



Universität Hamburg

DER FORSCHUNG | DER LEHRE | DER BILDUNG



KlimaCampus

Angela Pohlmann:

Local Climate Change Governance



Global Transformations Towards A Low Carbon Society

Working Paper Series

No 5, December 2011



Universität Hamburg

DER FORSCHUNG | DER LEHRE | DER BILDUNG



KlimaCampus

Global Transformations Towards A Low Carbon Society Working Paper Series

Edited by Prof. Dr. Anita Engels

University of Hamburg/KlimaCampus
Allende Platz 1
20146 Hamburg
Germany

ISSN: 1869-5485

The KlimaCampus at the University of Hamburg brings together social scientists, media scientists and economists, meteorologists, oceanographers and ecologists working on a broad range of issues concerning climate change.

This working paper series serves to disseminate results of ongoing research projects in the social sciences focused on transformations in society, politics and economy, trying to meet the challenges posed by global climate change.

Angela Pohlmann is a research fellow at the Institute of Sociology, University of Hamburg. Her fields of expertise are transnationalism, and concepts space and place. Currently she acquaints herself with environmental justice and mitigation research. Angela Pohlmann can be contacted at: angela.pohlmann@wiso.uni-hamburg.de

please cite as:

Pohlmann, Angela. 2011: Local Climate Change Governance, in: Engels, Anita (ed.), Global Transformations towards a Low Carbon Society, 5 (Working Paper Series), Hamburg: University of Hamburg/KlimaCampus

Cover Photos: Greenpeace, IISD, Siegfried Baier and flickr users davipt, david.nikonvscanon, leoffreitas, occupantproductions, phault



Global Transformations Towards a Low Carbon Society is an Open-Access-Publication. It can be read and downloaded for free at www.klimacampus.de. It is licensed under the Creative-Commons-Licence Attribution-Noncommercial-No Derivative Works 3.0 <http://creativecommons.org/licenses/by-nc-nd/3.0/>. It may be made accessible, reproduced or circulated freely as long as the author as well as the series title and the editor are referred to correctly, the paper remains unabridged and it is not distributed for profit.

Local Climate Change Governance

Hamburg, 2011

Angela Pohlmann

Index

1	Introduction	3
1.1	Introduction	3
1.2	Defining Governance and the Local.....	5
2	The Global and the Local	6
3	Perception and Representation of Climate Change.....	8
3.1	Non-Perception.....	9
3.2	Perception.....	11
4	Mitigation	13
4.1	Overview	13
4.2	Climate Change Governance.....	15
4.2.1	Governmental policy	15
4.2.2	Energy-Efficiency	18
4.2.3	Work of Organizations	19
4.3	Transnational Networks	21
5	Adaptation	23
5.1	Overview	23
5.2	Specific Topics in Adaptation Research	25
5.2.1	Vulnerability/Resilience.....	25
5.2.2	Institutions	29
5.2.3	Limits to adaptation.....	32
6	Theoretical concepts.....	33
6.1	Structure and Agency	33
6.2	Networks	34
7	Conclusion.....	36
8	References	39

1 Introduction

1.1 Introduction

Today, the reality of anthropogenic climate change is no longer seriously denied. Current discussions are more concerned with the amount of future temperature rise, the impacts of this rise, and the ways human societies will need to react to climate change in order to prosper. A consequence of transforming attitudes to anthropogenic climate change is a global movement in the direction of creating a low carbon society. Because both its causes and consequences are distributed around the world, climate change is generally understood to be a global problem in need of global answers. There is, however, a growing acknowledgement that locality, and local reactions to climate change, also play an important role.

This review provides an overview of the social science literature on local climate change governance. It aims to identify scientific issues and questions that contribute to an overall research focus on global transformation to a low carbon society. Thus, the guiding question is: What can local studies contribute to the topic of global transformations?

While earlier social sciences studies examined climate change from a perspective almost exclusively focused on events and developments at the global scale, this trend has changed. Scholars have now accomplished a large number of case studies, investigating a wide range of issues within the field of local climate change governance (among others Breitmeier et al. 2009; Engels 2008; Eversole/Scholfield 2006; Ford et al. 2006; Lahsen 2004; Keskitalo 2004; Pelling/Uitto 2001; Tompkins 2005; Norgaard 2009; Hartmuth 2002). While most of these studies take a general perspective on sub-national forms of climate change governance, a growing number of scholars are calling for micro-focused, or ethnographic, case studies in pursuit of more specific knowledge on governance processes.

Another development is the growing number of studies that apply a grassroots, or bottom-up, perspective to climate change governance research (among others, Wilbanks/Kates 1999; Breitmeier et al. 2009; McLeman 2010; Allaire/Blanc 2003; Aall et al. 2007; Kousky/Schneider 2003). A top-down perspective assumes a vertical relationship, where the higher levels of decision-making influence what is happening, and tends to ignore the role of the local as an important site of global environmental governance; a bottom-up perspective considers how local actors or events influence what is happening at 'higher' levels.

Some of the issues and research questions that have already been researched will be introduced in subsequent sections of this paper. While this article may give the impression that 'local climate change governance' is a distinctive set of topics and questions, one should kept in mind that the article does not comprise a specific field of research. Consequently, the

presented issues are not set by pre-given limits of a discipline—but derive from the author's idea of what to include¹.

Included in this review are studies that may bolster the scientific body of knowledge on how local climate change governance contributes to global transformations towards a low carbon society. Thus, the issues presented here may add a specific local perspective to global transformations, or present topics and themes that question, or even contradict, global perceptions and policies of climate change governance. Despite a clear technical and natural-science bias for scientific research, climate change has received growing attention from across the social sciences. As this review gives an overview of publications from the social sciences, literature from a range of disciplines is included. Among the disciplines taking part in this field of research are: sociology (among others Allaire/Blanc 2003; Astleithner/Hamedinger 2003; Dietz 2003; Engels 2003, 2008; Nakazawa 2006), political science (among others Kousky/Schneider 2003; Aall et al. 2007; Boykoff et al. 2010; Breitmeier et al. 2009; Eckerberg/Joas 2004), geography (Boykoff 2008; Bulkeley 2001; Ford et al. 2006; Iati 2008; Keskitalo/Kulyasova 2009), social anthropology (Crate/Nuttall 2009; Lazrus 2009), and psychology (Blake 1999; Hartmuth 2002). Despite all calls for an interdisciplinary approach—most publications are still identifiable with one discipline.

Subsequent to this introduction, a sub-section of this review will discuss and define the notions of 'governance' and 'the local'. The first main section of the article will provide an overview of what has been written with respect to the differences between the global and the local, and the dominations and suppressions present in these notions. As the perception of climate change is fundamental to any reaction to climate change, the second section will introduce authors who have worked on the question of how people perceive the reality of climate change. Scholars have found that an important aspect of climate change perception center on strategies of non-perception and denial. This is dealt with in a special sub-section. The third section introduces literature published on the issue of local climate change governance. As will be seen, most of this literature has, up to now, been focussed on the role of local governments and administration. Adaptation has been named as the second most important way people and societies will need to react to climate change. Consequently, the fourth section of this paper will present a selection of studies that deal with local adaptation governance. The final section will provide a second look at the presented literature, introducing some of the theoretical concepts used in that literature. The conclusion of this review will summarize the works that have been cited, answering the question of how local

¹ Generally not included are studies researching local environmental governance activities like waste, recycling, or biodiversity. Although these topics are both biologically and socially related to and even may affect climate change, these were excluded for analytical reasons. Likewise, as this article reviews the existing literature on *local* climate change governance, publications, dealing with climate change governance at the *global* scale are excluded as well. The exclusion of a specific piece of work, taking a global perspective, sometimes was not easy, as the multi-level dimensions of local climate change governance are not only acknowledged but will be highlighted in the subsequent sections.

climate change governance contributes to global transformations towards a low carbon society.

1.2 Defining Governance and the Local

Several commentators have noted a general political shift—from a central government model to decentralised governance processes—that has been accompanied by growing scholarly attention to this mode of policy-making (among others Eversole/Scholfield 2006; Betsill/Bulkeley 2006; Mortello/Jasanoff 2004). The general agreement on the growing importance of decentralised governance processes does, however, not lead to a common definition of what governance is. The definitions of governance vary not only due to a respective scholar's focus, but also mirror more fundamental disciplinary differentiations. Notably, definitions coming from the political science will differ markedly from those that are often applied by sociologists or social anthropologists. While political scientists understand governance with respect to the concept's formal meaning—concentrating on how power is officially spread vertically or horizontally among stakeholders—sociologists focus on the informal and social power structures immanent to the processes of governance itself.

There are, however, fundamental commonalities defining governance. The most important is that governance “involves processes through which collective goals are defined and pursued in which the state (or government) is not necessarily the only or most important actor” (Betsill/Bulkeley 2006: 144). While this statement allows perceiving governance as cooperation between different governmental departments, social science research normally focuses on collaboration between state- and non-state stakeholders. Non-state stakeholders, such as business, industry, parastatals, non-governmental organisations and civil society therefore receive a fair share of scientific attention. Furthermore, some governance processes are established and run without any governmental actor. To differentiate governance from other forms of collective action, it is necessary to refer to determinants besides the actor types participating. Most generally, governance seeks to achieve some form of public good (Andonova et al. 2009: 55). Even governance models comprised solely of civil society stakeholders must aim to create, change or preserve some kind of public good. For the focus of this review, the common good in question must be related to the causes or consequences of climate change. The broad definition of climate change governance, as it will be used in this paper, is: a process including different stakeholders who, in some form of participatory agreement, deal with the causes and consequences of climate change.

While the local, on first sight, seems to be quite clear, a short review of its application reveals a different reality. The next section will dive deeper into the problems deriving from the analytical separation of the local and the global. For a working-definition of the local, it has to be said that on a very general basis, the local is understood to be something below the national sphere (Lutsey/Sperling 2008; Kousky/Schneider 2003; Aall et al. 2007). Other authors define the local much more critically. For the purpose of this review, the local will generally be used

for social or geographical entities like: cities, rural communes, and entities or communities even smaller. If a cited publication refers to a larger entity, this will be made explicit.

2 The Global and the Local

Since the first publication on the topic of global climate change, the focus of most social science research on climate change governance has been on the international level of governance. In the last decade, however, an increasing number of scholars have paid attention to how climate change is perceived and addressed at the local level. The growing interest on the local impacts of, and reaction to, climate change was engendered by the insight that in spite of international treaties, protocols, and alignments, the local is an important site for governing climate change (Betsill/Bulkeley 2006, Adger 1999, 2001). Local governments have many tools at their disposal for implementing climate policy. Local governments most often have the legislative and executive control of many of the factors related to GHG emissions, such as: land use planning and regulation, residential and commercial regulations, transit options and solid waste disposal, and (often) the public transportation and electric supply networks (Kousky/Schneider 2003: 370; likewise see Betsill/Bulkeley 2006: 143). Generally, local governments tend to be more concerned with local outcomes of global climate change than national or international entities. Additionally, from the standpoint of a citizen, one's day-to-day life depends far more on the local time and place than on events in some future time at some distant location on the planet (Adger et al. 2009: 347, likewise see Lorenzoni et al. 2007: 452; Slocum 2004: 1). Thus, the growing recognition of the local within climate change governance, at least partly, derives from the fact that environmental politics has, "historically been a politics of the local. It derives emotional force from peoples' attachment to particular places, landscapes, and livelihoods, and to an ethic of communal living that can sustain stable, long-term regimes for the protection of shared resources" (Mortello/Jasanoff 2004: 7).

A number of scholars critique the distinction between the global and the local. This 'static vision' of local and global defines these categories as "fixed in meaning for all time rather than fluid and subject to strategic reinterpretation" (ibid: 14). Especially problematic is the 'evolutionary' distinction often merging 'global', 'modern', 'local', and 'traditional'. Likewise problematic is the identification of the global with attributes like 'science'; or heterogeneity and the local with 'knowledge' and perceived homogeneity (ibid). Upon closer inspection, none of these relationships hold.

Most notably, the idea that local entities are constituted by homogeneity has been challenged by scholars from the social sciences. As has been shown repeatedly, local communities, instead, are characterised by different forms of social differentiation. Indeed, case studies have shown that local perceptions of climate change, as well as the strategies to cope with climate change, "are diverse and sometimes even conflicting" (Engels 2008: 176, likewise see Lahsen 2004: 153; Lee/Stokes 2009: 1; Mortello/Jasanoff 2004; Fogel 2004). The

acknowledgement of social heterogeneity at the local level shows that, in order to gain a thorough understanding of global transformations, ethnographic and micro-focused case studies of local institutions and cultures are needed. Especially valuable would be accounts to integrate the results of micro-focused studies with broader, and more systematic, perspectives on globalisation (Mortello/Jasanoff 2004: 5). Furthermore, since the identities of actors are complex and hybrid, actors' perceptions of climate change, as well as their interpretations of their own agency², will differ markedly (Lahsen 2004: 153). Global perspectives, both within science as within politics, tend to diminish and deny this local diversity. The homogenisation, and thus simplification, of local heterogeneity often results from the need for standardization and universalization of local communities—deriving from the need to know and govern these communities (Fogel 2004: 106, likewise Engels 2008: 176). This standardization leads to scientific and political perceptions based on what is generally referred to as the majority. Minorities, like socially deprived or indigenous people, tend to be made invisible or unimportant (Fogel 2004: 103, Dulal et al. 2010; Kelman 2010). Consequently, global perceptions of the local are likewise criticised as being based on the perceptions, ideas and needs of the respective national, and international, powerful elites (Fogel 2004; Lahsen 2004; Lee/Stokes 2009; Mortello/Jasanoff 2004).

One aspect of this 'suppression' of the local, in order to empower global perspectives, organisation, and actions, is the construction of local knowledge as being different from, and of minor value to, 'global' science. This distinction denies the "situatedness" of 'science'—instead, constructing science as a universal truth free from local coloration (Mortello/Jasanoff 2004: 13). It also conceals that even inhabitants of apparently remote places are not living in isolation but are informed by broader networks of knowledge (Lazrus 2009: 240). Within these networks, people merge different 'spheres' of knowledge, contradicting the idea that local and global ways of knowing can be separated from each other. The definition of 'western modern, universal science' is not questioned by post-modern scholars alone. Instead, discussions in international forums reveal that even 'scientifically advanced' societies are characterised by major differences in their ways of knowing (Mortello/Jasanoff 2004: 19).

Scientifically, the distinctions between global and local actors and processes "obscure how global environmental governance takes place through processes and institutions operating at and between a variety of scales, involving a range of actors with different levels of authority" (Betsill/Bulkeley 2006: 142). In light of this recognition, it must be acknowledged that climate change challenges existing distinctions between the global and the local; climate change is a multi-dimensional problem that will not be solved if it is addressed from the direction of either the global or the local (Koch et al. 2007: 1324).

If the boundary between science and knowledge is constituted through social and political processes, it has to be asked: Who decides what counts as global vs. local, or distinguishes between knowledge and science (Mortello/Jasanoff 2004: 13)? It is important to consider

² The ability and capacity of an actor (individual or any other social entity), to act on its own accord.

these global power structures—not only because they are scientifically interesting—but because they play an important influence in pragmatic questions of climate change. Generally, it can be stated that “global climate change is a highly significant global environmental justice issue” (Norgaard 2009: 348). While the wealthy, industrialized countries are disproportionately responsible for the emission of GHG gases, poorer nations are not only more prone to the consequences of climate change, but are also less equipped to deal with those consequences (Bulkeley 2001: 432; Norgaard 2009: 348; Pelling/Uitto 2001: 52). The most fundamental discussion, in this area, concerns the question of whether the responsibility for climate change must be shouldered locally or by a global ‘community’. The main ‘problem’ is that climate change “is both ‘global’ and ‘local’ in the sense that both the causes and the effects of climate change have a global and local dimension. GHG emissions are by definition ‘local’ whereas many of the important driving forces are more of a global character” (Aall et al. 2007: 84; likewise Pelling/Uitto 2001). By concentrating on measures to be taken in response to the consequences of climate change, climate treaty negotiations tend to favour industrialized nations in terms of outcome and process (Norgaard 2009: 348). Thus, while the polluter principle, and the ‘moral sphere’, demand that wealthier nations step up to their responsibilities—as resulting from their emissions and historical obligations—in international organisations and discourses, wealthy nations are likely to use their power to benefit their own goals (Bulkeley 2001: 432; Pelling/Uitto 2001: 342; Norgaard 2009: 52, Fogel 2004).

To conclude this section, it should be noted that, aside from the importance of local case studies, it is critical to ignore the interconnectedness of local and global processes. Local actions tend to be deeply affected by global structures (Keskitalo/Kulyasova 2009; Pelling/Uitto 2001). However, scientific discussions about the local and the global underline the statement, made here, that research on global transformations towards a low carbon society will suffer from its immanent generalizing and homogeneizing tendency, if it is not enriched by knowledge about how these transformations shapen, and take shape, at the local level. As will be seen in the following chapters, research on local climate governance offers insights into issues, and questions, that are of decisive importance with respect to global transformations of society.

3 Perception and Representation of Climate Change

The perception, and representation, of climate change are of utmost importance for the implementation of any steps taken against climate change by individuals, groups or societies. To understand, and explain, global transformations towards a low carbon society, requires knowledge about why, in some localities, reactions to climate change and transformations processes are weak, or don’t exist at all. One of the findings in this section will be that: all scholars agree on the importance of acknowledging the locally, and socially, differentiated perceptions and representations of climate change. As the denial of climate change has been, and still is, a significant reaction to climate change, the first sub-section will review those

studies that deal with what will be called the ‘non-perception’ of climate change. The second sub-section will then turn to how the socially and locally differentiated perception of climate change informs the planning, and implementation, of actions and measures.

3.1 Non-Perception

Researching non-perception at the local level provides important insights into how global transformations affect the way people behave towards climate change. As even the global is made up of individuals, non-perception at the individual level will significantly affect transformations towards a low carbon society. Consequently, knowledge about non-perception is an important aspect of explaining these global transformations.

Since the 1990s, a number of studies—often socio-psychological—have dealt with the question of why people tend to ignore, or postpone, any action against climate change. Despite the problem that “climate change and its impacts, although generating concern, are also generally believed to be removed in space (‘not here’) and time (‘not yet’)” (Adger et al. 2009: 346, likewise see Lorenzoni et al. 2007: 452; Slocum 2004: 1), scholars have found different reasons why individuals, or societies, avoid recognizing the need for urgent action.

As early as 1999, James Blake claimed that the ‘value-action gap’ could not be “overcome simply by invoking an ‘information deficit’ model of participation, informed by a social psychological attitude-behaviour model” (ibid: 274). Instead, he argued, scholars have to pay attention to the everyday contexts “in which individual intentions and actions are constrained by socioeconomic and political institutions” (ibid). Drawing on data gathered during empirical research in the Huntingdonshire of Great Britain, Blake defined three categories of obstacles responsible for the gap between ‘concern’ and ‘action’: individuality, responsibility and practicality. In order to overcome these obstacles additional, and more differentiated policies are needed that allow for the diversity of individual values—as well as the negotiated and transitory character of these values. This presupposes the restructuring of socioeconomic, and political, institutions (ibid: 273). Blake’s paper concludes that the recognition and negotiation of diversity must be strengthened, even within local partnerships. As an additional important step towards overcoming the value-action gap, he called for a more equitable distribution of responsibility, and power, among different stakeholders in local governance processes (ibid).

Around ten years after Blake, Lorenzoni et al. (2007) drew upon three mixed-method studies, with an emphasis on qualitative data, to define engagement as an individual’s state comprising three elements: cognitive, affective and behavioural. Pure knowledge about climate change is not enough for people to become engaged. Some kind of emotional engagement, personal motivation, and, most of all, an individual ability to act, is indispensable. Widening the view from the individual to his social embeddedness, Lorenzoni et al. found a number of widespread, and ingrained, social barriers, like: inadequate infrastructure, social norms and values dedicating people to carbon-consuming lifestyles. Lorenzoni et al. concluded that structural change is needed in order to engage citizens and

communities in mitigation strategies, and that any mitigation effort must involve stakeholders from all parts of society.

Coming from sociology, rather than social-psychology, Kari M. Norgaard identified a further reason for non-perception among Western nations. She defined this behaviour as ‘socially organized denial’. Using this term, she drew attention to the fact that “ignoring information about global warming takes place in response to social circumstances and is carried out through a process of social interaction” (2009: 352). Based on ethnographic research in a rural, Norwegian community, she refuted the information-deficit model, as the people she interviewed were not only thoroughly informed about climate change, but tended to belong to a politically active society (ibid: 349f., 356f.). Norway has a long tradition of political participation, and offers a range of possibilities for civil society engagement. Consequently, neither the information-deficit model, nor concepts like that of Blake or Lorenzoni, are fully applicable to the case of Norway. Instead, any kind of non-response to climate change is at least partially a result of socially organized denial. Norwegian economic prosperity is tied to oil production. By collectively ignoring climate change, the Norwegian society is able to protect and maintain its economic interests (ibid: 347). The non-response among Norwegian citizens mirrors the political strategies of industry and politicians. One aspect of this strategy is to shift attention from national targets and measures—to international efforts. An important part of this international effort is to claim that it is good climate change policy to produce, and consume, Norwegian oil and gas since, compared to other nationalities, Norwegian petroleum products are among the cleanest in the international market. This strategy not only allowed Norway to increase its production of oil and gas threefold, but to drop national targets and measures. Denial, so far, has mostly been studied within psychology. Norgaard’s research on Norwegian political economy, however, illustrated that an important step towards making sense of why people do not want to know about global warming is to link psychological material on interactions, and culture, with macro level political economy.

Like Norgaard, McCright/Dunlap emphasized structural reasons for the denial of climate change. In an article published in 2003, they examined how the American conservative movement, the ‘environmental countermovement’, set out to construct, and spread, the idea of the ‘non problematcity’ of climate change. The conservative movement was afraid that actions, resulting from acknowledging climate change, would threaten economic libertarianism, one of the core elements of conservatism (ibid: 353). Supported by sympathetic, prominent scientists, conservative think tanks gained legitimacy for their ‘scientifically based’ counter-claims on global warming. Enlisting a whole range of lobby activities, like issuing press releases, holding policy forums, and sponsoring press conferences for policymakers, the conservative countermovement was, indeed, able to challenge the environmental community’s claims about global warming (ibid: 367). Until Kyoto, the conservative countermovement was supported by economic corporations, especially the fuel industry; since Kyoto, most corporations have publicly acknowledged climate change, and abandoned the countermovement (ibid: 369). The McCrights/Dunlaps study, however,

demonstrated how powerful actors are able to influence the perception of climate change, both in the political arena, and more broadly in society.

This line of research indicates the importance of the perception of climate change. The cited publications show that non-perception at the individual level is directly related to structures, and goals, at the macro-level. Research at the local level has shown that the reasons why people do not perceive climate change as a serious problem have less to do with individual perceptions, and more to do with forces and regulations directed from a much higher level of society. This does not mean that individuals, or social entities, have no agency. In the subsequent sections, it will be shown that local initiatives may even have the potential to alter the structural or political forces that prohibit climate change governance, or to implement mitigation or adaptation measures on their own account. These important, local contributions to global transformation are based on human perceptions of climate change, which are impossible to investigate on a macro level. Furthermore, these studies provide examples, and explanations, of how these higher levels create and support denial of climate change at the individual level. Knowledge about why certain groups or societies do not perceive climate change as a problem, or deny its seriousness³, is therefore an important aspect of research that, with respect to global transformations towards a low carbon society, could not have been gathered without local studies. The next section will deal with various scientists' findings on how the perception of climate change is shaped, and how the respective ways of perceiving climate change influence planning, and implementation, of responses.

3.2 Perception

A number of scholars from the social sciences have investigated the perceptions of climate change within different societies (Moyano et al. 2008; Hartmuth 2002; Boykoff 2008; Boykoff et al. 2010). The main focus of research being how people perceive climate change, what influences people's perceptions and how people react in response to their perceptions (Koch et al. 2007: 1325).

Hartmuth, in his study of social representations of anthropogenic climate change on the Island of Sylt/Germany, found that social constructions of environmental changes are of immense importance for governance processes—as these social constructions influence decisions on what to do at all levels of human self-organisation—from the individual to global society (ibid: 44). Diverging contextualisation of climate change by different actors or locations, however, occur because climate change is a socially and locally differentiated problem. Thus, it is important to acknowledge that the perception of climate change varies by population, depending on the respective risk envisaged by a specific individual, group, or location (ibid: 12).

Indeed, as Moyano et al. found for Andalusia/Spain, the recognition of climate change varies not only according to the vulnerability of a specific area, group or individual. Instead, only

³ As its plain existence is not really denied seriously any more.

specific aspects of climate change—those most likely to occur locally—will raise awareness among inhabitants. Thus, public response to this issue varies not only considerably across regions within the same country (2008: 64), but also across citizens, who give priority to those effects of climate change—like soil erosion, precipitation changes or forest fires (ibid: 68)—that are most likely to have a strong impact on their day-to-day lives.

The orientations, content and development of environmental policies, that are “are ultimately the result of a set of social values, beliefs, norms and expectations that predominate in a given society and at a specific moment in time” (ibid: 62). Furthermore, as Koch et al. underlined, scientists dealing with climate change governance, in particular, have to recognise the multitude of perceptions that come together in the process of governance. Climate change governance is often based on the participation of non-state stakeholders. These non-state stakeholders may arise from business, industry, parastatals, non-governmental organisations and civil society. The different actors are supposedly characterised by different perceptions of climate change. These different perceptions all contribute to the way in which the problem of climate change is defined, contested and addressed (Koch et al. 2007: 1333). Furthermore, “people do not have a fixed, rational and ready-made set of values that will be activated by particular calls to action; rather people's values are negotiated, transitory and sometimes contradictory” (Blake 1999: 265). Thus, the same stakeholder may have situational, varying objectives to climate change. Governance models must be aware of this ‘multi-dimensionality’ (Moyano et al. 2008: 63), within which opposing social interests must be consolidated.

An important question raised by some scientists is how perceptions are created and spread within a society. A number of scientists have examined the role of mass media (Olausson 2009; Boykoff 2008). They found that media representational practices may contribute to the perception of climate change by all entities of societies, ranging from the individual to the international level. Furthermore, mass media may influence governance actions, from both atop-down direction, and via grassroots pressure (Boykoff 2008: 566). Detecting a deficit in the works preceding his research project, Boykoff (2008) explicitly concentrated on the role of tabloids. For her, tabloids were important, influential sources impacting an understudied segment of society—mainly lower-income, and less educated, citizens of England—who, in terms of numbers, form the largest social segment. In a later work, Boykoff turned to examine the role of non-state actors like celebrities and sport associations (Boykoff et al. 2010). Here, she found that the ‘traditional’, powerful inhabitants of the discursive spaces – scientists, business and environmental groups – had been extended by ‘new’ voices. While this does not mean that the traditional speakers have stopped speaking, or are not heard anymore, “in the public sphere within which climate science and politics find meaning in our everyday lives, the boundaries between who constitutes an ‘authorized’ speaker (and who does not) has expanded” (Boykoff et al. 2010: 142).

Despite the general findings on geographically localised perceptions of climate change, researchers have found evidence that people are well aware of the different policy levels

needed to deal with a global problem like climate change. The the citizens of Andalusia, for example, do not perceive local or regional policies as the key to climate change, but clearly see, and differentiate between, levels of responsibility for political action—depending on the kind of problem, or the problem’s geographical scale (Moyano et al. 2008; Baldwin/Chandler 2010). These research findings, at the local level, provide the insight that climate change is mostly perceived in its local manifestations, or individual risks, and that global transformations towards a low carbon society will be thoroughly shaped by these differentiations. Likewise, local research has also shown that people are well aware of the global character of climate change—and the need to tackle climate change at the local, national and international levels.

4 Mitigation

The term mitigation applies to measures that are taken to reduce the emission of GHG-gases. The aim of this strategy is, if not to prevent climate change entirely, to limit climate change as greatly as possible. Frequently employed measures include climate action plans, emission-targets or specific incentives. Mitigation policy has mostly been understood, and handled, as a top-down process, where national governments implement the policies that have been negotiated in international treaties and agreements. Scholars have, however, become increasingly aware of the fact that international statutes, and national laws, are mostly realized by local governments—if not within local governance processes. Furthermore, scholars recognise that mitigation policies may also be initiated at the local level, possibly causing changes at the national, or even international, level. Consequently, scholars have begun to recognize the need to study mitigation policies at the local level. This chapter introduces some of the literature that has been published on the question of local mitigation governance processes. After giving a general overview of the publications, the subsequent sub-sections will approach specific lines of research within this field, especially those that complement macro-focused research on the question of global transformations towards a low carbon society.

4.1 Overview

Many research projects on mitigation governance have been designed as survey-studies of individual countries—integrating data from different counties, cities or municipalities (Aall et al. 2007; Hanak et al. 2008; Ye et al. 2008; Kousky/Schneider 2003; Lutsey/Sperling 2008; Lorenzoni et al. 2007; Lange/Schimank 2004; Lee/Stokes 2009; Granberg/Elander 2007). These kinds of studies mostly examine the success of local mitigation policies within one nation. Case studies of special topics have mostly been carried out in cities (Betsill/Bulkeley 2006; Rutland/Aylett 2008; Slocum 2004; Alber/Kern 2009; Astleithner/Hamedinger 2003; Corfee-Morlot et al. 2009). This concentration may well derive from the fact that cities are not only recognized as the biggest polluters, but also offer the best opportunities for mitigation. These qualities are a reflection on both the density of inhabitants, and the accumulation of

capacities and facilities situated in cities. Indeed, various authors suggest that cities, rather than nation-states, may be best equipped to pursue environmental policies (Corfee-Morlot et al. 2009; Breitmeier et al. 2009; Betsill/Bulkeley 2006). While the importance of cities, with respect to environmental policy, has been recognized by scholars, rural areas, so far, have received much less scientific attention. Indeed, rural areas have only, more or less, been investigated with respect to specific theoretical issues (Norgaard 2009; Eversole/Scholfield 2006).

Unlike adaptation research, where most studies are accomplished in developing countries, most studies in mitigation research have been conducted in developed countries. A large proportion of research has been conducted in the USA (Hanak et al. 2008; Kousky/Schneider 2003; Lutsey/Sperling 2008; Lee/Stokes 2009; Rutland/Aylett 2008; McCright/Dunlap 2003). An often cited reason why so much has been published concerning local environmental initiatives in the USA is that “local governments in the United States that are addressing climate change are doing so in the absence of the federal government’s participation in the Kyoto Protocol” (Engel 2005: 56). Thus, nearly all climate change policy in the USA derives from initiatives by local governments, or civil society. Often, the adoption of climate change policies, by municipalities, is explicitly intended to exert pressure on a national government that has proven to be clearly biased towards economic, rather than ecological, concerns (Rutland/Aylett 2008: 627). Another ‘hot-spot’ of mitigation research are the Nordic countries, predominated by Sweden and Norway (Olausson 2009; Norgaard 2009; Granberg/Elander 2007; Aall et al. 2007). Canada (Slocum 2004; McLeman 2010), Australia (Bulkeley 2001; Eversole/Scholfield 2006), Japan (Nakazawa 2006) and different European countries (Boykoff 2008; Lorenzoni et al. 2007; Blake 1999 in the UK; Moyano et al. 2008 in Spain; Hartmuth 2002; Lange/Schimank 2004, in Germany) have also been investigated, although not as thoroughly. While many scholars have used data from different locations, very few have used these data in a comparative way (Bulkeley/Kern 2004; Betsill/Bulkeley 2006; Alber/Kern 2009; Corfee-Morlot et al. 2009).

There are authors who explicitly, or implicitly, criticise the ‘methodological nationalism’ evident in national case studies (Betsill/Bulkeley 2006; Eckerberg/Joas 2004; Boykoff et al. 2010). Although these scholars are aware of the lasting influence of national restrictions and possibilities – especially law, and mode of regime – they make a point that the multi-level, multi-scalar reality of climate change governance is not tied to one nation-state exclusively. If it is taken into consideration that concerns regarding climate change are tied to the locally varying impacts of climate change consequences, it becomes especially clear that methodological nationalism, on the one hand, may overlook certain transnational connections, while, on the other hand, may presume a lack of equality within one nation-state.

A growing number of publications recognize that local authorities are neither congruent with national policies, nor conceptualize and enact environmental governance in isolation (Betsill/Bulkeley 2006: 144). Thus, while the studies reviewed here concentrate on the local level, a growing number of studies acknowledge the multi-level reality of climate change

governance. Authors like Wilbanks/Kates (1999), Bulkeley (2001), Eckerberg/Joas (2004), Betsill/Bulkeley (2006) or Ye et al. (2008) argue that it is “important to consider how climate protection is being addressed within and across different levels of government and governance operating in a multi-level system” (Bulkeley/Kern 2004: 2). Climate change governance not only includes stakeholders from different spheres of society, but also those from different levels of governance (i.e. local, regional, national, supra-national, international, and global).

4.2 Climate Change Governance

This sub-section will turn to specific topics, investigated by scholars of the social sciences, focusing on local mitigation policies.

4.2.1 Governmental policy

There are many studies, especially in the political science literature, on how sub-national entities (i.e. municipalities) implement climate change policies (Lutsey/Sperling 2008; Hanak et al. 2008, for the US; Aall et al. 2007, for Norway; Bulkeley 2001, for Australia; Bulkeley/Kern 2004, for UK and Germany). Most of these studies focus on the interplay of local, national, and international climate change policies (Lutsey/Sperling 2008, Aall et al. 2007; Bulkeley 2001). Acknowledging the fact that local mitigation policies not only exist as top-down decisions, but that mitigation policies from the local level may successfully be transferred to higher levels of government, the cited scholars define this interplay as a mutual relationship—not one of clear domination and suppression. Being mostly quantitative studies, statistical data from all (Lutsey/Sperling 2008), or from a large number of, localities (Aall et al. 2007; Hanak et al. 2008) are analysed and generalised.

Aall et al. (2007) provided an overview of how governance programs are planned, implemented, and run by local communities. In their comparative work on municipalities in Norway, they found that governmental grants are of crucial importance as a motivating factor in implementing a local climate policy program (ibid: 88). Analyzing the type of activities actually carried out by 23 municipalities, the researchers found that activities within the energy sector clearly dominated the environmental policies taken by municipalities (ibid: 91, likewise see Lutsey/Sperling 2008, for the USA). The participation of non-state actors in Norway, as well as the dissemination of information to, and the integration of, the public in the planning process, was found to be weak. More than half of the municipalities did not establish any kind of non-state participation; half didn't even make any effort to inform the public, in any way, about the planning process (ibid: 88). Normally, when the planning was carried out as governance process, a consultative group was established as the participatory mechanism for the integration of different stakeholder groups. Non-state actors, like energy companies, industry and NGOs, were the most frequent stakeholders.

For a long time, Australia, like the USA, did not ratify the Kyoto protocol—nor any other international treaty on climate change. Likewise, the Australian government did not pursue

any national environmental policy. When Australia's government was finally forced to become active, establishing a committee to negotiate the National Greenhouse Response Strategy (NGRS), the process remained closed to participation of non-state stakeholders (Bulkeley 2001: 440). When the federal government tried to initiate the policies developed by the NGRS, conflicts of accountability over climate change responsibilities, within Australia, were so strong that the government had to retract its policy and start a new process. The new National Greenhouse Strategy, which came into effect in 1998, was not only the result of a governance process that included stakeholders from outside the administration, but also adopted the ideal of sharing responsibilities, on both the horizontal and vertical levels, for measures that had been agreed upon (ibid: 441).

In their quantitative survey for the Public Policy Institute of California, Hanak et al. (2008) gained information on the extent, and types, of actions that were already implemented, or considered, by local governments in different parts of California (ibid: 3). California was chosen as it had taken a leadership role, among local US governments, on climate change. About one third of the local governments in California take part in international initiatives that encourage local environmental policy. Like Lutsey/Sperling (2008) found for America generally, climate change policy in California favoured actions like energy efficiency, which are easy to implement, and generate cost-savings (ibid: 36). Furthermore, Hanak et al. found that climate change activity increased proportionally to the number of inhabitants, and average household income. Another influential parameter was the political orientation of inhabitants. Municipalities with higher shares of Republican voters were somewhat less likely to establish a climate change policy (ibid).

Regarding the question of governance, the researchers found that partnerships and collaborations, both on vertical, and horizontal, levels have been crucial for the development and implementation of mitigation strategies. Unlike Aall et al. (2007) found for Norway, governmental grants were not as important in California. This derived from the circumstance that alternative financing models – like partnerships with the private sector, and working with private investors – were available, and that private sponsorship was rooted quite firmly within US society (Lutsey/Sperling 2008: 37). Lack of financial capacity, however, was still among the biggest problems faced by non-state stakeholders. An additional problem resulting from an absence of non-state stakeholders in Californian governance processes was a lack of information and clarity, notably when it came to jurisdiction (ibid).

The newly emerging, local climate change policy in China is very much dependent on the central government. "In China's unitary governmental system, local governments are supposed to implement decisions made by the central government. Thus, any change in local government priorities is usually a result of requirements instituted or incentives offered by the central government" (Ye Qi et al. 2008: 380). This dependence explains why the problem of climate change only became a high priority issue, for provincial and prefecture governments, after China's ratification of the Kyoto protocol. Besides responding to the central government's calls, local economic development was the main motivation behind local

climate change policy (ibid: 390f.). Like local governments in any other part of the world, China's local governments had come to recognize, and use, the link between energy-efficiency and climate change (ibid: 393). Thus, China's local mitigation policy almost solely focuses on enhancing energy-efficiency.

A special line of research, on the role of the government, developed typologies concerning the 'modes of governance' (Alber/Kern 2009; Bulkeley/Kern 2004; Betsill/Bulkeley 2006; Lemos/Agrawal 2006; Astleithner/Hamedinger 2003; and Breitmeier et al. 2009, for adaptation). In an article published 2004, Kristine Kern and Harriet Bulkeley distinguished between four modes of climate governance: self-governing, governing through enabling, governing by provision and governing by authority. Comparing England with Germany, they found that, in both countries, "it is the *enabling* role through which local government is most able to influence the activities of others" (ibid: 34). In an article published in 2009, Kristine Kern and Gotelind Alber made use of the same categories. The categories were distinct in terms of their governing capacities, ranging from soft forms of governing using a different model of public participation, to traditional forms of state intervention by rule-setting and enforcement (ibid: 1). Besides the similar importance of the enabling role, the researchers found that climate change policy, in most states, was still a predominantly voluntary task (ibid). As Krings (2011) pointed out, this role may be both a result of, as well as restricted by, the financial, material and personal scarcity most communal governments suffer. Due to this scarcity, communal governments are in need of cost-effective instruments. How the factor of cost-effectiveness shapes local government choices of mitigation policies will be expanded on in next sub-section.

Another typology concentrates on emerging 'hybrid modes of governance' (Lee/Stokes 2009; Lemos/Agrawal 2006). Lemos and Agrawal (2006) found that governance models based on government partnerships with the private sector can be defined as "co-management", "public-private partnerships" or "social-private partnerships"—depending on the non-state partner and the intended outcome (ibid: 297). The most basic distinction, however, is made between vertical and horizontal integration (Corfee-Morlot et al. 2009; Lee/Stokes 2009). Vertical integration concerns the cooperation between local, national, and international policies. Horizontal integration implies the collaboration of different departments, institutions or stakeholders in local and regional governments. Both vertical, and horizontal, integration allow two-way benefits: locally-led, or bottom-up, initiatives may be able to influence national action, while nationally-led, or top-down, decisions may establish a framework within which local players have a fair chance of participation (Corfee-Morlot et al. 2009: 2). Most local policies still seem to be a primarily top-down decision, inspired by officials' or staff-members' ideas about 'good business' or rational policy choices (Kousky/Schneider 2003: 361). The next sub-section will take a closer look at the rational policy choices that inform local climate change governance.

4.2.2 Energy-Efficiency

Energy-efficiency is the most widespread local mitigation strategy (among others Lutsey/Sperling 2008; Hanak et al. 2008; Aall et al. 2007; Ye Qi et al. 2008; Boykoff et al. 2010; Keskitalo 2004). While most scholars merely acknowledge this fact, a number of scientists have set out to study the background, and reasoning, for this decision (Kousky/Schneider 2003; Rutland/Aylett 2008; Slocum 2004). Kousky/Schneider found that decisions made by local governments are primarily justified by cost savings and other co-benefits rather than by public pressure or a desire to protect the climate (2003: 361). As the implementation of energy-efficient strategies is rather easy to justify and implement, uncontroversial, and is able to generate fairly rapid cost savings, most governmental mitigation policies are based on energy-efficiency strategies. Often, the cost-saving factor is used as a selling point, especially when there is less support for environmental action per se (Hanak et al. 2008: 36). This kind of policy has been labelled: “picking the low-hanging fruit” (Aall et al. 2007: 93; likewise see Hanak et al. 2008: 36). Hanak et al. explained that the comparatively uncomplicated implementation of energy-efficiency policies derives from the administrative circumstance that these policies can be handled as internal operations (2008: 36). This seems to be an important motivation, as “it is easier to tackle internal operations than to launch community-wide programs, particularly when other entities (e.g. electric and water utilities, regional transportation authorities) play important roles in setting policies for the community” (ibid).

Portland, Oregon likewise decided to base its mitigation policy on energy-efficiency strategies. Rutland/Aylett (2008), however, not only found cost-saving factors to be the reason for Portland’s focus on energy-efficiency. Portland’s ‘Carbon Dioxide Reduction Strategy’ did not target all sectors. Instead, only those sectors that could be governed were counted as ‘local carbon emissions’. Emissions like airplane travel from or to the city, long distance transportations through the city or of imported commodities, that could not be governed effectively were simply left out from the calculation. This decision does not only derive from an administrations’ ‘Realpolitik’ or preference for easy to implement policies, but

“[t]he reduction strategy’s broadly articulated objectives, its focus on energy efficiency, and its representation of carbon emissions were each the product of a distinct actor network, formed in the midst of an energy crisis and stabilized through the translation of different, but compatible, interests in energy reform” (ibid: 637).

Energy-efficiency was basically the lowest common denominator of the different stakeholders. Rutland/Aylett’s second finding was that the specific constellation of the actor-network in Portland promoted a strategy that shifted the main responsibility for carbon reductions to private households. As Boykoff explained, making people aware of their ability to contribute to the reduction of carbon emissions can empower individuals, and can contribute to the creation and support of civil society movements. Simultaneously, however, this strategy may unfairly shift the responsibility to the individual, and “socialize climate change problems and solutions at the level of the individual and consumers at the expense of

holding states, institutions and corporations accountable” (Boykoff et al. 2010: 34, likewise Slocum 2004). This problem was identified, by Rutland/Aylett, in Portland: “Portland empowered its citizens to do certain things and not others. No tools for example, were provided to assist citizens in lobbying for more effective regulation of large corporations” (2008: 641). Taking both findings together, Rutland/Aylett concluded that the actor network dictating Portland’s mitigation policy not only enabled, but, at the same moment, constrained local action on climate change (ibid: 643).

The energy-efficiency strategy didn’t just shift attention and responsibility to the individual; concentrating on energy-efficiency diverted attention from the need to lower energy consumption (Rutland/Aylett 2008: 643). In fact, scholars are critical of focusing on energy-efficiency—as such focus is understood to divert attention away from more significant changes within powerful, carbon-based political economies (Slocum 2004: 11; Boykoff et al. 2010: 146; Ye Qi et al. 2008; Keskitalo 2004). Both energy-efficiency and conservation serve to prolong the use of carbon-emitting energy, and engender a “problematic tendency to lionize and entrench the acts of individuals primarily as consumers at the expense of more critical considerations of citizenship” (Boykoff et al. 2010: 146). Furthermore, these strategies deny any critical discussion on the ideals of consumerism and capitalism. Instead of focusing solely on energy-efficiency, it is important to take countermeasures that account for social, economic and political processes, as well as practices, that create climate change (Keskitalo 2004: 426; Ye Qi et al. 2008: 397).

4.2.3 Work of Organizations

As already noted, climate change governance may involve stakeholders from all spheres of society, and all levels of hierarchy. Non-state actors, involved in governance processes, contribute to the way in which climate change is defined and contested—as well as what problems are addressed, and how those problems are tackled (Koch et al. 2007: 1333). With the potential to pose a significant influence, actors besides local governmental and administrative stakeholders, must be studied in order to gain thorough knowledge on local climate change governance processes.

Until now, however, the role of non-state stakeholders seemed to suffer from a certain lack of scientific interest. Despite regular announcements of the growing importance of non-state stakeholders in nearly all publications on climate change governance, very few studies explicitly set their focus on such stakeholders. This may well derive from a slight quantitative bias. As stakeholders from civil society are diverse in their composition, goals and background, studies on non-state stakeholders have only been able to use published statistics, or data, in a very limited way (compared to the actions and measures undertaken by local governments and administrations). Instead, researchers have had to undertake some sort of case study.

Eversole and Scholfield (2006) investigated the nature and limits of local participation in governance processes, taking a ‘grassroots-perspective’. Australian environmental policy has

become aware that inhabitants of certain localities are often equipped with specific local knowledge, and are characterized by a long-term interest in their area. Often, local inhabitants are better able to create sustainable solutions to local needs than any other expert or governmental actor. Having recognized this, policymakers in Australia increasingly encourage communities to play a larger role in their own development.

One of the strengths of local actors is that they are more successful in recognizing, and thus promoting, solutions for the local specifics of global climate change. Greenpeace Canada, for example, launched a successful campaign to raise awareness on climate change—employing the image of a hungry polar bear (Slocum 2004). The polar bear proved to be a valuable icon, not just because it is impressive and attention-grabbing generally; Canadians share the national identity of being members of a northern country, so the polar bear is a “significant part of Canadian iconography” (ibid: 14). By using the image of the polar bear, Greenpeace Canada reshaped the globalized scientific, and policy-based, discourses on the causes and consequences of climate change, and made such discourses meaningful to Canadian inhabitants.

While the last sub-section provided a relatively pessimistic view of the reasons why governance models are created and supported by local governments, Eversole/Scholfield found a much more optimistic explanation. For them, the growing role of governance models was not just part of a general shift from centralised government models to decentralised governance processes, but was the expression of a “philosophical orientation toward ‘participatory’ development underpinned by local ownership of development initiatives and an acknowledgement of the analytical capabilities of local people” (ibid: 321). Besides creating more localised and sustainable solutions, Eversole/Scholfield found that local non-state stakeholders were well able to work around, or in, the gaps of established structures in order to achieve innovative solutions. When local stakeholders work together to tackle local issues, “they create new governance spaces that lie outside of existing government and organisational bureaucracies” (ibid: 320). Thus, non-state stakeholders were able to undertake innovative, specific measures that could not have been undertaken by governmental actors.

Besides acknowledging the general improvements achieved through implementing a governance model, most scholars, however, are aware of more critical aspects. As Lange/Schimank (2004) exemplified among the German Agenda21 processes, the most affected people sometimes don’t participating within the process – especially when those people belong to a social minority group. While industry and business are able to formulate and support their interests, individuals, notably those who are un- or poorly-organised, or organised but lacking resources rarely take part within governance. Thus, already organised co-operations, or initiatives made up of middle- or high-income households, are the ones that gain decision-making power through governance models. Furthermore, the ‘exit-option’ (as participation is voluntary, and anybody can simply leave the process) may lead to a homogenisation of the discourse, especially when smaller groups or individuals feel that their voice has no chance of being heard or respected. In the worst case scenario, governance

processes may lead to a decrease in democratic values and norms; administrative action is, at least, officially bound to include social minorities, or to implement some kind of minority rights.

For scientific research, Eversole/Scholfield developed three parameters for the analysis of the participatory effect of governance processes: the degree of 'inclusivity', meaning who will have a say in decision-making; the degree of influence, meaning how much say a participant will have; and the degree of formality or informality, meaning the degree to which existing institutional arrangements permit participation. Examples of this last parameter include questions like: Are there limitations for participation? Is participation limited to organised interest-groups (2006: 312)? And how much can an interest group gain by taking part?

In general, it seems that among the most limiting challenges for civil society initiatives are the scarcity of resources (Aall et al. 2007; Hanak et al. 2008; Rutland/Aylett 2008), insufficient legislation (Hanak et al. 2008) and conflicts with prioritized municipal projects (Rutland/Aylett 2008; Allaire/Blanc 2003). As "higher-level support and resourcing is often needed to make 'grassroots' solutions work" (Eversole/Scholfield 2006: 320), the privileging of other local projects is a likely threat to governance solutions. In developing countries, for example, this becomes especially relevant when environmental concerns are thought to contest with development projects. (Roberts 2008). Ye Qi et al. explained that China, for instance, did not engage in any kind of climate change policy before 2007—one of the main reasons being that "climate change mitigation efforts were believed to work against local interests because reducing greenhouse gas emissions and energy consumption could slow economic growth" (Ye Qi et al. 2008: 379). Conflicts with other stakeholders, however, are the biggest challenge to governance (Allaire/Blanc 2003). Different stakeholders may have very different ideas on what to do, and how to do it. Notably, business interests often articulate vehement opposition to the ideas of other stakeholders, using their higher status to discourage open discussion, or to silence other actors (Keskitalo 2004; Rutland/Aylett 2008; Adger et al. 2009). This problem is enhanced by the tendency of most governmental actors to be biased towards the desires, and opposition, of business stakeholders. Likewise, during planning and implementation, tensions may arise over the relative responsibilities of different actors (Blake 1999: 257).

As has been seen in this sub-section, scholars will have to react to the growing importance of non-state stakeholders by making such stakeholders the focus of more research. Moving away from a state-centred perspective, scholars have to realize the diversity of actors and institutions taking part in climate change governance processes. Otherwise, social research on governance processes will miss one of the most important aspects of what sets governance processes apart from governmental decisions.

4.3 Transnational Networks

As already stated, localities do not engage in climate change governance in isolation (Betsill/Bulkeley 2006). Instead, many local communities are part of regional, national, or

transnational governance networks. Until now, transnational networks have been thoroughly under-studied. Among the few exceptions to this are studies by Alber/Kern (2009), Toly (2008), Betsill/Bulkeley (2006) and Andanova et al. (2009). By a wide margin, most of these networks are created by, or for, urban municipalities. These networks not only influence governance in a vertical way, by enabling the sharing of best-practice examples among pioneering cities (Alber/Kern 2009: 1). They also, by pooling influence and capacities, highlight and support the presence of the influence of a given city in the world. Toly (2008) explicitly analysed the centrifugal aspects of cities⁴. He took a grassroots-perspective on how cities influenced higher levels of governance, instead of looking at how cities were influenced by forces from higher levels of governance. He found that, besides the pooling of global influence, the connections created by municipal networks presented opportunities for inter-municipal dialogue. The transnational networks of cities, according to Toly, “may be among the most underexamined potential norm entrepreneurs in the climate discourse” (ibid: 352).

All of the studies discussed here were macro-focused. Two of them (Alber/Kern 2009; Andanova et al. 2009) analyzed city networks with the goal of extracting typologies. While Alber/Kern examined city networks with respect to the mode of governance (self-governing, governing through enabling, governing by provision and governing by authority) employed, Andanova et al. created a typology based on two different criteria: the types of actors involved, and the governance functions provided by the network. The types of actors ranged from purely public at the one pole, to purely private, transnational governance networks at the other pole, with hybrid forms in the middle. The functions were: information sharing, capacity building and implementing (or rule setting). Despite this analytical distinction, the authors were aware of the fact that these functions were not clearly separable. Notably, information sharing was an aspect of nearly all networks, even if such sharing wasn't always a network's main purpose (ibid: 66).

Betsill and Bulkeley, in an article published 2006, described how the Cities for Climate Protection program, “a network that is simultaneously global and local, state and no state, could be conceptualized as part of global environmental governance” (ibid: 141). They found that traditional, theoretical approaches from political science were insufficient for the analysis of these networks—as these approaches “obscure how the governance of global climate change takes place through processes and institutions operating at and between a variety of scales and involving a range of actors with different levels and forms of authority” (ibid). Thus, like local communities, transnational networks, despite being voluntarily united by shared needs, desires or principles, are nonetheless heterogeneous entities.

All of these studies, however, are macro-level studies, focusing exclusively on the role of city-networks. Rural transnational networks, like the Association of Small Islands States, have received even less (or no) attention, thus far, by scholars from the social sciences. Besides this gap in social science research on local mitigation governance processes, further arguments

⁴ Centrifugal describes the ways in which cities generate forces that bear upon the extra-urban (ibid: 341).

will be made here that underline the need for local research. Basically, there would be no knowledge of how international agreements, or national laws, are implemented and realized; as such processes take place, for the most part, at the local level. This lack of knowledge would create scientific blindness towards the ways in which non-state stakeholders contribute, with specific local knowledge and informal approaches, to innovative solutions that may then be transferred to the national or international spheres. Thus, the interconnectedness, and mutual influence, of the different levels in which transformations towards a low carbon society take place, would quite possibly be overlooked. At the least, global approaches would miss the *bottom-up* influences that may affect these transformations. Furthermore, a macro-perspective is insensitive towards the problems local actors may face when trying to take part in governance processes, or implement mitigation measures. To understand why certain steps in the transformation process are taken very slowly, or not at all, research focussing on the local level is indispensable. Likewise, it is not possible to explain the origin and development of certain innovations and solutions if science ignores the level on which they were invented. Transformations towards a low carbon society will not be understood, or explained fully, without knowledge about local governance processes.

5 Adaptation

The notion of adaptation is used to describe human preparations for the expected effects of climate change (i.e. sea-level rise, droughts, hurricanes...). Besides mitigation, it is the second important way in which societies will have to react to anthropogenic climate change. While not being directly part of the transformations towards a low carbon society, in the sense of the word (as adaptation does not decrease the emittance of carbon or other air-polluting substances), adaptation is part of the transformation towards a society affected by climate change.

As will be seen, adaptation is generally acknowledged to be a foremost local issue. Consequently, scientific research on adaptation will learn little without local research. The following section will provide an overview of the literature that has been published on local adaptation policies, in general, and questions from social science research on the issue, in particular.

5.1 Overview

While the bulk of the international debate on climate change, since the 1990s, has dealt with the issue of mitigation, growing attention is now given to adaptation, both in political and organisational practice and science. (Adger et al. 2009: 336; likewise see Koch et al. 2007).

While mitigation primarily concerns national governments taking part in international negotiations, adaptation is generally understood to be a local issue that is best approached on the local level. More specifically it is argued that, as the impacts of climate change are socially and locally differentiated, local peculiarities are not captured by national or

international treaties and protocols (Olausson 2009; Næss et al. 2005; Adger 1999, 2001; Tanner et al. 2009; Engels 2008; Leitch et al. 2009). This argumentation is not found only among scholars, but is widely acknowledged by practitioners.

Acknowledging this highly local character, most research on adaptation has, until now, been designed and carried out as case studies (among others Breitmeier et al. 2009; Naess et al. 2005; Pelling/Uitto 2001; Roberts 2008; Koch et al. 2007; Adelekan 2009; McLeman 2010, Lazrus 2009; Adger 1999, 2001; Pelling 1999; Dulal et al. 2010). Among case studies conducted in wealthier nations, the ‘hotspots’ of research are the US and Canada (McLeman 2010; Cohen 1997), Australia (Leitch et al. 2009; Baldwin/Chandler 2010) and the European nations, especially the Netherlands and the Scandinavian countries (Keskitalo/Kulyasova 2009; Naess et al. 2005; Granberg/Elander 2007). Scholars studying adaptation in poorer nations often choose island states (Lazrus 2009 in Tuvalu; Pelling/Uitto 2001; Iati 2008, Pacific Islands; Tompkins 2005, Cayman Islands; Kelman 2010) or African countries (Engels 2003, 2008, Sudan; Adelekan 2009, Nigeria). Asian countries are mostly analysed with respect to how the constriction of fundamental prerequisites—like democracy, transparency, and participation—affects governance processes (Tanner et al. 2009; Adger 1999, 2001; Brooks et al. 2005; Iati 2008; Lazrus 2009; Dulal et al. 2010). Of the wealthier nations in Africa, only South Africa (Roberts 2008; Koch et al. 2007) has so far received a certain amount of scientific attention. Some regions, like the arctic, and mountainous regions (but see Dulal et al. 2010; Ingold et al. 2010) are thoroughly understudied, when it comes to climate change governance.

As global climate change is not a local phenomenon, some scientists have begun to complain that the majority of adaptation research projects are designed as case studies. While comparative research is still only beginning to take place, there are nonetheless some scholars who have employed different comparative approaches for their research. Comparative work has been done using both ‘intra-national’ and ‘inter-national’ comparisons. Intra-national comparative work – meaning work where different communities or cities, within one nation or region, are described or compared against one another – aims to clarify the different ways in which locations and their inhabitants are affected by climate change (Pelling 1999), or clarify the different perceptions of, and reactions to, climate change (Engels 2008; Fogel 2004) or present different forms of local governance and measures of adaptation (Granberg/Elander 2007; Neass et al. 2005; Tanner et al. 2009⁵). Inter-national comparisons aim to compare how (inter-)national rules, strategies, or resources influence local policies (Bulkeley/Kern 2004; Breitmeier et al. 2009; Keskitalo/Kulyasova 2009; Iati 2008); or extract typologies for specific theoretical concepts (Agrawal 2008; Adger et al. 2009).

⁵ Tanner et al. (2009) study ten Asian cities in five different nations (Vietnam, China, India, Bangladesh, and Thailand). As they are not foremost interested in how the different national laws, governments or resources the cities ability to adapt, and subsume all these nations under the level of Asian developing states, their work is understood here as intra-national (i.e. regional) work.

Critics, regarding the purely local focus of many case studies, also direct attention to the concept that science has to be sensitive to the fact that localities do not exist in isolation, and, consequently, adaptation has to be understood as a multi-level process (Koch et al. 2007; Wilbanks/Kates 1999; Adger et al. 2009; Keskitalo/Kulyasova 2009; Keskitalo 2004; Leitch et al. 2009). Today, the stakeholders themselves may not be locals, as the case may be with the interests, ideas, and resources taking part in the process (Keskitalo/Kulyasova 2009; Koch et al. 2007). In accordance with this comprehension, some scholars employ a multi-scale perspective on climate change governance processes (Keskitalo/Kulyasova 2009; Næss et al. 2005; Keskitalo 2004). Most research, so far, has acknowledged the interdependency of the different levels of society involved in most adaptation governance, without making the differences between those levels the focus of their work. Keskitalo/Kulyasova (2009), in their comparative work, on coastal, small-scale fishing in northern Norway and north-west Russia, were among the few scholars explicitly employing a multi-level focus.

Despite being criticised, case studies have not lost their meaning. One of their many contributions to adaptation research is that, due to their findings, the focus of research has shifted from a top-down, to a bottom-up, perspective. Today, the focus of most adaptation research “lies on people’s vulnerability, livelihood, coping and adaptive capacity and seeks to foster participatory and local adaptation” (Breitmeier et al. 2009: 8; likewise see Wilbanks/Kates 1999: 601; Eckerberg/Joas 2004: 405). Case studies draw specific attention to local context, demonstrating, for instance, that two communities in the same region can be impacted very differently by change—depending, among other things, on each community’s respective ability to compensate for the change in question. For example, a smaller community, with a higher proportion of its population already in vulnerable economies, and little access to alleviating resources, might find it more difficult to adapt to change than would an economically central, well-resourced area (Keskitalo 2004: 429; likewise McLeman 2010). Likewise, different groups of people have different abilities to cope with the results of climate change, especially hazards (Pelling 1999; Agrawal 2008); they may also have different objectives for how adaptation should be carried out (Engels 2008).

5.2 Specific Topics in Adaptation Research

Within the field of adaptation research, a range of different topics are examined. Many of the issues mirror the lines of interest studied in mitigation research. The issues presented here have been chosen on the basis that they could not have been found, or studied, taking a macro-perspective.

5.2.1 Vulnerability/Resilience

One of the most important questions in adaptation research concerns the question of vulnerability/resilience. Vulnerability derives from the potential affliction of places and people due to the occurrence of the effects of climate change.

“Vulnerability is a product of physical exposure to natural hazard, and human capacity to prepare for or mitigate and to recover from (cope with) any negative impacts of disaster. Thus, vulnerability is a product of access to economic, political, social, environmental and geographical assets” (Pelling/Uitto 2001: 51).

Resilience can be understood as referring to the ability to persist, and adapt, in the face of climate shocks and stresses (Adger 1999; Tanner et al. 2009). The mission of adaptation, thus, is to strengthen the resilience of vulnerable people (as well as of flora and fauna).

As it will be mostly the poor and disadvantaged who suffer from the effects of climate change, research on vulnerability and resilience is closely related to social inequality (Agrawal 2008, Adger 1999, 2001; McLeman 2010; Tompkins 2005; Pelling 1999; Tanner et al. 2009; Dulal et al. 2010). The consequences of climate change, at both global and local scales, will affect people and places unequally.

At the global scale, geography and frail infrastructure are likely to enhance the consequences of global climate change in the poorer nations of the southern hemisphere (Norgaard 2009: 348). Nations in polar or coastal areas will be hit disproportionately by the effects of climate change (Agrawal 2008) as well – especially when it comes to sea-level rise, flooding, and drought. One of the greatest global injustices is the fact that, generally, those nations that will suffer most from climate change are the least responsible for climate change’s emergence (Iati 2008: 21; likewise see Breitmeier et al. 2009). The very living conditions that restrict the contribution of a given nation, or locality, to the climate change problem, tend to make that nation particularly vulnerable to climate change’s effects (Iati 2008: 21).

Despite the common tendency of scientists in the field of social inequality to concentrate on the deprived and excluded, research on the powerful entities within a system is important in order to understand how such a system has been established and maintained. Translated to the question of global inequality in the climate change discourse, it is important to study nations that profit from the existing ‘hierarchy’ of countries. This doesn’t just translate to the administrative, or governmental, system of nations in an international competition of centre and periphery. Instead, by looking at the day-to-day life of the ordinary inhabitants in wealthier nations, important insights will be gathered—as the “almost complete lack of work on the behaviour of those everyday citizens benefiting from environmental inequity further perpetuates the invisibility of the actions of wealthy citizens in the North” (Norgaard 2009: 353). Most researchers engaged with adaptation, however, choose to research poor or developing countries (Engels 2003, 2008; Breitmeier et al. 2009; Adger 2001; Tanner et al. 2009; Agrawal 2008; Iati 2008; Pelling 1999; Pelling/Uitto 2001; Lazrus 2009; Dulal et al. 2010) in order to examine how people react to the (expected) effects of climate change. If research on adaptation takes place in wealthy countries, it mostly focuses on problems arising in the process of adaptation governance (Roberts 2008; Norgaard 2009; McLeman 2010; Naess et al. 2005; Koch et al. 2007, Ingold et al. 2010).

Rural and urban populations will be affected in different ways by climate change. Rural people will suffer under the destruction of infrastructure. Such destruction may imply a

temporary, total separation from the rest of the world (McLeman 2010). As most rural communities, through today, are largely dependent on agrarian economies, loss of crop, devastation of nature preserves and the general effects of a changed climate on nature will affect their economic basis (Agrawal 2008; Christopolos 2010; Adger 1999; Moyano et al. 2008; Keskitalo/Kulyasova 2009; Cohen 1997; Dulal et al. 2010). Rural studies have drawn attention to the negative aspects of governance. Due to its social services and its power to formulate and enforce policies and regulations, the state still is the most important institution for the poor (Dulal et al. 2010: 631). Consequently, the roll-back of the nation-state, and the integration of international, private interest groups in local, and national, political decision making, significantly affects poor inhabitants of rural areas. In Xuan Thuy, the privatization of mangrove forests, and their conversion into aquaculture, was the major cause of increasing inequality over time (Adger 1999). Other critics have noted the balance of power in governance processes. Keskitalo/Kulyasova (2009) warned that vulnerability research, in rural communities, tends to blindly assume local communities are characterised by a subsistence economy. Thus, researchers may overlook the fact that even remote localities can be part of national and global economic contexts, which may determine a large part of the adaptive capacity for localities (ibid: 61). In Norway, and northern Russia, small-scale fishers do not have the financial resources to compete, with large vessel groups, for the nationally commissioned fishing quota (Keskitalo/Kulyasova 2009: 62f.). Besides lacking the necessary financial resources, the small-scale fishers also lack sufficient representation within the organisations in charge of the allocation of the fishing quota. The fishers' ability to adapt to climate change – for example, by moving to different fishing grounds – is severely restricted by their limited access to higher levels of decision making. The example of fishers exemplifies the critical tendency of governance processes to be based on processes and structures that benefit powerful stakeholders, and to overlook the concerns of minorities. This may lead to a situation where governance processes, despite their intention to be more sensitive to the interests of small groups, are dominated by the (global) concerns of national or international players. A problematic outcome of this existing power structure could be the marginalisation of local concerns (ibid: 68).

Within cities, slum dwellers are most at risk (Adelekan 2009; Breitmeier et al. 2009; Pelling 1999; Pelling/Uitto 2001; Tanner et al. 2009). The most obvious problems in slums are the density of population, and lack of basic infrastructure and social services. Also, the geographic context of many slums imposes certain threats to their inhabitants. Many are situated in environmentally vulnerable areas (Adelekan 2009; Breitmeier et al. 2009). Adelekan (2009), in his study of the vulnerability of the poor in Lagos/Nigeria, found that more than 50 per cent of slum-dwellers in Lagos lived fewer than 500 metres from the coastline (ibid: 11). This is especially dangerous in a city whose low-lying coast, according to the IPCC, is likely to experience severe impacts, from flooding, as a result of rising sea levels (ibid: 6). Although many high-income living quarters are similarly close to the coast, Pelling found that, even if those high-income households are likely to suffer from floods, they are better able to absorb losses caused by floods or other hazards (1999: 253). The slum-dwellers'

lack of material or financial resources is, therefore, the basic reason for their vulnerability (Adelekan 2009). Slum-dwellers live in dangerous places, without the ability to prepare for likely threats; if they are visited by the consequences of living in such places, slum-dwellers are unable to compensate for their losses.

The central insight to the process of adaptation, provided by social scientists, is that vulnerability is socially differentiated (Adger 1999: 250, likewise among others Cohen 1997; Adger et al. 2009; Adelekan 2009; Breitmeier et al. 2009; Engels 2008; Keskitalo/Kulyasova 2009; McLeman 2010). Not surprisingly, poor groups and individuals are most likely to suffer from the effects of climate change. Their inability to cope not only derives from the fact that most poor people lack the capacities to react adequately to climate change, but also because the needs and requirements of poor people tend to be ignored by local national governments, and international organisations (Engels 2008; Adelekan 2009; Roberts 2008; McLeman 2010; Kelman 2010). These problems are not only found in developing countries. The position of a nation in the global economy is neither a guarantor for the resilience, nor the equal consideration, of all inhabitants' needs (Breitmeier et al. 2009). For example, McLeman studied a rural town in Canada. Although Canada is a rich nation, he found that many people in a particular 'developing commune' suffered from a lack government support. To counterbalance the shortcomings of public social services and other forms of government support, members of the community began to create institutions and organisations to handle such diverse needs as: conserving and restoring infrastructure, supporting the old and poor, and providing shuttle-services to medical appointments. Like Adelekan found for slum-dwellers in Lagos, McLeman conceded that the inhabitants of the rural Canadian community he studied have to rely on their social networks, and their social capital⁶, to deal with the effects of climate change (Adelekan 2009; McLeman 2010).

Governance tends to be seen as an instrument capable of reducing just this sort of social inequality—by empowering the most likely victims of climate change (Lazrus 2009; Agrawal 2008; Tompkins 2005). Governance models could be especially valuable for ensuring that international agreements and initiatives are aware of the specific needs and vulnerabilities of localities. To ensure that the implemented measures are sustainable, and in accordance with the needs and desires of the local population, local perceptions and institutions have to be included in the governance process (Lazrus 2009: 247). Civil society stakeholders would not only advocate for vulnerable groups in governance processes, but would be valuable in "channelling financial, information and technological, leadership, and policy interventions" (Agrawal 2008: 2f.) back to the people. Often, it depends on civil society groups and NGOs, alone, to significantly contribute to governance, by integrating the needs and priorities of vulnerable people (Tanner et al. 2009: 38).

⁶ Social networks are the relationships which individuals or institutions have. Social capital means the potential resources an individual or institution may have access to, due to his contacts and relationships.

More often than not, however, disadvantaged groups are not included in governance processes (Allaire/Blanc 2003; Kelman 2010). As Tanner et al. found in their comparative work on ten Asian cities, lower income groups already tend to lack

“access to the information required to participate, even when projects are likely to have a significant impact on their lives. [...] Vulnerable communities are simply informed of urban disaster management plans formulated without their participation, usually communicated through community meetings or mass media” (Tanner et al. 2009: 36).

Even if disadvantaged groups are able to become stakeholders, their ideas tend to be overlooked. The ‘weak voice’ of disadvantaged groups may be further silenced by “incompetently introduced mechanisms of participation in decision-making [which] may jeopardise the interests of minorities since, due to the lack of capabilities or financial means, these minorities may be unable to present their opinion effectively” (Breitmeier et al. 2009: 12). Also, the potential for individuals or groups to know about, or communicate with, the person or organisation supposed to be their spokesperson, may be limited, as “decisions affecting adaptation are not only made by actors that may be democratically accessible to local citizens” (Keskitalo/Kulyasova 2009: 60, likewise Eckerberg/Joas 2004: 407).

Breitmeier et al. (2009) analysed how different factors within cities influence the success of governance processes. The researchers found that the type of political system that exists on the city level, or the mode of governance used for developing and implementing measures, are crucial factors. Likewise, Pelling (1999) found that, in Guyana, the existing, structural inequalities in society (social, ethnic, gender) impeded the development of participatory political models, contributing to the vulnerability of certain groups to natural hazards. Further, Pelling came to the conclusion that the practice of international donor agencies funding ‘community sponsored development’ has missed the opportunity to empower grassroots organisation—thus contributing to the reproduction of embedded distributions of power and vulnerability.

Authors have recommended different ways for overcoming the potential pitfalls of governance-processes. Iati Iati, in his research on Pacific Island States, argued that civil society organisations were the best facilitators between the local level and the national and international levels, as civil society organisations had the potential to communicate with local communities, governments, international organisations and most other major actors in adaptation processes (Iati 2008: 27). Keskitalo (2004) proposed stakeholder consultations to ascertain the equal partaking of different actors, and their interests, within governance processes. Ingold et al. (2010) underlined the need not only for top-down but also bottom-up communication.

5.2.2 Institutions

Nearly from the beginning, the role and importance of social institutions has been at the focus of much of the adaptation research within the social sciences (O’Riordan/Jordan 1999; Naess et al. 2005; Koch et al. 2007; Keskitalo 2004; Tompkins 2005; Foa 2009; Breitmeier et al.

2009). Even authors dealing with other topics (Adger 2001; Koch et al. 2007) acknowledge the significant role of institutional factors.

Social institutions are relatively stable structures, or mechanisms of social order, that by encapsulating values, norms and worldviews define roles and provide a social context for action (O’Riordan/Jordan 1999: 82). They lend order to how climate change is understood, contextualized and responded to by members of a specific social entity (O’Riordan/Jordan 1999; Koch et al. 2007; Keskitalo 2004). The perception of risk, and the desire to react, are largely determined

“by the institutions forming the context of individuals’ everyday life. Accordingly, institutions have become an additional focus of studies of climate change in society, the particular interest being institutional perceptions and interaction, that is, the type of knowledge that institutions and individuals operate with” (Keskitalo 2004: 428).

An important question concerns the role of institutions in the creation of vulnerability and resilience. How do existing social institutions shape vulnerability, and which social institutions contribute to resilience (or how should social institutions be changed to enhance adaptation)? Social institutions concerned with the political system, and political values, will have notable influence on the governance of climate change. But institutions concerned with the role of women and socially deprived may have to be changed in order to enhance governance processes. If the social institutions of a given society prevent women, the poor or the disabled from participation in political activity, any planned or initiated participatory approach has to respond to the social and institutional context that either facilitates, or inhibits, the participation of these social groups (Breitmeier et al. 2009: 12). Thus, any planned or initiated governance model will have to establish new political roles for members of these groups—or otherwise accept the exclusion of members of these groups from the process and (probably) outcomes.

Breitmeier et al. (2009), in their comparative work on climate change adaptation in the cities of Dhaka (Bangladesh), Lagos (Nigeria), and Hamburg (Germany), analysed how urban governance was influenced by social institutions and learning processes (ibid: 11). The researchers argued that the existence, and character, of social institutions, and social learning, are crucial factors determining if, and how, governance processes were started and run. Social learning thereby related to the modification of cognitive structures, resulting in a change of behaviour (ibid: 13). Here, one of the most important questions of social sciences becomes visible: How do social structures and individual behaviours interact? The implementation of participatory political approaches may be restricted by existing social institutions that form part of the social structure. The interesting question is this: Could establishing a governance model change these institutions through social learning, or is the successful implementation of a governance model a prerequisite to social change?

Roberto Foa tested a range of economic, and social-institutional, measures, for their influence on quality of adaptation governance (Foa 2009). He employed a mixture of literature review and a composite of institutional indices developed within the World Bank (specifically, the

Worldwide Governance Indicators, and the Indices of Social Development). Albeit recognizing that his results were limited by the sheer generality of the data he used, he found that by informing, and restricting, the possibilities for action, social institutions determined how certain countries adapted to climate change. The development of a robust, critical civil society is considered particularly important. By 'robust', Foa referred to the quality of two parameters: information, and participation. Participation in elections, and constitutional rights, however, are not sufficient, "if these are not supplemented by civic networks and associations capable of making democracy work" (ibid: 13). The role/empowerment of women, and cohesion within society (absence of ethnic or religious conflicts), are further social institutions that have to be improved to enhance resilience. #

In her case study on the Cayman Islands, Emma Tompkins found that the functioning, and resilience, of existing social institutions influenced how a society could cope with climate change (Tompkins 2005: 141). Although she noted that "[i]nstitutions change in response to countless influences and it is almost impossible to separate those factors that are driven by awareness of environmental risk, from those driven by other economic, social or environmental pressures" (ibid: 142, likewise see Koch et al. 2007: 1327), she found two factors that were important for increasing the functioning of social institutions: "exposure to impacts and the presence of a persuasive power in society" (Tompkins 2005: 141). Looking for these factors, she explained the changes occurring in Cayman Islands politics, leading (among others) to the development of a National Hurricane Committee consisting of members of the public, private sector contractors, religious groups and NGO's.

Similar to Tompkins' work, there is a general consensus within adaptation research that social institutions on climate, and climate change, are affected by numerous influences from other dimensions and levels of society (Næss et al. 2005: 126; Breitmeier et al. 2009: 12; Koch et al. 2007: 1327). Instead of being isolated from the rest of society, these institutions "operate within economic, political and social settings that affect the outcomes. Often the effectiveness of institutions depends not only on their own characteristics, but also on their interactions with other institutions" (Koch et al. 2007: 1327). These interactions, by social institutions, imply that the perception of climate, climate change and governance processes may be affected by, or even depend upon, national or international influences, especially those regarding commerce.

"Commerce has become regional, national, and global, and institutions at all of these levels have been created to enable and regulate trade, transportation, competition, and conflict. These institutions shape environmental impact, even if they are not designed with that intent. They also provide mechanisms for environmental governance (e.g., national laws) and part of the social context for local efforts at environmental governance" (Dietz 2003: 1908).

Thus, to understand social institutions on the local level requires accounting for the multi-level reality of human interaction.

The practical importance of understanding the role of institutions within governance processes is underlined by Keskitalo. To understand the behaviour of stakeholders, Keskitalo found it

important to “focus on the complex institutional factors that shape stakeholders’ understandings and actions on multiple levels” (2004: 425).

5.2.3 Limits to adaptation

A present discussion, in the realm of adaptation, concerns the limits of adaptation. These limits are predominately seen as being set by technological, financial or institutional capacity. Even if the need to engender action is acknowledged, the realization of adaptation may be hampered by different reasons arising from the individual, community, local, national or international levels. Until recently, literature on climate change adaptation has focused predominantly on financial, technical and institutional constraints as the determinants of adaptive capacity—while failing to take into consideration potential social determinants (Adger et al. 2009).

Broadly speaking, what has been considered in the previous sections can be used to explain the reasons why adaptation may be limited:

“It is difficult for decision makers to act on climate change – and apportion resources – when they don’t have the support of the community. Decisions [...] occur in the context of other day to day choices and against a backdrop of demographic, economic, environmental and cultural change. These decisions encompass stakeholders and institutions simultaneously across local, national and international scales: effective response requires integration of policy and action across these three levels of governance” (Leitch et al. 2009: 5).

Leitch et al. focused on the perception of risk in regard to climate change at a certain locality. As decisions within organisations are made by individuals and groups of individuals, the perception of risk by a single individual in an organisation may determine if certain adaptive measures is taken or not (ibid: 2).

Even when the decision has been made to initialise adaptation, realization may be hindered, altered or even resisted due to conflicts between the different stakeholders. These conflicts may be the result of the competing interests of stakeholders at the local, national, and international levels (Naess et al. 2005: 131; Keskitalo/Kulyasova 2009), or between stakeholders at the local level who represent different interest groups (Breitmeier et al. 2009; Olausson 2009; Keskitalo 2004). As the process of governance requires a certain level of agreement between stakeholders, conflicts can severely affect the realization of adaptation. Since locations will be affected by different consequences of climate change, there will be disagreement on the question of which problems should be tackled in what ways. Commercial stakeholders, in particular, and other powerful actors may use their high status to protect their interests, discourage open discussion or create disagreement between political authority and groups of citizens (Keskitalo 2004: 427). The second critical step that may set limits to adaptation is the mobilization of diverse local resources (Allaire/Blanc 2003).

Adger et al. (2009) took the discussion on the limits of adaptation one step further. They contested the idea that limits are set by biological, economic or technological reasons. Instead, they argued that limits to adaptation are endogenous to society. Adger et al. demonstrated that

what are seen as risks, possibilities, or goals are constructed socially, and derive from the specific cultural and social values of a society at a specific moment in time. The researchers stated that adaptation is not limited only by exogenous forces, such as conflicts, financial resources or legal barriers. Instead, values, perceptions, processes and power structures within society are responsible for what adaptation measures are initiated and run. “What may be a limit in one society may not be in another, depending on the ethical standpoint, the emphasis placed on scientific projections, the risk perceptions of the society, and the extent to which places and cultures are values” (Adger et al. 2009: 349).

To figure out what endogenous limits are restricting adaptation, and how these endogenous forces affect global transformation towards a low carbon society, studies taking a local perspective are indispensable. As these limits are mostly apparent at the local level, especially when it comes to the implementation of adaptation measures, it is the local level that must be considered. Social institutions are not bound by national borders; they can vary widely within one national society. Therefore, it is difficult to explore social institutions, and how they allow, influence or restrict climate change governance in a specific society, if social scientists only concentrate on the global arena and quantitative surveys. The fact that vulnerability to climate change is socially differentiated, and depends upon geographical specifics, likewise calls for micro-focused, or ethnographic, approaches; only powerful actors, or the interests of majorities, make it to the national, or global, level. Not only is the vulnerability of certain individuals or groups, towards specific threats imposed by climate change, missed in micro-focused research—but local solutions and approaches get lost in the generalisation of macro-studies.

6 Theoretical concepts

While many papers on climate change governance attempt to give practical advice to politicians, or organisations acting in this field, the topic of climate change governance has also been studied from a theoretical perspective. The following sections give an overview of the theoretical concepts that have been used, and how these concepts have been applied to the manifold issues of local climate change governance.

6.1 *Structure and Agency*

Most broadly, ‘agency’ can be defined as “intentional human action”, whereas structure can be understood as “the set of institutions and other regularized, often formal social relationships within which such action takes place” (Wilbanks/Kates 1999: 603). With regard to local climate change governance, the most common way to employ the concepts of structure and agency is to analyze the agency of local actors opposing national (Eversole/Scholfield 2006) or global (Wilbanks/Kates 1999; Lazrus 2009; Pelling/Uitto 2001) forces. These studies tend to consider agency as being “intrinsically localized”, while structures can be associated with more encompassing scales like the national and the global

(Wilbanks/Kates 1999: 603; likewise Lazrus 2009). Wilbanks' and Kates' primary thesis concerned relationships between the scales of macro and micro—stating that the “interactions between macro-structure and micro-agency affect the way our world works” (ibid: 601). Heather Lazrus made use of the dichotomy of structure and agency to show how agency is retained by local communities in Tuvalu, despite the global forces of international organisations and actors. In Tuvalu, traditional forms of rule-making have always been based on common approval by local politicians.

Most commentators agree that, despite all hope that governance models might help to promote local autonomy and sovereignty, local people's legitimacy and influence within existing structures are very limited, “leaving them largely disconnected from, and unacknowledged in, larger governance processes beyond the local level” (Eversole/Scholfield 2006: 322). Generally, the dominant national and international paradigms “too often deny local agency and meaning making” (Lazrus: 2009: 245). Pelling/Uitto (2001), on the other hand, state that it does no good, politically or scientifically, to view agency as dominated by wider structures. They remind us that “even the weakest of actors have some power to colour, undermine, resist or ultimately overturn structures imposed from above” (ibid: 59). This understanding not only ‘empowers’ individuals, but also challenges homogenous notions of the local. Consequently, global or national systems, and local agency, should be seen as interacting with, rather than imposing on, local communities (ibid).

6.2 Networks

Networks-analysis is employed in local climate change governance research, both as a method and as a theoretical concept. For the most part, respective studies aim to analyse the participants in mitigation, or adaptation, measures of participants, as well as show how the networks made up of these participants influence the climate change policy adopted in a specific locality (Agrawal 2008; Rutland/Aylett 2008; Ingold et al. 2010), or within global contexts (Betsill/Bulkeley 2006). Concepts of networks, therefore, are only rarely used as the sole theoretical framework, but instead are combined with additional concepts (Rutland/Aylett 2008; Betsill/Bulkeley 2006).

Examining networks on a local scale, Arun Agrawal (2008) used network analysis to analyze “institutional partnerships and their impacts on resource access of vulnerable social groups” (ibid: 3). He found that adaptation is not only unavoidably local, but that adaptation measures have to be sensitive to the social and geographical peculiarities of each locality. Furthermore, adaptation always occurs within an institutional context. Institutions, therefore, are crucial in three different ways: they work “as mediating bodies that connect households to local resources, determine how flows of external support will be distributed among different social groups, and link local populations to national policies and interventions” (ibid: 50).

While Agrawal underlined the importance of determining the outcomes of adaptation measures, Rutland and Aylett (2008) employed the actor-network theory to demonstrate how the official perception, and definition, of climate change and local emissions are shaped by

the configuration of actors participating in local governance processes. Drawing on the case of Portland/Oregon, they showed how “collective priorities emerge as different actants learn how to move toward their goals by working together”⁷ (ibid: 627). In Portland, the particular constellation of stakeholders resulted in a mitigation strategy that nearly exclusively concentrated on energy-efficiency. Additionally, the stakeholders created what they choose to be their main object of concentration: local GHG emissions. In a second step, the authors successfully combined actor-network theory with Foucault’s concept of governmentality, in order to explain “how the state attempts to achieve its objectives – once they are established – by conducting the conduct of its citizens” (ibid).

Allaire/Blanc (2003), like Rutland/Aylett, combined a network-actor theory with a second theoretical concept—in this case, Boltanski’s and Thévenot’s ‘modes of cities’. Their results, reached by adopting a network perspective, were quite similar to those of Rutland/Aylett. Like the other authors, Allaire/Blanc found that all aspects occurring in the creation and implementation of climate change strategies depended, critically, “on the position occupied by local actors in various networks” (ibid: 18). Furthermore, the authors concluded that environmental concerns are normally not the only objectives guiding governance processes, the participants and the outcomes (ibid: 19). Instead, the “configuration of the local system of environmental action depends to a large extent on the position of [...] actors in local networks and on their connections with the different institutions concerned” (ibid: 20). The authors explained the different objectives of the actors they studied, by making use of Boltanski and Thévenot. Actors belong to different institutional sectors. These sectors supply their members with “a ‘superior common principle [...] which serves as a reference point to interpret situations, qualify objects and people, test and justify actions an channel controversies and debates” (ibid: 21).

A different focus on networks was adopted by McLeman (2010), in her case study on climate change adaptation measures taken in a rural community in Canada. She found that social networks—which until recently was the instrument used by people in the area to react to climate events – in the last years have been losing their potential due to demographic change. Traditionally, because the community was poorly equipped with social services, the younger members of the extended family networks cared for the older members of these networks. As young people increasingly left the community, older people who stayed behind were less able to cope with heavy snowfalls in winter, and heat waves during the summer. Additionally, the community had been discovered by retirees from nearby cities. These new members of the community, for the most part, did not have any social network within the community. The demographic changes not only led to the establishment of formal social networks, but also forced the local government to spend more money to provide the community with social services and infrastructure.

⁷ In his actor-network theory, Latour (1996) extends the idea of actors to non-human, non-individual entities (370). Humans and non-human entities together act as actants in correlations of action.

7 Conclusion

The previous sections introduced the general topic of local climate change governance, with respect to different fields of research. While the global is still often thought to be of foremost importance in the development of climate change policies, the role and meaning of the local is being acknowledged by a growing number of scholars and practitioners. This change is accompanied by scientific criticism of the separation of the global and the local, and the hierarchy implicit in this separation. While chapter 2 has shown that the global and the local are deeply intertwined, and characterised by an inextricable mutual relationship, it has also demonstrated that research on global transformations towards a low carbon society will suffer from an immanent generalizing, and homogenising, tendency—if it is not enriched by knowledge of how these transformations shape, and take shape at, the local level.

As the second section has shown, people's perceptions of climate change do not just derive from an individual lack of motivation or information, but are influenced by large-scale political, social and economic reasons. Only those studies that focus on the local or individual levels will be able to explain how higher levels create and support denial of climate change—not just within politics, but also at the individual level. People's or societies' denial of climate change, or denial of the seriousness of climate change, will have a significant influence on global transformations towards a low carbon society. Thus, local studies on denial or non-perception will play an important role, providing answers that cannot be obtained by global approaches.

A related research question concerns the perception of climate change by individuals and societies. The result of chapter 3 has been that climate change is mostly perceived in its local manifestations, and individual risks, and that global transformation towards a low carbon society will be thoroughly shaped and influenced by these differentiations. Local studies are able to provide insight into the locally and socially differentiated manifestations and risks, and how these risks are embedded within a certain society.

International treaties, acknowledgements and policies are able to give important general orders, or set the guidelines, for climate change governance. Indeed, many mitigation policies own their existence to innovations and decisions made at the global level. These policies and innovations, however, need to touch the earth somewhere. Their realisation, and thus their needed specifications and adjustments, happen at the local level. Research taken from a global perspective will not be able to follow the adjustments and realisations of any international climate change policy. Furthermore, local studies have shown that climate change policy is not a one-way road where the local receives orders from the global. Instead, successful local ideas, innovations, and solutions may be adopted at higher levels, thus influencing national or even international politics. While in nations like China, local policies may be very much dependent on the central government's orders, the USA is an example of a country where environmental policy implemented by a local government has been completely independent of, or even in opposition to, the national government's policy.

Research on local climate change has shown that the perceived homogeneity of ‘the local’ not only obscures social differences, but also tends to ignore or undervalue local knowledge. Thus, the local level is not only able to recognize and account for the specific needs of its inhabitants, but may also be more aware of specific possibilities to react. Additionally, local governments have the advantage that they own the legal and executive competencies to implement and enforce mitigation and adaptation measures. Local climate change governance has the potential to account for the socially differentiated vulnerability of its inhabitants, and provide local solutions. Therefore, local studies may do more than discover the benefits of local climate change governance. Research has shown that the adoption of climate change governance models, by local governments, does not derive (at least not solely) from a growing democratic or moral awareness. Often, the inclusion of non-stake actors allows governments and administrations to shift responsibility, costs or work to other stakeholders. Likewise, the engagement of stakeholders in governance processes is not simply a result of environmental concerns. Industrial, and middle-class, stakeholders, more than others, may dominate local governance processes because they are better equipped, and better organised, than individuals and other socially marginalised stakeholders. Even more critical, is the fact that the inclusion of non-stake actors allows governments and administrations to shift responsibility, costs or work to other stakeholders. Likewise, the engagement of stakeholders in governance processes is not simply a result of environmental concerns. Furthermore, most governance processes that have been analysed have been criticised for not being transparent or participatory enough, for not respecting different perceptions and needs among their stakeholders and for lacking sufficient protection for minorities. It is research at the local level that has discovered the problems, difficulties, and non-success of the adaptation of ideas designed at the global level. This is because rules instituted at the global level—must be implemented at the local level.

Adaptation research has brought attention to the fact that vulnerability to climate change is socially differentiated. Socially or financially deprived people will not only be hit hardest by the impacts of climate change, but will also be the least able to compensate for the losses caused by floods, droughts or other kinds of natural hazards. Local level research has shown that, despite international hierarchies, this fact does not apply only to poor or developing countries, but that vulnerability is also differentiated in wealthy nations. As this differentiation is tightly connected to the specific factors of a given society and locality, nationally or internationally arranged policies or innovations are too general, and too broad, to offer sufficient solutions. Thus, there is not only a need to create local solutions, but also to have local social science research that considers vulnerability, its social causes and consequences.

A scientifically interesting fact is that the focus on the local level provides social scientists the opportunity to make use of methods and theoretical concepts that are not very useful at the global level.

Some general conclusions can be extracted from the literature reviewed. The most important is that there are many reasons why scholars from the social sciences should employ a local perspective. The local is not just the level at which the effects of climate change will occur; these effects vary markedly depending both on their nature, as well as their social implications. Likewise, the measures that are taken against climate change (mitigation or adaptation) may be decided on a global level, but will, however, be implemented locally. These implementations, as well, will need to be aware of the social and environmental differences between different localities. Furthermore, as this review has shown, the local does not exist as a homogenous entity. Research must recognize, and react to, the fact that intra-local differences can be as great as international differences. Due to the need for generalisation and standardisation, policies and research on a global scale are not able to do justice to this heterogeneity. Another argument is that macro-perspective studies mostly apply a top-down perspective, thus turning a blind eye to bottom-up processes through which the local may be able to influence organisations, or events, at the global level. Taken together, local perspective studies are needed in order to examine an important aspect of the reality of, and the governance processes centred on, climate change.

The final, important finding of this review is that local climate change governance literature still has many gaps, and scientific shortcomings, to challenge. Comparative work is missing altogether, or only sparsely comprised, no matter the issue. Related to this, may be the fact that transnational, municipality climate change networks are thoroughly understudied, especially when it comes to networks for local entities such as cities. Case studies focusing on non-state stakeholders are likewise underrepresented. The often referred to bottom-up perspective, so far, has mostly been a theoretical claim. Here, as well, case studies are missing.

8 References

- Aall, Carlo; Groven, Kyrre; Lindseth, Gard* (2007): The Scope of Action for Local Climate Policy: The Case of Norway. In: *Global Environmental Politics*, Vol. 7 (2), pp. 83–101.
- Adelekan Ibidun O.* (2009): Vulnerability of Poor Urban Coastal Communities to Climate Change in Lagos, Nigeria. Online on: <http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1256566800920/6505269-1268260567624/Adelekan.pdf>. Last download: 07/18/2011.
- Adger, Neil W.* (1999): Social Vulnerability to Climate Change and Extremes in Coastal Vietnam. In: *World Development*, Vol. 27 (2), pp. 249–269.
- (2001): Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change. In: *Journal of International Development*, Vol 13 (7), pp.:921-931.
- Adger, Neil W.; Dessai, Suraje; Goulden, Marisa; Hulme, Mike; Lorenzoni, Irene; Nelson, Donald R.; Naess, Lars O.; Wolf, Johanna; Wreford, Anita* (2009): Are there social limits to adaptation to climate change? In: *Climatic Change*, Vol. 93 (3-4), pp. 335–354.
- Agrawal, Arun* (2008): The Role of Local Institutions in Adaptation to Climate Change: Paper prepared for the Social Dimensions of Climate Change, Social Development Department, The World Bank, Washington DC, March 5-6, 2008. Online on: <http://www.icarus.info/wp-content/uploads/2009/11/agrawal-adaptation-institutions-livelihoods.pdf>. Last download: 8/11/2011.
- Alber, Gotelind; Kern, Kristine* (2009): Governing Climate Change in Cities: Modes of Urban Climate Governance in Multi-level Systems. In: *OECD: Competitive Cities and Climate Change*. OECD Conference Proceedings, Milan/Italy, 9-10 October 2008. Online on: <http://www.oecd.org/dataoecd/22/7/41449602.pdf>. Last download: 10/11/2011.
- Allaire, Gilles; Blanc, Michel* (2003): Local/Global Institutional Systems of Environmental Public Action. In: *Sociologia Ruralis*, Vol. 43 (1), pp. 17–33.
- Andonova, Liliana B.; Betsill, Michele M.; Bulkeley, Harriet* (2009): Transnational Climate Governance. In: *Global Environmental Politics*, Vol. 9 (2), pp. 52–73.
- Astleithner, Florentina; Hamedinger, Alexander* (2003): Urban Sustainability as a New Form of Governance: Obstacles and Potentials in the Case of Vienna. In: *Innovation: The European Journal of Social Science Research*, Vol. 16 (1), pp. 51–75.
- Baldwin, Claudia; Chandler, Lisa* (2010): ‘At the Water’s Edge’: Community voices on climate change. In: *Local Environment*, Vol. 15 (7), pp. 637-649.

- Betsill, Michele M.; Bulkeley, Harriet* (2006): Cities and the Multilevel Governance of Global Climate Change. In: *Global Governance: a review of multilateralism and international organizations*, Vol. 12 (2), pp. 141–160.
- Blake, James* (1999): Overcoming the 'value-action gap' in environmental policy: Tensions between national policy and local experience. In: *Local Environment*, Vol. 4 (3), pp. 257–278.
- Boykoff, Maxwell T.* (2008): The cultural politics of climate change discourse in UK tabloids. In: *Political Geography*, Vol. 27 (5), pp. 549–569.
- Boykoff, Maxwell T.; Goodmann, Michael; Curtis, Ian* (2010): Cultural Politics of Climate Change: Interactions in Everyday Spaces. In: M. Boykoff (ed.) *The Politics of Climate Change: A Survey*. London: Routledge, pp. 136–154.
- Breitmeier, Hemit; Juhn, Judith; Schwindenhammer, Sandra* (2009): Analyzing Urban Adaptation Strategies to Climate Change: A Comparison of the Coastal Cities of Dhaka, Lagos and Hamburg: Contribution to the Panel „Regieren im Klimawandel“ Section „Regierungssystem und Regieren in der Bundesrepublik Deutschland“, DVPW-Kongress 21.-25.09.2009, Kiel. Online on: https://www.dvpw.de/fileadmin/docs/Kongress2009/Paperroom/2009Regieren-pBreitmeier_Kuhn_Schwindenhammer.pdf. Last download: 06/09/2011.
- Brooks, Nick; Adger, Neil W.; Kelly, Mick* (2005): The Determinants of Vulnerability and Adaptive Capacity at the National Level and the Implications for Adaptation. In: *Global Environmental Change*, Vol. 15 (2), pp. 151-163.
- Bulkeley, Harriet* (2001): Governing Climate Change: the Politics of Risk Society? In: *Transactions of the Institute of British Geographers*, Vol. 26 (4), pp. 430–447.
- Bulkeley; Harriet; Kern, Kristine* (2004): Local climate change policy in the United Kingdom and Germany. Berlin: Wissenschaftszentrum Berlin.
- Christopolos, Ian* (2010): The multiplicity of climate and rural risk. Online on: http://www.diis.dk/graphics/Publications/WP2010/WP201008_multiplicity_climate_rural_risk.pdf. Last download: 06/16/2011.
- Cohen, Stewart J.* (1997): Scientist–stakeholder collaboration in integrated assessment of climate change: lessons from a case study of Northwest Canada. In: *Environmental Modeling and Assessment*, Vol. 2 (4), pp. 281–293.
- Corfee-Morlot Jan; Kamal-Chaoui, Lamia; Donovan, Michael G.; Robert, Alexis; Cochran, Ian; Teasdale, Pierre-Jonathan* (2009): Cities, Climate Change and Multilevel Governance. OECD Environmental Working Papers No. 14, OECD publishing.
- Crate, Susan A.; Nuttall, Mark* (eds.) (2009): *Anthropology and Climate Change: From Encounters to Actions*. Walnut Creek: Left Coast Press.

- Dietz, Thomas; Ostrom, Elinor; Stern, Paul C.* (2003): The Struggle to Govern the Commons. In: *Science*, Vol. 302 (5652), pp. 1907–1912.
- Dulal, Hari B.; Brodnig, Gernot; Thakus, Hemanta K.r; Green-Onoriose, Charity* (2010): Do the poor have what they need to adapt to climate change? A case study of Nepal. In: *Local Environment*, Vol. 15 (7), pp. 621-635.
- Eckerberg, Katarina; Joas, Marko* (2004): Multi-level environmental governance: a concept under stress? In: *Local Environment*, Vol. 9 (5), pp. 405–412.
- Engel, Kirsten* (2005): Mitigating Global Climate Change in the United States: A Regional Approach. In: *NYU Environmental Law Journal*, Vol. (14), pp. 54–86.
- Engels, Anita* (2003): Institutionalisation of Ecological Risk Perceptions: The Role of Climate Change Discourses in Germany. In: H. Breit; A. Engels; T. Moss; M. Troja (ed.) *How institutions change: Perspectives on social learning in global and local environmental contexts*. Opladen: Leske + Budrich, pp. 155–177.
- (2008): Local Environmental Crises and Global Sea-Level Rise: The Case of Coastal Zones in Senegal. In: M. Casimir (ed.) *Culture and the Changing Environment*. Oxford, New York: Berghahn, pp. 175–195.
- Eversole, Robin; Scholfield, Kaye* (2006): Governance in the Gaps: Inter-Agency Action in a Rural Town. In: *Rural Society*, Vol. 16 (3), pp. 320–327.
- Foa, Roberto* (2009): Social And Governance Dimensions Of Climate Change: Implications For Policy. World Bank Policy Research Working Paper Series. Online on: <http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1232059926563/5747581-1239131985528/foa.pdf>. Last download: 01/06/2012.
- Fogel, Cathleen* (2004): The Local, the Global, and the Kyoto Protocol. In: Marybeth Mortello; Sheila Jasanoff (ed.) *Earthly Politics: Local and Global in Environmental Governance*. Cambridge (USA), London: MIT, pp. 103–125.
- Ford, James D.; Smit, Barry; Wandel, Johanna* (2006): Vulnerability to climate change in the Arctic: A case study from Arctic Bay, Canada. In: *Global Environmental Change*, Vol. 16 (2), pp. 145–160.
- Granberg, Mikeal; Elander, Ingemar* (2007): Local Governance and Climate Change: Reflections on the Swedish Experience. In: *Local Environment*, Vol. 12 (5), pp. 573-548.
- Hanak, Ellen; Bedsworth, Louise; Swanbeck, Sarah; Malaczynski, Joanna* (2008): Climate Policy at the Local Level: A Survey of California’s Cities and Counties. San Francisco: Public Policy Institute of California. Online on: http://www.ppic.org/content/pubs/report/R_1108EHR.pdf. Last download: 01/06/2012.
- Hartmuth, Gerhard* (2002): Soziale Repräsentationen des anthropogenen Klimawandels auf Sylt: eine explorative Analyse lokal kontextualisierter Vorstellungen von

- Schlüsselpersonen. Dissertation. Magdeburg: Fakultät für Geistes-, Sozial- und Erziehungswissenschaften. Online on: <http://diglib.uni-magdeburg.de/Dissertationen-/2002/gerhartmuth.pdf>. Last download: 01/06/2012.
- Iati, Iati* (2008): The Potential of Civil Society in Climate Change Adaptation Strategies. In: *Political Science*, Vol. 60 (1), pp. 19–30.
- Ingold, Karin; Balsinger, Jörg; Hirschi, Christian* (2010): Climate change in mountain regions: how local communities adapt to extreme events. In: *Local Environment*, Vol. 15 (7), pp. 651-661.
- Kelman, Ilan* (2010): Hearing voices from Small Island Developing States for climate change. In: *Local Environment*, Vol. 15 (7), pp. 605-619.
- Keskitalo, E. Carina H.* (2004): A framework for multi-level stakeholder studies in response to global change. In: *Local Environment*, Vol. 9 (5), pp. 425–435.
- Keskitalo, E. Carina. H.; Kulyasova, Antonina A.* (2009): The role of governance in community adaptation to climate change. In: *Polar Research*, Vol. 28 (1), pp. 60–70.
- Koch, Ingrid Christine; Vogel, Coleen; Patel, Zarina* (2007): Institutional dynamics and climate change adaptation in South Africa. In: *Mitigation and Adaptation Strategies for Global Change*, Vol. 12 (8), pp. 1323–1339.
- Kousky, Carolyn; Schneider, Stephen H.* (2003): Global climate policy: will cities lead the way? In: *Climate Policy*, Vol. 3, pp. 359–372.
- Krings, Martin* (2011): Carbon Market Finance und Stadtentwicklung: Joint Implementation als Instrument im kommunalen Klimaschutz? Unpublished Master Thesis, HafenCity Universität Hamburg.
- Lahsen, Myanna* (2004): Transnational Locals: Brazilian Experiences of the Climate Regime. In: Marybeth Mortello; S. Jasanoff (ed.) *Earthly Politics: Local and Global in Environmental Governance*. Cambridge (USA), London: MIT, pp. 151–172.
- Lange, Stefan; Schimank, Uwe* (2004): Einleitung: Governance und Gesellschaftliche Integration. In: idid. (eds.) *Governance und Gesellschaftliche Integration*. Wiesbaden: VS, pp. 9-46.
- Latour, Bruno* (1996): On Actor-network Theory. A few Clarifications. In: *Soziale Welt*, Vol. 47 (4), pp. 369–382.
- Lazrus, Heather* (2009): The Governance of Vulnerability: Climate Change and Agency in Tuvalu, South Pacific. In: S. Crate; M. Nuttall (eds.) *Anthropology and Climate Change: From Encounters to Actions*. Walnut Creek: Left Coast Press, pp. 240–249.
- Lee, Robert; Stokes, Ellen* (2009): Environmental Governance: Reconnecting the Global and the Local. In: *Journal of Law and Society*, Vol. 36 (1), pp. 1–10.

- Leitch, Anne M.; Robinson, Cathy; Cook, James* (2009): The capacity of local government to support adaptation to climate change: dealing with risk and uncertainty. Online on: http://www.qldcoastalconference.org.au/images/upload_images/Leitch_Anne.pdf. Last download: 01/06/2012.
- Lemos, Maria C.; Agrawal, Arun* (2006): Environmental Governance. In: Annual Review of Environment and Resources, Vol. 31 (1), pp. 297–325.
- Lorenzoni, Irene; Nicholason-Cole, Sophie; Whitmarsh, Lorraine* (2007): Barriers perceived to engaging with climate change among the UK public and their policy implications. In: Global Environmental Change, Vol. 17 (3-4), pp. 445–459.
- Lutsey, Nicholas; Sperling, Daniel* (2008): America's bottom-up climate change mitigation policy. In: Energy Policy, Vol. 36 (2), pp. 673–685.
- McCright, Aaron M.; Dunlap, Riley E.* (2003): Defeating Kyoto: The Conservative Movement's Impact on U.S. Climate Change Policy. In: Social Problems, Vol. 50 (3), pp. 348–373.
- McLeman, Robert* (2010): Impacts of population change on vulnerability and the capacity to adapt to climate change and variability: a typology based on lessons from “a hard country”. In: Population and Environment, Vol. 31 (5), pp. 286–316.
- Mortello, Marybeth L.; Jasanoff, Sheila* (2004): Introduction: Globalization and Environmental Governance. In: M. Mortello; S. Jasanoff (eds.) Earthly Politics: Local and Global in Environmental Governance. Cambridge (USA), London: MIT, pp. 1–29.
- Moyano, Eduardo; Paniagua, Angel; Lafuente, Regina* (2008): Environmental Policy, Public Opinion and Global Climate Change in Southern Europe: The Case of Andalusia. In: Open Environmental Sciences, Vol. 2, pp. 62–70.
- Næss, Lars O.; Bang, Guri; Eriksen, Siri; Vevatne, Jonas* (2005): Institutional adaptation to climate change: Flood responses at the municipal level in Norway. In: Global Environmental Change, Vol. 15 (2), pp. 125–138.
- Nakazawa, Hideo* (2006): Between the Global Environmental Regime and Local Sustainability: A Local Review on the Inclusion, Failure and Reinventing Process of the Environmental Governance. In: International Journal of Japanese Sociology, Vol. 15 (1), pp. 59-85.
- Norgaard, Kari M.* (2009): “We don't Really Want to Know”: Environmental Justice and Socially Organized Denial of Global Warming in Norway. In: Organization and Environment, Vol. 19 (3), pp. 347–370.
- O’Riordan, Timothy; Jordan, Andrew* (1999): Institutions, climate change and cultural theory: towards a common analytical framework. In: Global Environmental Change, Vol. 9 (2), pp. 81–93.

- Olausson, Ulrika* (2009): Global warming--global responsibility? Media frames of collective action and scientific certainty. In: *Public Understanding of Science*, Vol. 18 (4), pp. 421–436.
- Pelling, Marc* (1999): The political ecology of flood hazard in urban Guyana. In: *Geoforum*, Vol. 30 (3), pp. 249–261.
- Pelling, Marc; Uitto, Juha I.* (2001): Small island developing states: natural disaster, vulnerability and global change. In: *Environmental Hazards*, Vol. 3 (2), pp. 49–62.
- Roberts, Debra* (2008): Thinking globally, acting locally -- institutionalizing climate change at the local government level in Durban, South Africa. In: *Environment and Urbanization*, Vol. 20 (2), pp. 521–537.
- Rutland, Ted; Aylett, Alex* (2008): The work of policy: actor networks, governmentality, and local action on climate change in Portland, Oregon. In: *Environment and Planning*, Vol. 26, pp. 627–646.
- Slocum, Rachel* (2004): Polar Bears and energy-efficient lightbulbs: strategies to bring climate change home. In: *Environment and Planning*, Vol. 22, pp. 1–26.
- Tanner, Thomas; Mitchell, Tom; Polack, Emily; Guenther, Bruce* (2009): Urban Governance for Adaptation: Assessing Climate Change Resilience in Ten Asian Cities. In: *IDS Working Papers*, Vol. 2009 (315), pp. 1–47.
- Toly, Noah J.* (2008): Transnational Municipal Networks in Climate Politics: From Global Governance to Global Politics. In: *Globalizations*, Vol. 5 (3), pp. 341–356.
- Tompkins, Emma L.* (2005): Planning for climate change in small islands: Insights from national hurricane preparedness in the Cayman Islands. In: *Global Environmental Change*, Vol. 15 (2), pp. 139–149.
- Wilbanks, Thomas J.; Kates, Robert W.* (1999): Global Change in Local Places: How Scale Matters. In: *Climatic Change*, Vol. 43 (3), pp. 601–628.
- Ye Qi; Li Ma; Huanbo Zhang; Huimin Li* (2008): Translating a Global Issue into Local Priority: China's Local Government Response to Climate Change. In: *The Journal of Environment & Development*, Vol. 17 (4), pp. 379–400.