and disagreement; reframe the problem; and prioritize needs and goals, deciding what they are willing to give up and under what circumstances” (OECD 2005, p. 13).

(2) The deliberation competency is the most important micro-level fundament for the deliberation behavior in reflexive governance processes. In defining this competency we draw upon different sources (Cohen 1989, Gadamer 1990, Habermas 1981, Lecher & Hoff 1997, OECD 2005, Rychen & Salganik 2003). The deliberation competency refers to the ability for deliberative forms of knowledge generation. This ability involves transdisciplinary forms of learning where different bodies of knowledge from science and other societal groups such as business communities or non-governmental organizations bring together their knowledge. Hence, the deliberation competency has some overlaps with the interaction competency. We go beyond the definition of “deliberative competence of citizens” by Claus Offe (1997) in terms of detail. The deliberation competency consists of the following elements.

The motivation to learn: Each individual involved in a reflexive governance process needs to have the motivation to gain new knowledge and an understanding of the beliefs, interests and values of other actors involved in this process. This motivation includes the ability to take responsibility for his or her learning and harness emotions, even negative ones, and manage them to achieve learning.

The ability to perceive, understand and tolerate others’ beliefs, knowledge claims, interests and values: This competency element requires individuals to detect and decipher differences in beliefs, knowledge claims, interests and values in a governance process of manifold actors. In addition, it seems necessary that these differences are accepted as such, based on “a commitment to the respect of a pluralism of values and aims” (Cohen 1989), beliefs and knowledge claims. The acceptance of differences often also involves an effective management of emotions like anger and impatience.

The ability to deal with complexity: Most problems of modern societies are highly complex, requiring the “anticipation of the long-term systemic effects of action strategies” (Voß & Kemp 2006), i.e. the long-term thinking in decades and centuries. Therefore actors involved in reflexive governance processes should possess the ability to deal with this complexity. This ability involves a minimum of systemic or ecologic thinking (cf. Lecher & Hoff 1997), the capability to evaluate and organize partly inconsistent knowledge and information, and the ability to cope with feelings of excessive demand, frustration and helplessness, which often arise when individuals are confronted with high complexity.

The ability to find integrated and creative solutions: This ability underlies the process, which Voß and Kemp (2006) name “integrated transdisciplinary knowledge production”. Today’s diverse and complex world demands that we do not necessarily rush to a single answer, to an either-or solution, but rather handle tensions by integrating seemingly contradictory or incompatible goals as aspects of the same reality. Thus, individuals involved in reflexive governance processes should be able to “think and act in a more integrated way, taking into account the manifold interconnections and interrelations between positions or ideas that may appear contradictory, but that may sometimes only superficially be so” (OECD 2005, p. 9). This integrative capability often also involves a certain amount of creativity in order to find innovative solutions that go beyond traditional ways of problem solving.

(3) The adaptation competency is directly related to the adaptation behavior in reflexive governance processes. The iterative development of strategies and institutions in the reflexive governance process – including the abandonment of previous decisions and governance solutions – requires individuals involved in this process to be highly flexible and adaptive. In defining this adaptation competency again we draw upon the DeSeCo-project (cf. OECD 2005, Rychen and Salganik 2003) and our own theoretical considerations. The adaptation competency consists of the following elements:

The ability for self-reflection / reflectiveness: In order to realize adaptation in a reflexive governance process individuals involved in this process need to have the capability to regularly reassess the applicability of the policies they decided from a neutral point of view. Therefore, they need to possess the ability to think reflectively, i.e. to question and change personal and institutional thoughts and practices. Thinking reflectively demands relatively complex mental processes and requires the subject of a thought process to become its object. This ability for self-reflection and reflectiveness implies the use of metacognitive skills (thinking about thinking) and taking a critical stance on previous thoughts, decisions and practices (cf. OECD 2005). Also here, emotional competence is required: in terms of dealing with feelings of frustration when policies fail.

The ability to accept failures as a natural part of the management of complex tasks / “failure-friendliness”: Whereas the ability for self-reflection and reflectiveness focuses more on one’s own thoughts, decisions and practices, the ability or attitude to accept failures as a natural part of reflexive governance processes refers more to thoughts, decisions and practices of other persons involved in these processes. Often people tend to blame a person or institution when things go wrong. People involved in a reflexive governance process should be able to avoid such blaming reactions and overcome

emotions of blame in order to keep stakeholders integrated in the process. An attitude of “failure-friendliness” can help to avoid blaming reactions.

The ability to identify innovative and creative solutions: This ability overlaps to a large extent with the “ability to find integrated and creative solutions” named as an element of the deliberation competency. As an element of the adaptation competency this ability guarantees that policies are adapted or altered after previous policies failed or new conditions such as hitherto unknown environmental threats or social dynamics emerged. Probably, with respect to adaptation even more creativity is asked for than with respect to deliberation because one has to think of innovative solutions that go beyond one’s own previous ways of problem solving.

The Case of Climate Change Adaptation in Germany

To illustrate our micro-level perspective and the importance of competencies for the success of reflexive governance approaches we refer to the case of adaptation to climate change. Empirically we base our analysis on data from an exploratory case study on climate change adaptation in Germany.

Adaptation to Climate Change

Adaptation to climate change refers to “adjustments to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and associated extreme weather events” (Adger et al. 2007, p. 720). For example, building higher dykes and flood retention basins because of an increased risk of flooding due to climate change and higher precipitation qualifies as an adaptation measure. Please note that the term ‘adaptation’ is used differently here from the usage in previous parts of the chapter.

Adaptation to climate change cannot be substituted by mitigation of climate change, the reduction of greenhouse gas emissions, which cause climate change to a large extent. “Even the most stringent mitigation efforts cannot avoid further impacts of climate change in the next few decades (...), which makes adaptation unavoidable. However, without mitigation, a magnitude of climate change is likely to be reached that makes adaptation impossible for some natural systems, while for most human systems it would involve very high social and economic costs” (Klein et al. 2007, p. 747).

With its high uncertainties and complexity, adaptation to climate change represents an appropriate and challenging field of application for reflexive governance. As yet, reflexive governance has not been used to describe or govern climate change adaptation processes. Generally, developing policy approaches for climate change

adaptation is just in the beginning. One approach, developed to support national planning for adaptation by the United Nations Development Programme (UNDP), is the “Adaptation Policy Framework” (APF) (Lim et al. 2005). However, a main gap in APF – already identified by Mirza and Burton (2005) – is its insufficient stakeholder participation in the planning, design, implementation, and monitoring of projects, an element strongly stressed in the reflexive governance concept.

Much recent literature on the adaptation to climate change includes reference to the importance of elements incorporated in the reflexive governance approach, including the importance of micro-level factors such as cognitions (e.g., Grothmann & Reusswig 2006, Grothmann & Patt 2005, Weber 2006). In climate change research such “success factors” for adaptation are summarized in the concept of adaptive capacity. “Adaptive Capacity is the ability or potential of a system to respond successfully to climate variability and change” (Adger et al. 2007, p. 727). Reviewing a large set of studies on climate change adaptation Adger et al. (2007, p. 728) come to the conclusion “that adaptive capacity is influenced not only by economic development and technology, but also by social factors such as human capital and governance structures”.

Although human capital (the stock of productive skills and technical knowledge available in a society or group of people) – a concept close to the competency concept focused on in this chapter – is identified as an essential condition for successful adaptation to climate change, as yet there is no detailed analysis of the necessary human capital or competencies for climate change adaptation processes. In this respect, our analysis of competencies for reflexive governance and climate change adaptation does not only fill a gap in the reflexive governance literature but also in research on climate change adaptation.

Competencies for Reflexive Governance of Climate Change Adaptation

Potential short- and long-term impacts of climate change on different interlinked sectors and regions constitute a highly complex and uncertain problem sphere that requires knowledge intensive and cooperative adaptation processes. To effectively become involved in reflexive governance processes of climate change adaptation individuals require not only general competencies for reflexive governance – interaction, deliberation and adaptation competency – but also a problem specific “uncertainty competency”. This competency is essential because so far many initiatives for adaptation to climate change are impeded by the large uncertainty of climate change impacts (cf. Adger et al. 2007). This uncertainty stems from the uncertainty of future greenhouse gas emissions – the main trigger of climate change – and the imperfect scientific understanding of the climate system and its

interconnections with ecological, economic and social systems. Whereas for some climate change impacts in some regions the trends are quite clear (e.g., temperature increase), for other impacts the trends can be positive or negative (e.g., precipitation increase or decrease). Even with a better understanding of future greenhouse gas emissions and the climate system, future climate change impacts will remain uncertain to a certain extent.

Individuals as well as organizational institutions are often uncomfortable with uncertainty due to the inherent lack of predictability. Uncertainty is cognitively and emotionally challenging. It creates a feeling of vulnerability or anxiety that can lead to actively distorting perceptions and information. This can produce premature closure, false dichotomies and rejection of relevant information (Clampitt & Williams 2000). Often people reduce uncertainty through heuristics or rules of thumb. Kahneman, Slovic and Tversky (1982, p. 48) demonstrated that "in making predictions and judgments under uncertainty, people (...) rely on a limited number of heuristics which sometimes yield reasonable judgments and sometimes lead to severe and systematic error". Therefore, uncertainty competence is needed, which allows people to make reasoned adaptation decisions under the uncertainty of climate change impacts.

In defining the uncertainty competency we draw upon literature from social psychology and organizational research. We identify three main elements of uncertainty competency:

The ability to understand uncertainty: This ability allows individuals to perceive and understand the uncertainty of future climate change impacts in its full dimension, including an understanding of the uncertainty differences between different climate change impacts, regions and time-scales.

The tolerance for uncertainty: This cognitive and/or emotional orientation (Furnham 1995) allows people to tolerate the uncertainty of future climate change impacts. It implies that the uncertainty is accepted in its full dimension without reducing, ignoring or eliminating it immediately through heuristics or rules of thumb. This tolerance also includes the ability to cope with feelings of vulnerability or anxiety, which often arise when individuals are confronted with uncertainty.

The ability to make reasoned decisions under uncertainty: In recent years, a large body of research has been devoted to formal procedures for decision making under uncertainty (e.g., Kárný 2005), including practical guidelines for decision making with regard to climate change adaptation (cf. Willows & Connell 2003). This research includes rules for decision making under uncertainty (e.g., MaxiMin-, MaxiMax-, Hurwicz-, Laplace- or MiniMax-Regret-Rule). The basic knowledge of this systematic

decision making principles constitutes the third element of the uncertainty competency and guarantees an ability to make reasoned decisions under uncertainty.

Climate Change Adaptation in Germany – An Exploratory Case Study

To gain some empirical hint for our hypothesis of the importance of competencies for knowledge intensive governance processes we conducted a case study on climate change adaptation in Germany. The first and as yet only comprehensive study on potential climate change impacts in Germany by Zebisch et al. (2005) indicates that especially Southwest Germany, the central parts of Eastern Germany, and the Alps are vulnerable to climate change. In Southwest Germany the high temperatures will cause problems in the health sector. In Eastern Germany, low water availability and the risk of summer droughts will in particular impact agriculture and forestry, as well as the transport sector (river navigation). The Alps are very vulnerable to climate change especially in nature conservation, flood protection and winter tourism.

Different from mitigation efforts to reduce greenhouse gas emissions, adaptation activities to the impacts of climate change are just in the beginning in Germany and their outcome cannot yet be evaluated. Although these adaptation initiatives do not explicitly apply reflexive governance principles they show key elements of this governance approach (e.g., extensive deliberation processes, stakeholder dialogues). Therefore, a study on the influence of individual competencies on these adaptation initiatives can provide some empirical indicators for the importance of competencies in reflexive governance processes. We want to emphasize that our case study is an exploratory study and that its results are just indicators (but not evidence) of the importance of competencies in knowledge intensive participatory governance processes.

We applied three data collection methods: (a) Half-standardized questionnaires with ten experts from different federal government institutions in Germany, who have in-depth knowledge of adaptation activities in their federal states; (b) Narrative interviews with two independent experts on one perennial climate change adaptation activity on flood hazard management in Germany; (c) Participatory observation of four workshops on adaptation to climate change in Germany. We analyzed the gained data by content-analytic methods.

In the half-standardized questionnaires the experts were asked to recall projects and initiatives on adaptation to climate change in their federal states. On this basis, they assessed whether specific competencies are lacking for the success of these adaptation projects and initiatives (on a 4-point-scale from “do not agree at all” to

“totally agree”). To guarantee the comprehensibility of the named competencies they were described differently from the definition of competencies in this chapter. Eight experts “agreed” or “totally agreed” that there is a lack of uncertainty competency and complexity competence. Uncertainty competency was described as “acceptance of and adaptation despite the uncertainty of climate scenarios”, complexity competence was defined as “acceptance of and adaptation despite the complexity of climate change impacts”. In this chapter, this competence is included as “the ability to deal with complexity” in the deliberation competency. Seven experts “agreed” or “totally agreed” that there is a lack of sustainability competence, which was described as “long-term thinking in decades and centuries” (also included in “the ability to deal with complexity” in this chapter). Five respondents perceived a lack of communication competence, “the ability for an understandable communication of climate change impacts and adaptation options”. Four experts identified a lack of cooperation competence, “the ability for interdisciplinary and transdisciplinary cooperation between different stakeholders”. In this chapter, both – communication and cooperation competence – are part of the interaction competency. Hence, the respondents highly agreed on the importance and the lack of competencies for climate change adaptation, especially of the competencies to deal with uncertainty, complexity and long term thinking.

The narrative interviews with two independent experts^{iv} focused on a specific climate change adaptation process in flood hazard management in Germany. In the following this process is summarized in note form: (1) Initiative of water management agency to „be the first“ in Germany to show proactive adaptation to climate change; (2) Application of a regional model of climate change to calculate flood risk; (3) Perennial political process in which the uncertainty of the climate change scenario was presented as being relatively small by the water management agency due to the perceived unwillingness of the responsible decision makers/ politicians to decide under uncertainty; (4) Political decision for increase of dyke height; (5) New and more reliable climate change model outputs become available, which shows smaller flood risk than previous model; (6) Water management agency does not explicitly communicate the new results to politicians because it worries that the former decision for an increase of dyke height will be annulled and a new perennial decision process will start. This adaptation process presents an example of a lack of uncertainty competency. Obviously, the water management agency and probably also the involved politicians did not have the ability to adequately deal with the uncertainty of climate change. After new and better information on climate change became available the water management agency tended to negate this information.^v

Also the participatory observation of four different workshops on adaptation to climate change in Germany generated a lack of uncertainty competency as the main result. The observation of a workshop on the adaptation of biodiversity management, agriculture and forestry in Germany also revealed the lack of another competence: The interaction competency of many participants was very low. Because of this lacking competency the workshop came to no conclusions and no compromise between the conflicting positions was found.

Our data highlight a lack of necessary competencies for processes of adaptation to climate change. The results indicate that a lack of uncertainty competency is a major barrier for successful adaptation processes in Germany. But also other competencies – including interaction, deliberation and adaptation competence – seem to lack, which is mainly indicated by the results of the expert questionnaire.

Integrating Individual Competencies in Collective Reflexive Governance

In the previous sections we have presented the areas of behavior which are typically involved in reflexive governance processes (interaction, deliberation and adaptation), the competencies that seem necessary to perform these behaviors (interaction, deliberation and adaptation competency), and we have presented some empirical indicators for the importance of these competencies from adaptation to climate change in Germany.

As yet, there are – to our knowledge – no experiences from reflexive governance processes how to address competencies. Nevertheless, we now want to elaborate on some practices that seem suited for this challenge. As has been noted before, competencies summarize and reformulate different psychological factors, which are important for reflexive governance, and make these factors addressable for selection and training of “personnel” for reflexive governance processes. To improve the practice of reflexive governance processes and advance their chances of success necessary competencies among participating individuals should be systematically taken into account in the design of these processes. But “designing participatory exercises responding to [...] a whole array of personality related factors is still at least as much an art as a science” (Toth & Hizsnyik 1998, p. 205). Nevertheless, some promising practices addressing individual competencies can be named – practices, which should be applied at least for the “inner circle” of participating actors and stakeholders in the reflexive governance process. In the following, we differentiate between practices that can be included in the design of specific reflexive governance processes (e.g., training modules in workshops) and practices that support the

development of reflexive governance competencies and civic skills on a more general level (e.g., school education).

Practices addressing individual competencies in specific reflexive governance processes can be ordered along a temporal dimension. One of the first steps in the governance process should be the commitment of the initiator(s) of the process to pay attention to the role of competencies in the whole process. Soon after, the initiator(s) have to decide upon further persons (stakeholders and management personnel) to be included in the participatory reflexive governance process. Here, it should be tried to systematically assess the competencies of these persons. This can be realized by interviews with the “candidates” or with people, who know them well. The interviews should include questions regarding the candidates’ interaction, deliberation and adaptation competency. No standard interview procedure has been developed yet for gathering data on these competencies but much can be learned from systematic, reliable and valid interview procedures developed in personality and organizational psychology. Based on the gathered data the individuals to be included in the governance process should be selected and invited to participate. Especially for key positions of the reflexive governance process a systematic assessment of competencies should be conducted.

It will be the standard case that during this competency assessment phase and later in the actual reflexive governance process (e.g., on adaptation to water scarcity climate change in a particular region) one has to recognize that not all participating individuals possess the necessary competencies to optimally contribute to the process. In many cases stakeholders, who lack some of the desirable competencies, need to be included because of reasons like political power. To deal with this situation participating individuals can be trained and educated. Such activities of education and individual capacity building can be realized before and during the governance process. Whereas the management personnel of the reflexive governance process (e.g., members of a government institution) can be trained before the start of the process, “training on the job” (i.e., training during the process) seems to be the most feasible way for participating stakeholders. Probably, most participating stakeholders have a low motivation to take part in training sessions *before* the actual reflexive governance process starts and are more willing to accept training modules *during* regular workshops. In addition, people normally do not like to be told that they lack some competencies. One promising way to train participating actors in desirable competencies under these circumstances is the inclusion of a neutral education professional who has no stake on the problem, which the governance process addresses (e.g., water scarcity due to climate change). He or she can observe the stakeholder meetings, give feedback on observed problems in the process (e.g., difficulties in dealing with complexity) and can design training sessions to educate

the group in solving these problems (e.g., education in systemic thinking). In designing training modules for the interaction, deliberation and adaptation competency one can refer to different sources, mainly to experiences from school education presented in the next paragraph, but also to other sources like community psychology (e.g., Tasseit 1983). If there is no willingness among participating individuals to take part in such trainings it is useful to make the reflexive governance process resilient to people that lack the competencies to constructively take part in the process. One option to do so is an agreement of the majority of the participating actors to follow some norms for cooperation during the reflexive governance process (e.g., to respect and appreciate the values, beliefs, cultures and histories of others). Another option is to prepare standard answers for typical arguments that hinder reaching a solution in the governance process. For example, in a reflexive governance process to deal with the impacts of climate change it has to be expected that participating people lack an uncertainty competency and therefore argue for postponing decisions on adaptation measures until more reliable scientific data on climate change impacts become available. A useful answer to this argument is the reference to the potential very high costs of climate change impacts compared with the relatively low costs of precautionary adaptation measures.

Reflexive governance competencies can also be supported outside specific governance processes, mainly in the educational system. As has been noted before, the discussion of civic and democratic skills has a long tradition in educational research and practice (e.g., Dewey 1916, Marshall 1955, Chawla & Cushing 2007). “Deliberative civic education is broadly conceived as instruction that utilizes varying forms of classroom deliberation and deliberative exercises to enhance the democratic skills of citizenship and to increase understanding of democratic practice” (Murphy, 2004, p. 74). Hillygus (2005) show that the content of higher education, especially a curriculum that develops language and civic skills, is influential in shaping participation in American democracy – a result that indicates how the interaction competency, which includes participatory skills, can be supported in general education. Many other scholars studied the role of the educational system for the development of civic skills and give recommendations for improving current practice (e.g., Conover & Searing 2000, Dobozy 2007, Galston 2001, Morreale & Backlund 2002, Reinders & Youniss 2006).

Also other life domains have been studied with regard to their contribution to the development of civic skills. For example, Adman (2008) could not find empirical evidence for the hypothesis that by practicing civic skills and democratic decision-making at the workplace, citizens become more active in politics. Contrary to previous work, the results of Djupe and Grant (2001) indicate that church-gained

civic skills and religious tradition do not directly affect political participation among those currently active in religious institutions.

Summary and Conclusions

Reflexive governance refers to a new practice of governance that can address long-term, highly complex and highly uncertain societal problems. In analyzing reflexive governance processes from a micro-level behavioral perspective, we identified three areas of behavior as crucial for reflexive governance: Interaction (participatory goal formulation and strategy development among various societal actors), deliberation (transdisciplinary learning and knowledge generation, especially with regard to long-term systemic effects), and adaptation (iterative development of flexible strategies and institutions).

As yet, the literature on reflexive governance identified knowledge, cognitions and motives as important conditions in complex and knowledge-intensive governance processes. As yet neglected are the necessary competencies of individual actors to effectively steer and participate in reflexive governance processes. The specific focus of this chapter, therefore, lied in an extensive analysis of these necessary competencies, that integrate different psychological factors – like knowledge, cognitions and motives – on a higher conceptual level. Based on competency research we differentiated between three general competencies (interaction, deliberation and adaptation competency), which seem relevant for all reflexive governance processes, and competencies that are problem specific (e.g., uncertainty competence). As this chapter maintains, these competencies are essential conditions for the functioning of reflexive governance processes and need to be developed and supported.

We illustrated this micro-level perspective on reflexive governance with the case of adaptation to climate change in Germany. Early adaptation initiatives show key elements of reflexive governance, but our data also indicate the lack of necessary competencies and capacity building efforts for the functioning of these reflexive governance elements in adaptation practice. Hence, the micro-level perspective and focus on individual competencies applied in this chapter proved useful to identify important prerequisites and barriers of reflexive governance processes.

Finally, we discussed practical strategies to address individual competencies in collective reflexive governance processes. As yet, there are – to our knowledge – no experiences from reflexive governance processes how to address competencies. Nevertheless, practices that seem promising can be identified. We differentiated between practices that can be included in the design of specific reflexive governance processes (e.g., systematic selection and training of participating actors) and practices

that support the development of reflexive governance competencies and civic skills on a more general level (e.g., school education).

This chapter represents only a first draft and illustration of necessary competencies for reflexive governance processes. Nevertheless it has been shown that it seems promising to integrate micro-level factors and especially individual competencies in future models of reflexive governance. Future research should test and differentiate these competencies. It needs to be tested – preferably with more rigid methodologies than applied in this study – whether a lack of competencies qualifies as an important barrier of reflexive governance processes also in other fields of application (apart from climate change adaptation). In addition to competencies these tests should address further success factors and barriers in order to gain insight into the relative importance of competencies for the functioning of reflexive governance processes. Further on, the competencies need to be made operational in two ways: First, reliable and valid instruments to measure the competencies need to be developed, not only for research purposes but also for the selection of “personnel” for key positions of reflexive governance processes. Second, operational tools, procedures and conditions for the training of necessary competencies need to be designed to allow individuals and stakeholders to effectively become involved in reflexive governance processes.

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Endnotes

ⁱ Evidently, success factors and competencies on the individual level have to be accompanied by specific necessary structures, processes and competencies on the meso- (e.g., organizational) and macro-level (e.g., societal). For example, organizations, cultures or societies can have a higher or lower adaptation competency. Although micro-, meso- and macro-level competencies overlap to some extent, individual competencies have to be conceptualized differently from group-level competencies. In this chapter, we focus on competencies of individual actors.

ⁱⁱ We abstain from including "emotional competency" as an independent factor in our model of micro-level success factors for reflexive governance processes and integrate aspects of this competency in the interaction, deliberation and adaptation competency. We use emotional competency synonymously with emotional intelligence and follow the definition by Mayer and Salovey (1997). Their model proposes that emotional intelligence includes 4 types of abilities: (1) Perceiving emotions – the ability to detect and decipher emotions in faces, pictures, voices, and cultural artifacts, including the ability to identify one's own emotions. (2) Using emotions – the ability to harness emotions to facilitate various cognitive activities, such as thinking and problem solving. (3) Understanding emotions – the ability to comprehend emotion language and to appreciate complicated relationships among emotions. (4) Managing emotions – the ability to regulate and harness emotions, even negative ones, in both ourselves and in others to achieve intended goals.

ⁱⁱⁱ Other prerequisites and success-factors for the interaction component on the individual level are for example time and interest to participate in the reflexive governance process. On the meso- and macro-level fundamentals for the interaction component are for example a "critical mass" of organizations and institutions that are willing to participate in the reflexive governance process, a democratic political system, participatory cultural norms, etc.

^{iv} The two interviewees had access to information how the adaptation process proceeded but were not involved in this activity. Therefore, they had no reason to present the adaptation process in a positively biased way. They were questioned independently from each other and their “stories” of the adaptation process were congruent.

^v Although this example presents an example of lacking institutional competency of the water management agency it can also be interpreted as a lack of individual uncertainty competency among the heads of the water management agency and the responsible politicians.