Forest conflicts in the face of energy transition and climate change:

Actor-centered analysis from a multi-level governance perspective

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Summary

The future of forests is closely linked to climate change and energy transition because the preconditions for forest management are changed through climate and energy policies (Beland Lindahl and Westholm 2012). Forest management has multiple objectives, and different stakeholders have competing interests in forests. A strong dichotomy between environmental and economic interests has characterized forest policy and most conflicts about forests in the past (Winkel and Sotirow 2011). Climate change and energy transition modify this established conflict line because new conflicts related to climate mitigation, climate adaptation, and renewable energies have blurred the clear opposition between environmental and economic interest (Mautz 2010). In the context of the new challenges of climate change and energy transition, the need for effective, efficient and legitimate forest governance is gaining a new importance.

Based on 86 qualitative interviews about forest conflicts and forest governance in five qualitative case studies, theoretical approaches focusing on multi-level and multi-scale governance are merged with the field of environmental and natural resource conflict research in this thesis. Forest conflicts and their governance are a multi-level and multi-scale issue. However, not so much is known about how collective and individual state and non-state actors act in complex governance systems and how they perceive governance systems. In order to contribute to the understanding of these knowledge gaps, this thesis tests the applicability of three theoretical perspectives on multiple scales and levels of decision-making (multi-level governance, polycentricity, politics of scale) to fruitfully study forest conflicts. Furthermore, the thesis provides empirical insights about forest conflicts in the face of energy transition and climate change. Based on the theoretical and empirical findings, this thesis provides practical recommendations to policy makers and practitioners on how to improve governance in forestry and the management of other natural resources. For example, this thesis shows the importance of considering different actor constellations in participatory processes at different governance levels, and that not every actor will react the same way to a certain method of decision-making. Furthermore, this thesis illustrates how trust building measures, such as enhanced communication between stakeholders, transparency in decision-making and forest education can reduce the risk of destructive conflict escalation.

This thesis also demonstrates that energy transition and the discussion about climate change are sources of new conflicts, can change old conflicts, and add new, additional levels to forest governance. Thus, climate change and energy transition cause further fragmentation of forest governance and make forest governance more multi-level, create additional venue-shopping opportunities, and bring new actors into forest governance, causing new power constellations in the policy field. Forest governance is in a reconfiguration process which can be conceptualized as shift towards multi-level governance. Level choice and the relation of state and non-state actors in decision-making are important aspects of governance, thus the theoretical approach has yielded valuable insights in forest conflicts and the importance of scale construction in conflict discourses can be illustrated. Different levels are associated with different functions, strengths, and weaknesses of stakeholders; the perceptions of appropriate scale choice are often based on frames. The empirical findings have shown that level choice is

often a normative and/or cultural decision, often no objective "best" decision-making level exists. Some actors consider different competing, overlapping, and nested decision-making levels to be an opportunity for interest realization; others feel helpless and overwhelmed in complex, multi-level systems. Different re-scaling strategies (up-scaling, down-scaling, fit re-scaling) are applied by actors to realize their interests. Non-state actors have an important function in linking processes from different levels. However, multi-level governance and related concepts have their limits for the explanation of forest conflict processes because some important factors cannot be captured with this approach. For example, social-psychological factors and conflict frames are important for the understanding of conflict development and governance and at a local level individual action and the relations between individuals crucially set the preconditions for the governance of conflicts.

Zusammenfassung

Die Zukunft von Wäldern ist eng mit Klimawandel und Energiewende verknüpft, weil die Grundbedingungen für Waldnutzung durch Energie- und Klimapolitik verändert werden (Beland Lindahl and Westholm 2012). Wälder sind multifunktional und verschiedene Stakeholder haben konkurrierende Interessen an Wäldern. Konflikte um Wälder waren in der Vergangenheit durch einen starken Gegensatz zwischen ökologischen und ökonomischen Interessen charakterisiert (Winkel and Sotirov 2011). Klimawandel und Energiewende verändern diese etablierte Konfliktlinie, weil neue Konflikte im Zusammenhang mit Klimaschutz, Klimaanpassung und erneuerbaren Energien den klaren Gegensatz zwischen ökologischen und wirtschaftlichen Interessen verschwimmen lassen (Mautz 2010). Im Zusammenhang mit den neuen Herausforderungen Klimawandel und Energiewende gewinnt die Notwendigkeit für effektive, effiziente und legitime Wald-Governance neue Bedeutung.

Auf der Basis von fünf qualitativen Fallstudien mit insgesamt 86 leitfadengestützten Interviews zu Waldkonflikten und Wald-Governance, kombiniert diese Arbeit theoretische Ansätze zu multi-level und multi-scale Governance mit dem Feld der Forst- und Umweltkonfliktforschung. Waldkonflikte und deren Governance umfassen mehrere politisch-administrative und räumliche Ebenen. Dennoch ist nicht viel darüber bekannt, wie kollektive und individuelle staatliche und nicht-staatliche Akteure in diesen komplexen Governance Systemen handeln und diese Systeme wahrnehmen. Zur Beantwortung dieser ungeklärten Fragen testet diese Arbeit die Anwendbarkeit von drei theoretischen Perspektiven aus dem Feld der Mehrebenenforschung zur Analyse von Waldkonflikten, illustriert die Auswirkungen von Klimawandel und Energiewende auf Wald-Governance und kommt zu Empfehlungen für Politik und Praxis für den Umgang mit Wald- und Umweltkonflikten. Beispielsweise wird durch die Arbeit gezeigt, dass es wichtig ist verschiedene Akteurskonstellationen in partizipativen Prozessen auf verschiedenen Governance-Ebenen zu berücksichtigen und dass nicht jeder Akteur gleich in Entscheidungsprozessen agiert. Des Weiteren wird gezeigt, wie Vertrauensbildende Maßnahmen, wie beispielsweise verbesserte Kommunikation zwischen verschiedenen Stakeholdern, Transparenz in Entscheidungsprozessen und waldpädagogische Bildung das Risiko von destruktiver Konflikteskalation reduzieren kann. Die Arbeit zeigt, dass die Diskussion um den Klimawandel und die Energiewende Ursache für neue Konflikte sind, bestehende Konflikte verändern und Ursache für, zusätzliche Entscheidungsebenen innerhalb des Wald-Governance Systems sind. Dadurch verursachen die Diskussion um Klimawandel und Energiewende eine weitere Fragmentierung der Wald-Governance Landschaft und die Entstehung zusätzlicher Entscheidungsebenen. Dadurch entstehen zusätzliche Möglichkeiten des „venue shoppings". Des Weiteren gewinnen neue Akteure an Bedeutung. Diese Faktoren tragen zur Veränderung bisheriger Machstrukturen in dem Politikfeld Wald bei. Wald-Governance in Deutschland befindet sich in einem Konfigurationsprozess, der als Trend zu multi-level Governance konzeptualisiert werden kann. Die Wahl von Entscheidungsebenen und das Verhältnis von staatlichen und nicht-staatlichen Akteuren in Entscheidungen sind wichtige Elemente von Governance, daher konnte der theoretische Ansatz wertvolle Einsichten in Waldkonflikte und die Bedeutung der Konstruktion von Entscheidungsebenen in Konfliktdiskursen veranschaulicht werden. Verschiedene Entscheidungsebenen werden von Stakeholdern mit verschiedenen Funktionen, Stärken und Schwächen assoziiert, die Wahrnehmung angemessener Entschei-

dungsebenen basiert häufig auf Konflikt-Frames. Die empirischen Ergebnisse zeigten, dass die Wahl einer räumlichen Entscheidungsebene häufig eine normative und/oder kulturelle Entscheidung ist. Häufig gibt es keine objektive „beste" Entscheidungsebene. Verschiedene konkurrierende, überlappende und ineinander verschachtelte Entscheidungsebenen werden als Möglichkeiten der Interessendurchsetzung von einigen Akteuren angesehen. Andere Akteure fühlen sich hilflos und überwältigt in komplexen Mehrebenensystemen. Verschiedene Strategien werden von Akteuren angewendet, um festgelegte Entscheidungsebenen zu verändern (up-scaling, down-scaling, fit-scaling) um ihre Interessen durchzusetzen. Nicht-staatliche Akteure haben eine wichtige Funktion in der Verknüpfung von Prozessen auf verschiedenen Entscheidungsebenen. Dennoch haben multi-level Governance und verwandte Theoriefelder ihre Grenzen um Konfliktprozesse in Wald-Governance Systemen zu erklären, da einige wichtige Faktoren mit diesem theoretischen Ansatz nicht erfasst werden können. Sozial-psychologische Faktoren und Konflikt-Frames sind wichtig für das Verständnis von Konfliktentstehung und Governance und auf lokaler Ebene spielen individuelle Handlungen und das Verhältnis einziger Akteure zueinander eine wichtige Rolle und legen die Bedingungen für erfolgreiches Governance von Konflikten fest.

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Contents

Overview of constitutive publications and manuscripts

[1] Juerges, Nataly; Jens Newig (2015): How interest groups adapt to the changing forest governance landscape in the EU: A case study from Germany. Forest Policy and Economics 50, 228-235. Doi:10.1016/j.forpol.2014.07.015.

ABSTRACT

Multi-level governance theory states that interest groups play an important role in decision-making processes. However, the implications of the assumed trend from government to multi-level forest governance for interest groups have not been sufficiently examined. This paper examines the case of German forest politics and studies the effects of the trend towards multi-level governance for forest-related interest groups. The empirical analysis implies that interest groups are in an organizational and/or strategic reconfiguration process in response to changes of the overall governance structure. Different coping strategies among interest groups organized on multiple levels, and interest groups organized on a single organizational level are observed. Many interest groups feel overwhelmed in their attempt to understand and observe every level of action at the same time. Inequalities between the ability of different interest groups to influence decision-making might be reinforced by the trend towards a multi-level governance structure.

[2] Juerges, Nataly; Alisa Weber; Jens Newig; Jessica Leahy: The Role of Trust in Local Natural Resource Management Conflicts: A Case Study from Forest Management in the German State of Lower Saxony.

ABSTRACT

Managing conflicts between different stakeholders is an important part of forest management at a local level. Trust is thought to be an important factor in conflict management. We examined how stakeholders in an informally organized forest network perceive the role of trust in the development and management of natural resource conflicts. Based on 24 qualitative semi-structured interviews conducted in the German state of Lower Saxony, a model is proposed based on 12 factors that are perceived by the interviewed stakeholders to interact with the relationship between trust and conflict. The findings imply that more emphasis should be placed on trust building measures in informally organized natural resource networks in order to manage natural resource conflicts between different stakeholders on a local level.

[3] Juerges, Nataly; Jens Newig (2015): What role for frames in scalar conflicts? Land Use Policy 49, 426-434. Doi:10.1016/j.landusepol.2015.08.013.

ABSTRACT

To meet growing demands of renewable energy, wind farms are increasingly planned and situated in forested lands. This stirs novel conflicts, which are often not strictly technological in nature. Instead, perceptions and narratives of affected actors play an important role in the development of such conflicts. As often in land-use decision, this involves conflicts over the right spatial scale on which decisions should be taken. This study empirically examines how conflicts over the most appropriate governance level for decision-making are rooted in the different frames of involved actors. Based on 44 qualitative interviews in the German states of Lower Saxony and Rhineland-Palatinate, this study provides evidence for the value of frame theory for understanding governance level or scaling conflicts. Furthermore, the study is helpful to wind energy policy makers because it illustrates how actors perceive the strength and weaknesses of different governance levels. The findings imply that frame reflection should become more integrated into conflict management practices because conflict over governance level or scale can be based on different perceptions of what the conflict is about and which levels of action are required.

[4] Juerges, Nataly; Jessica Leahy; Jens Newig (under review at Energy Policy): Stakeholder perceptions of polycentric governance in wind energy conflicts: An actor typology.

ABSTRACT

This case study examines wind energy conflicts in forested landscapes in Maine, USA and Rhineland-Palatinate, Germany. Specifically, actor perspectives on polycentric governance and its legitimacy to manage this complex conflict were evaluated based on 40 qualitative, semi-structured interviews with decision-makers and important stakeholders from various sectors. Generally, polycentric governance systems of wind energy issues were seen positively and considered as having high legitimacy. Even though different individuals had varied perceptions, the aggregated perceptions of the two polycentric systems in Maine and Rhineland-Palatinate as well as the factors that generally constitute legitimacy in wind energy conflict governance were quite similar in both cases. Some actors benefit from polycentric governance settings, while others face disadvantages because they are overwhelmed by the complexity of multiple decision-making arenas. An actor typology is proposed to describe different stakeholders within a polycentric energy governance setting. The results indicate that the findings about the advantages of polycentricity for the governance of small-scale common pool resources might be marginally transferable to the governance of energy transitions.

FRAMEWORK PAPER

1 Introduction

1.1 Motivation, aims & goals

The transition towards renewable energies and climate change are major challenges of our time (Poocharoen and Sovacool 2012). Climate change is expected to have major impacts on world forest resources because of the increased risk of extreme weather events such as storms or droughts (Lindner et al. 2010). However, forests are also seen as an important factor in the mitigation of climate change because of their capacity to bound CO_2 and their effects on regional climates (Bonan et al. 2008). Furthermore, the future of forests is closely linked to climate change and energy transition because the preconditions of forest area use and forest management are affected by changes in energy and climate polices (Beland Lindahl and Westholm 2012). Energy transition and the discourse on climate change are important aspects for forest conflict research because these challenges add new interests and functions to the principle of multifunctional, sustainable forest use (Eckerberg and Sandström 2013).

The term energy transition describes a long-term structural change in the energy system towards a renewable energy system with improved energy efficiency. The term is also associated with the transformation of the energy system into a more democratic one, where profits of energy regeneration are kept decentralized in the energy producing regions (Sadler and Kurtz 2014). The transition towards renewable energies is hereby understood as an ongoing process without a clearly defined starting point. Beginning in the 1970s, members of the environmental movement declared the necessity for such a transition. Based mainly on grass roots activities, the first renewable energy projects were established in the following years. With the German Renewable Energy Act in 1991, and its amendments beginning in the year 2000, German energy policies contributed to the further development of this transition process. The political decision to increase the share of renewable energies up to 60% by 2050, and the decision to phase-out nuclear energy by 2022 in response to the nuclear disaster in Fukushima were important events that supported the ongoing transition towards renewable energies.

Forest management has multiple objectives and different stakeholders have competing interests in forests. Specifically related to trade-offs between the sometimes conflicting ecologic, economic and social dimensions of multi-functional forest management that had to be dealt with in the past. German forestry claims to be the cradle of the sustainability paradigm. The concept was developed in 1713 by Hanns Carl von Carlowitz, who proposed that only the timber that can be re-grown in a year should be harvested in order to sustain the economic use of forests over time (Carlowitz 1713, reprint 2012). The meaning of the term has changed substantially over time. Today's augmented meaning of sustainable forestry includes social and ecological aspects as well, but there is no general agreement about the priorities for forest management and how to deliberate different interests in forests against each other. A strong dichotomy between environmental and economic interests in forests characterizes forest policy in Germany (Winkel and Sotirow 2011), and most conflicts about forests traditionally (Hellström and Welp 1996; Mann 1998). The new interest in forests

related to energy transition and climate change modify established forest conflict lines because new conflicts related to climate mitigation, climate adaptation, and renewable energies blurred the clear opposition between environmental and economic interests. Due to the ongoing changes in the forest conflict landscape, the governance of forest conflicts is a very timely topic and is of high relevance for scientists and practitioners (Eckerberg and Sandström 2013). Since energy transition and the discourse on climate change has triggered a fundamental discussion between actors engaged within forest governance about the future role of forests in society (Beland Lindahl and Westholm 2012) the need for effective and legitimate forest conflict governance to help deliberate between conflicting interests in forests is gaining a new importance.

Forest conflicts are examined with different spatial and empirical scopes in forest policy research. Forest conflicts and the governance of forest conflicts is a multi-level issue, including the full range from micro-scale (e.g. household) to global analytical dimensions (Satyal Pravat and Humphreys 2013). Furthermore, forest conflicts are studied from a broad range of theoretical perspectives. Governance perspectives have recently become a promising approach for analyzing forest conflicts (Eckerberg and Sandström 2013). Theories that consider the multi-level nature of contemporary governance and the changing relation of state and non-state actors in decision-making can be particularly fruitful for studying multi-scale conflicts. Different theories focus on the phenomena of the multi-level nature of contemporary governance systems with different competing and nested decision-making points and the relation of state and non-state actors in decision-making processes within those systems. This thesis applies three theoretical concepts that focus on these phenomena: multi-level governance, polycentricity, and politics of scale.

Although multi-level governance, polycentricity and politics of scale all examine the same phenomena, a challenge in the combination of the three approaches lies in the fact that relevant concepts are discussed under different terms (Knodt and Große Hüttmann 2006). Furthermore, there are contradictory understandings in the literature of whether the problem lies only in the parallel use of different terms or if the concepts actually differ in their meanings. The relation of those concepts first has to be clarified before the value of combining the theories in this thesis can be explained in more detail. Multi-level governance describes the different spatial units on which decision-making authority is dispersed as "levels". Politics of scale uses the term "scale" to describe spatial units of decision-making authority. Often, "level" and "scale" are used interchangeably (e.g. Zulu 2009), but some authors (e.g. Gibson et al. 2000; Poteete 2012) disagree with this, arguing that "level" and "scale" describe different concepts that have different implications. Even though the concepts of "level" and "scale" have different origins and foci, the concepts have many important similarities. Therefore, in this thesis the terms "level" and "scale" are used interchangeably. Both terms describe a multi-purpose or special purpose jurisdiction of formally assigned or informally accepted authority covering the area of a certain territory. A system of "multi-level" or "multi-scale" governance is understood as system where decision-making authority is dispersed over several layers, each responsible for a certain territory. These layers can be overlapping and/or hierarchically nested.

The applied theoretical concepts examine the same phenomena but differ in their specific perspectives and foci. Multi-level governance focuses on the ability of governance systems

with multiple decision-making points dispersed over several levels to solve problems (Jachtenfuchs 2001, Marginson and Keune 2012). There are different notions and understandings of the concept of polycentricity in the literature (Aligica and Tarko 2011). Within this thesis, polycentric governance is understood as a system of Type II multi-level governance (Hooghe and Marks 2003) and is defined as "a system where citizens are able to organize not just one but multiple governing authorities at different scales" (Ostrom 1999: 39). Literature on polycentricity shares the focus on the problem-solving capacity of multi-level/polycentric governance systems, and focuses more specifically on the problem-solving capacity of systems of local self-governance within multi-level governance systems. Literature in the field of politics of scale has a distinctive other perspective on multi-level processes. Studies in the context of politics of scale focus less on the ability of governance systems to solve problems, instead, the role of actors in the creation, maintenance or modification of governance systems consisting of multiple levels is examined (e.g. Hüesker and Moss 2015). Due to the different perspectives on the same phenomena, the theoretical approaches complement each other in the analysis of conflicts in governance systems with dispersed decision-making authority.

The three applied concepts differ in some of their assumptions, for example about the characteristics and motivations of actors involved in decision-making processes. The thoughts, motivations, and actions of actors involved in managing conflicts in decision-making processes are an important factor for the theoretical understanding of conflicts and their practical management. Multi-level governance and polycentricity assume that actors are interested in finding solutions for problems. Contrarily, politics of scale assumes that actors are mainly motivated by maintaining and increasing their influence to improve their chances of interest realization. It has been argued that actors apply different strategies in governance systems with various decision-making points, and that some actors are more successful than others in advocating their interests in multi-level systems (Hüesker and Moss 2015). Similar concepts are also described within other theoretical approaches. For example, non-governmental organizations engage in "venue shopping" (Baumgartner and Jones 1993) by choosing between different available decision-making venues for their lobbying approaches. Furthermore, it has also been described in the context of other theoretical approaches how non-governmental organizations play an important role in bridging different governance levels and in enabling integration of local stakeholders in decision-making processes (Espinosa-Romero et al. 2014).

Previous studies illustrated the relevance of understanding actor behavior in multi-level governance systems for further theory development and natural resource management praxis, but have also emphasized that more empirical research in environmental governance is needed to fully understand actor behavior within multi-level systems (Hüesker and Moss 2015). Further research has been suggested in order to examine the effects on individual and collective actors of the assumed trend towards multi-level governance more closely (Stephenson 2013). So far, not enough is known about how different types of collective and individual state and non-state actors act in complex governance systems and how they perceive these governance systems (Espinosa-Romero et al. 2014; Hüesker and Moss 2015; Pellikka and Sandström 2011). It has been argued that there is a lack of empirical knowledge and solid microanalysis about how exactly policy processes in the multi-level governance

landscape of the European Union work (Jachtenfuchs 2001, Papadopoulos 2005). More empirical research examining these issues through case studies in different contexts is needed for the further development of multi-level governance and related theories in their understanding of actor behavior and actor perceptions within multi-level systems. The understanding of the behavior of different actor types and their perceptions of complex, multi-level systems is particularly relevant in the field of conflict research because this knowledge is important to estimate the implications of conflict governance design.

In order to contribute to the knowledge in the above outlined fields, the aims of this thesis are:

- to provide empirical insights about how energy transition and climate change impact forest conflict landscapes in different parts of Germany and in other regions of the world,

- to contribute to the understanding of actor behavior and actor perceptions within multi-level governance systems by presenting extensive empirical data based on five case studies,

- to empirically test the potential of three conceptual lenses on multiple levels of governance and their interplay (multi-level governance, polycentricity, politics of scale) in order to understand and explain forest conflict processes,

- to provide practical recommendations to policy makers and practitioners on how to design conflict governance systems in forestry and other natural resources that allow decision-making on conflictive issues which is perceived as effective and legitimate by actors involved in those conflicts.

1.2 Thesis structure

This cumulative doctoral thesis is comprised of four research papers that address the outlined research goals from different perspectives:

[1] Juerges, Nataly and Jens Newig (2015): How interest groups adapt to the changing forest governance landscape in the EU: A case study from Germany. In: Forest Policy and Economics 50, 228-235.

[2] Juerges, Nataly; Alisa Weber; Jens Newig; Jessica Leahy: The Role of Trust in Local Natural Resource Management Conflicts: A Case Study from Forest Management in the German State of Lower Saxony.

[3] Juerges, Nataly and Jens Newig (2015): What role for frames in scalar conflicts? In: Land Use Policy 49, 426-434.

[4] Juerges, Nataly; Jessica Leahy; Jens Newig (under review): Stakeholder perceptions of polycentric governance in wind energy conflicts: An actor typology.

Appendix 1 includes further information on the authorship contributions for each paper and publication status of each paper.

CASES

Following the theoretical approach of the thesis, the empirical scope of the overall study is based on a multiple-level embedded case study design, including multiple cases, with cases nested within other cases, covering several governance levels (Yin 2014). Each research paper has a different spatial and empirical basis (Graph 1). The case selection was conducted in an iterative process by selecting further case studies based on the findings of the previous case studies. Studies with multiple cases considering different problem scales are particularly valuable for further theory development because findings of different contexts can be contrasted with each other and shed light on the examined phenomenon from different perspectives (Yin 2014).

Research paper [1] is based on a case study of interest groups in the German forest governance landscape. As described in research paper [1], forest governance, as a policy sector of relatively low importance compared to other policy sectors, would be an auspicious candidate to develop into a multi-level governance system (Bache and Flinders 2005). Forest governance has been described as "fragmented" (Giessen 2013). It is of theoretical relevance for the understanding of multi-level governance to test empirically, if ongoing changes in forest governance can be conceptualized as trending towards multi-level governance and how collective actors respond to such a trend.

Research paper [2] focuses on a conflict landscape at the local level with a case study from an informal forest stakeholder network in Lower Saxony. Networks are seen as an important part of governance. The empirical analysis of networks delivered valuable knowledge about governance processes at a micro-level (Jachtenfuchs 2001). However, little is known about how actors involved in issue networks at the local level interact with each other within these networks, and which factors are shaping the likelihood of conflict within networks.

For an in-depth analysis, a conflict case was selected to examine the development and process of this conflict in case studies in different, but complementary focus regions in three case studies within and outside Germany in the research papers [3] and [4]. The conflict about wind energy in forests was selected based on the findings of the expert interviews as a case. The conflict about wind energy in forests is highly relevant for practitioners and policy makers because, in the context of energy transition, forests will be increasingly used for the realization of wind energy projects. Many participants in the expert interviews in the first empirical phase mentioned this conflict as highly relevant and argued that it will become even more important in the future. Research papers [3] and [4] both have a state-level focus, since the state is still the most important decision-making level for forests in Germany. Research paper [3] is based on two case studies within Germany, the state of Lower Saxony and the state of Rhineland-Palatinate. Whereas [4] is based on case study in the state of Rhineland-Palatinate, Germany and the state of Maine, USA.

THEORETICAL PERSPECTIVES

In addition to the different empirical basis and the different spatial scales of each research paper, the papers are also based on each other complementing theoretical perspectives and concepts (multi-level governance, polycentricity, politics of scale, frames, trust) (Graph 1). As outlined in the previous section, different conceptual perspectives focus on the relations of different decision-making levels and state and non-state actors within multi-layered governance systems. It has been argued that those different perspectives should be more unified in order to understand and explain empirical findings (Gruby and Basurto 2014; Poteete 2012). This thesis followed this recommendation by integrating the three related approaches as analytical frameworks for the analysis of those case studies.

Research paper [1] discusses whether or not ongoing changes in forest governance can be conceptualized as a trend towards multi-level governance. Research paper [2] is based on literature about the relation of trust and conflict, but also illustrates the importance of networks and non-state actors for explaining local forest governance processes. Research paper [3] combines literature on multi-level governance with the field of politics of scale to explain conflicts over appropriate decision-making points in wind energy conflicts. Research paper [4] applies the theoretical framework of polycentricity to examine how actors involved in wind energy conflicts perceive governance settings to regulate them. All four research papers contribute to the further development of governance theories on the relations of multiple levels and of state and non-state actors in decision-making but differ in their specific analytical perspectives. This combination allowed for a comprehensive analysis because the combination of the "problem-solving" focus of multi-level governance, and the "problem-solving capacity of local self-governance" of polycentricity with the focus on "scalar strategies of actors" of politics of scale shed light on the overall research interest from different perspectives. Thus, this thesis confirmed the assumption that the combination of different theoretical approaches focusing on the multi-level nature of governance can yield valuable insights (Poteete 2012; Gruby and Basurto 2014). This has proven particularly true in the empirical study of environmental and natural resource conflict processes.

STRUCTURE OF THE FRAMEWORK PAPER

In the following sections of this framework paper, the theoretical background of the thesis and the applied theories and concepts in the four research papers are presented in greater depth. Next, the case study design and the reasons for the selection of the three cases and five case studies are explained, followed by the presentation of the methods applied in the data collection and analysis of the six empirical phases of this thesis. Then, the methodological approach of this thesis is critically discussed. The findings of the four research papers and their contributions to the overall research interest of this thesis are shortly presented and discussed. Finally, the conclusions for research and practice are presented. Ten recommendations for practitioners and policy makers summarize the practical relevance of the findings. Three themes for future research are outlined based on the theoretical and empirical findings of this thesis.

THEORETICAL PERSPECTIVES

- MULTI-LEVEL GOVERNANCE
- POLITICS OF SCALE
- POLYCENTICITY

- CONFLICT FRAMING
- TRUST & CONFLICT

SPATIAL SCOPE

- MULTI-LEVEL (EU, national, state, local level)
- STATE LEVEL (Maine, USA & Rhineland-Palatinate)
- STATE LEVEL (Lower Saxony & Rhineland-Palatinate
- LOCAL LEVEL (Districts Uelzen & Lüchow-Dannenberg

PAPER [1]

PAPER [4]

PAPER [3]

PAPER [2]

CASES

- INTEREST GROUPS IN GERMAN FOREST GOVERNANCE
- INFORMAL LOCAL FOREST NETWORK
- CONFLICT ABOUT WIND ENERGY IN FORESTS

Graph 1: Thesis structure

2 Concepts and theoretical perspectives

This thesis merges theoretical approaches focusing on the dispersion of decision-making authority over multiple levels, multiple actors and multiple sectors of governance within the field of environmental and natural resource conflict research. In the following sub-sections the applied theoretical perspectives and major concepts are introduced.

2.1 Theories on multi-level and multi-scale governance

The allocation of authority and responsibilities between decision-making points and between different state and non-state actors are important questions in the context of many sustainability problems with complex multi-scale character. Two points are relevant here. The first point is the increasingly multi-leveled, polycentric nature of governance systems, which is widely seen as a given precondition. The second point is that multi-level governance systems are also seen as a solution for achieving effective governance of multi-scale sustainability problems (Cash and Moser 2010; Gibson et al. 2000; Hooghe and Marks 2003; Kok and Veldkamp 2011; Poteete 2012). It has been argued that both the transition towards renewable energies and the mitigation of climate change require action on multiple levels by taking multi-scale interactions into account (Poocharoen and Sovacool 2012; Smith 2007).

The causes and consequences of climate change are a combination of events at different scales. The problem of climate change is most likely caused by human greenhouse gas emissions. The consequences of climate change are a global problem, but different regions and countries will be affected to different extents. The vulnerability to effects of climate change will differ between regions as well. Regions that will be the most negatively impacted by climate change, and that are also most vulnerable, are not identical with the regions that are contributing to the most emissions causing climate change (IPPC 2014). The transition towards renewable energies is seen as an important strategy to reduce the severity of climate change. However, measures undertaken with the goal of reducing greenhouse gas emissions from fossil fuels might have negative effects in other regions of the world as well. For example, an extreme increase in energetic use of timber in Germany to substitute fossil fuels might increase unsustainable forest use and deforestation in other regions of the world because of the increased demand for timber on the world market. This example shows that multi-scale interactions need to be taken into account because actions at one level may also have a positive or negative impact at other places or times. The identification and understanding of multi-scale interactions constitutes a major challenge for research and practice. Multi-scale interactions need to be identified first in order to design and implement effective governance arrangements. Multi-level governance and related theories are useful concepts for examining the complex interactions between humans and their environment from the local to the global level (Mwangi and Wardell 2012).

Unintended multi-scale interactions can be an effect of multi-level governance because actors at one decision-making point might not always completely foresee the effects of their decisions at other levels (Aligica and Tarko 2011). However, governance arrangements with decision-making authority dispersed over several levels have also been suggested for addressing those multi-scale dynamics and interactions (Andersson and Ostrom 2008;

Mwangi and Wardell 2012). The idea behind this is that complex problems that include problem dimensions at different levels are better addressed by governance systems matching to the different problem dimensions at different levels. Furthermore, it has been argued that governance systems including different levels are more robust and resilient (Mwangi and Wardell 2012). Forests are particularly complex systems because they are based on the interaction of an ecosystem and a social system, and are impacted by many bio-geophysical and socio-economic factors (Mwangi and Wardell 2012). Due to this high complexity, the analysis of forest conflicts requires a theoretical perspective that takes multi-level and multi-scale interactions into account. The perspective of multi-level governance is useful for the analysis of this type of policy process because it allows *"an understanding of complexity at and between levels"* (Stubbs 2006: 67).

The effects of decision-making authority allocation and shifts between levels and state and non-state actors are examined in different disciplines. This thesis applies the concepts of multi-level governance (Bache and Flinders 2004; Benz 2006; Hooghe and Marks 2003; Piattoni 2010), polycentricity studies (Ostrom et al. 1961) and politics of scale (Swyngedouw 2005). In the following sub-sections, the three applied theoretical approaches in this thesis, which focus on the dispersion of decision-making authority over several layers are briefly presented, and the reasons why the combination of these theories is valuable for the understanding of forest conflict processes is explained.

2.1.1 Multi-level governance and polycentricity

The concept of multi-level governance has its origin in the context of European integration studies and relates to a way of thinking about the political system of the European Union and its member states (Bache and Flinders 2004, Stephenson 2013). The concept is based on the assumption that the political system became more complex because actors and decision-making points increased. Whereas "multi-level" implies that political processes link different vertical and horizontal political structures because of interdependencies between different levels, "governance" refers to the blurring differences between state and society (Benz 2006). The loss of power of the sovereign national state to sub-national and supranational state and non-state actors is the central theme of multi-level governance (Piattoni 2010). This shift has also been conceptualized as a move of decision-making authority departing at the sovereign national state on three axes: state vs. society, center vs. periphery, and domestic vs. international (Piattoni 2010). Multi-level governance structures have been categorized as Type-I and Type-II multi-level governance (Hooghe and Marks 2003). Type-I describes governance systems with hierarchically nested multi-level jurisdictions, whereas Type-II multi-level governance describes special purpose jurisdictions which are cross-cutting the hierarchical and horizontal structures of the overall governance system (Hooghe and Marks 2003).

There are different notions and understandings of the concept of polycentricity in the literature (Aligica and Tarko 2011). Within this thesis, polycentric governance is understood as a system of Type II multi-level governance (Hooghe and Marks 2003) and is defined as "a system where citizens are able to organize not just one but multiple governing authorities at different scales" (Ostrom 1999: 39). Polycentric governance is described as a system with multiple overlapping and competing jurisdictions at different nested levels with considerable

independence from each other (Ostrom 1999). In the context of complex and interconnected problems, the concept of polycentricity became a promising approach in environmental, natural resource and energy governance research. It is argued that polycentric settings can be more effective in governing complex environmental problems than monocentric governance systems (Andersson and Ostrom 2008; Araral 2014; McGinnis and Walker 2010; Sovacool 2011; Nagendra and Ostrom 2012; Ostrom 1999). Polycentric governance systems have been advocated in order to allow an evolutionary improvement of rules because governance units can be created and adapted to problem scopes and different governance units can learn from each other (Ostrom 1999; McGinnis and Walker 2010; Sovacool 2011). Within the literature on the concept of polycentricity, the importance of allowing the development of local self-governance mechanisms to solve problems has been emphasized (McGinnis and Walker 2010). Literature on the concept of polycentricity is considered an additional theoretical perspective in this thesis because the focus on local self-governance mechanisms adds another analytical aspect to the perspective of multi-level governance theory. Local self-governance fits into the concept of Type-II multi-level governance, but does not receive explicit attention in the literature on multi-level governance. That is, there is no real focus on the features of this special type of level within multi-level governance. Since many studies have confirmed the value of local self-governance mechanisms for solving problems of natural resource misuse, the concept of polycentricity is considered to be relevant for tackling forest conflicts.

Multi-level governance can be understood as an empirical, normative, or theoretical issue (Piattoni 2010). Multi-level governance theory poses several empirical questions which are, so far, not sufficiently answered (Knodt and Große Hüttmann 2006). It has neither been fully explored in which policy sectors a trend towards multi-level governance exists, nor is it completely clear how multi-level governance works, and which political outcomes it produces. Further research has been suggested for more closely examining the effects on individual and collective actors of the assumed trend towards multi-level governance (Stephenson 2013). Individual actors and their actions and motivations matter in the concept of multi-level governance. The approach acknowledges the importance of specific actor constellations within the multi-layered system of the EU and its member states and the diversity of state and non-state actors involved in decision-making (Knodt and Große Hüttmann 2006). Furthermore, the approach distinguishes clearly between institutions and actors who are making decisions and implementing those institutions (Knodt and Große Hüttmann 2006). It is assumed that actors play an important role in linking different spheres of authority (Piattoni 2010). However, not enough is known about how different types of collective and individual state and non-state actors behave in complex governance systems and how they perceive these governance systems (Espinosa-Romero et al. 2014; Pellikka and Sandström 2011). It has been argued that there is a lack of empirical knowledge and solid microanalysis about how exactly policy processes in the multi-level governance landscape of the European Union work (Jachtenfuchs 2001, Papadopoulos 2005). For the further development of multi-level governance and related theories in their understanding of actor behavior and actor perceptions within multi-level systems, more empirical research is needed examining these issues using case studies in different contexts.

It has also been argued that multi-level governance can be understood as a normative concept because it is assumed to be more democratic than traditional top-down government

approaches based on the broad inclusion of non-state actors in decision-making (Piattoni 2010). This perspective is also contested by arguing that multi-level governance has multiple legitimacy problems (Papadopoulos 2005). The legitimacy of multi-level governance is, for example, compromised because actors do not have equal opportunities to participate in decision-making processes because the options for participation are dependent on available resources, many decision-makers are not democratically elected, and decisions are made through involvement and cooperation of many actors, resulting in a lack of clear accountability for decisions (Papadopoulos 2005). It has been argued that multi-level governance is an efficient governance arrangement for problem solving (Stephenson 2013). Based on the democratic deficits in terms of accountability and political control multi-level governance has been described as "Faustian bargain" in which legitimacy of decision-making is traded against purported efficiency (Pierre and Peters 2005). Because of the concentration on the problem-solving capacity of multi-level governance arrangements, it has also been stated that multi-level governance theory has a problem-solving bias (Jachtenfuchs 2001, Marginson and Keune 2012). However, the discussion in the scientific literature about the legitimacy of multi-level governance, and whether or not the orientation towards problem solving disputes the legitimacy of the concept, is mainly conceptual in nature. There is a lack of empirically-based knowledge about how actors involved in multi-level governance systems perceive the legitimacy of decisions made in multi-level governance systems. Therefore, more research is needed to examine if the theoretical concerns about the legitimacy of multi-level governance systems are shared by those involved in environmental and natural resource conflicts governed by multi-level governance systems.

Another criticism of the concept of multi-level governance is that multi-level governance is an analytical perspective rather than a theory. This is because it lacks any explanation of the causes for how the phenomenon discussed actually developed, and how the described processes will develop in the future (Knodt and Große Hüttmann 2006, Stephensen 2013). However, scholars of the field do not see the value of multi-level governance as an explanatory theory of European integration, but instead as a framework to conceptualize and describe processes in this context (Bache and Flinders 2004). Related to this point, it has been pointed out that multi-level governance lacks an explanation of how exactly single levels and whole multi-level governance systems develop. Particularly, it is argued that multi-level governance "*sees the world as a collection of fixed territories*" instead of a result of social construction (Faludi 2012: 198; Stubbs 2006).

Another criticism of multi-level governance is that it ignores questions of political power (Marginson and Keune 2012). It is assumed in the concept of multi-level governance that because of the participation of non-state actors in decision-making the interests, knowledge and concerns of stakeholders can be considered and deliberated in decision-making processes. Thereby, multi-level governance theory tends to neglect the fact that not all stakeholders have the same resources and opportunities to participate and advocate their interests in decision-making processes. This inequality in participation is an expression of power relations that are not sufficiently considered in the concept. Furthermore, multi-level governance assumes a general interest of actors involved in conflicts to find solutions for problems. This might not always be the case, for example, if the power of an actor would be reduced by the resolution of a problem, then they might have an interest in further escalation of the conflict.

Due to these criticisms and the "blind spots" of the multi-level governance approach, this thesis combines multi-level governance with the perspective of politics of scale, which offers a complementary perspective on processes in multi-level governance systems.

2.1.2 Politics of Scale

A theoretical perspective that is complementary to multi-level governance and polycentricity, which also examines governance systems with a dispersion of decision-making authority over several territorial units, has been developed in the field of political geography under the name, politics of scale. The perspective of politics of scale examines the same phenomenon but has a distinctively different analytical focus than the previously discussed approaches. While multi-level governance and polycentricity focus on the effects of governance arrangements with dispersed authority over several levels and whether they are effective in solving problems, the focus of politics of scale lies in the development of multi-level governance systems, how levels become defined, and how decisions about allocation of authority between existing and newly created levels are reached (Wissen 2009).

Contrary to the perspective of multi-level governance, governance levels, respectively scales, are not considered as given. Instead, the fluid, socially constructed, and discursive character of spatial decision-making units is emphasized in this theory field (Bulkeley 2005; Delaney and Leitner 1997). The aspect of the discursive character of scale construction in this literature is considered and applied in combination with the multi-level governance approach. Studies in this field examine how actors try to change, maintain, or contest power relations by constructing and changing conflict scales (Hüesker and Moss 2015; Wissen 2009; Zulu 2009). Non-state actors are believed to play a crucial role in the formation and change of decision-making levels (Bulkeley 2005). This dynamic perspective on scales of the politics of scale theory helps to overcome the limitations of multi-level governance, which is more static in its perspective (Wissen 2009). However, similar perspectives have also been applied much earlier by other authors, using different terms than politics of scale but examining the same phenomena (Klins 2000).

Conflicts are a relevant process for the construction and re-definition of scale. Conflict participants define scales in conflict processes by articulating their understanding of the spatial dimensions of the conflict (Sadler and Kurtz 2014). Thereby, it is assumed that scaling processes are not neutral in regard to actor constellations (Griffin 2013; Swyngedouw 2005). Through a change in the spatial conflict scope, power constellations are also changed. Therefore, the definition of the conflict scale impacts the balance of powers within the conflict and can determine the outcome of the conflict. Contrary to the perspective of multi-level governance and polycentricity, actors are assumed to be less motivated to find a solution to a problem; instead, they are driven by power considerations.

Environmental problems are framed at a specific spatial scale, for example as a local problem or a global problem. This scale is discursively constructed, but there can be different, parallel understandings of the problem scale by different actor groups (Griffin 2013). For example, deforestation due to unsustainable forest use in a specific area can be seen as a local problem because it negatively impacts the availability of wood for energetic use or construction purposes in the surrounding area. The same deforestation process can also be seen as a global

problem because the forest might also be a habitat for rare species, and the deforestation then becomes a threat to biodiversity because it endangers the further existence of that species. These different understandings compete in the problem discourse with each other. Whereas studies in the context of multi-level governance theory would likely focus on the optimal allocation of decision-making authority between levels to reduce the deforestation problem, studies in politics of scale would aim to understand how power relations between actors lead to the current allocation of decision-making authority between levels to decide about the forest.

Different understandings of the problem scale can lead to conflict between groups and the conflict outcome is dependent on the power relations of those actors because it impacts which group is more successful in dominating the discourse about the problem scale (Griffin 2013). Strategies of non-governmental organizations for bypassing certain decision-makers and lobbying for their interest in other political venues, often described as "venue shopping" (Baumgartner and Jones 1993; Weber and Christopherson 2002) is also described in the literature of politics of scale, and is referred to as "scale jumping" (Stubbs 2006) or "scale bending" (Griffin 2013). Processes that change the scope of conflict are relevant for the conflict outcome because *the outcome of all conflict is determined by the scope of its contagion. The number of people involved in any conflict determines what happens; every change in the number of participants, every increase or reduction in the number of participants, affects the result.*"(Schattschneider 1960:2).

Scale has been a central issue in debates on energy production (Sadler and Kurtz 2014). It has been argued that decision-making about the future of the energy system is linked to the development of the political system and the allocation of decision-making authority within the political system (Naradoslawsky 2012). If renewable energies continue to gain importance, the energy producing regions will be more important for the economy. This increasing importance will likely be correlated with an increase of power in these regions (Naradoslawsky 2012). Thus, the transition towards renewable energies is related to a major rescaling process of decision-making authority. The relevance of scale construction in the conflict process is clearly demonstrated in conflicts related to wind energy (Sadler and Kurtz 2014). The understanding of a wind energy conflict as a more local issue or as a global issue in the context of global warming defines who has a legitimate stake in the conflict (Sadler and Kurtz 2014). The branding of local actors in conflict discourses as "NIMBYs" can be used to marginalize their opinions and interests because through localizing them and their arguments to the spatial scale of a "backyard" they are not considered able to make a useful contribution the discourse (Griffin 2013).

The theoretical perspective of politics of scale is rarely applied in forest governance research. Zulu (2009) has shown that the theoretical perspective of politics of scale can lead to a more nuanced understanding of forest governance and the reasons for failure of forest governance in addressing forest conflicts.

However, the perspective of politics of scale is not without criticism. The perspective of politics of scale neglects *the structuring effect of institutions"* (Wissen 2009: 890). In reality, institutions matter because they organize social compromise and they are responsible for a certain path dependency of governance (Wissen 2009). Furthermore, it has been argued that

the concentration on the social construction of scale neglects the relevance of landscapes, natural limits and their geophysical relevance for the social construction of scales (Görg 2007). For example, a large river or mountain belt constitutes natural boundaries of a territory because humans living inside or outside that natural border cannot easily cross them. This physical mobility constraint will be likely reflected in the definition of the political-administrative boundaries of the area. However, natural boundaries are only relevant under current socio-technical conditions. If new technologies are developed, for example, high tech shoes that allow one to fly easily over large rivers or mountain belts, the boundaries in that area might become redefined.

2.2 Environmental and natural resource conflicts

Research about conflicts over control, management or use of forests is an important research field worldwide, and is of high societal relevance (Eckerberg and Sandström 2013).

2.2.1 Conflict definition, conflict types and conflict dimensions
This thesis follows the conflict definition of the FAO (Matiru 2000:1):

> *"Natural resources conflicts are disagreements and disputes over access to, and control and use of, natural resources. These conflicts often emerge because people have different uses for resources such as forests, water, pastures and land, or want to manage them in different ways. Disagreements also arise when these interests and needs are incompatible, or when the priorities of some user groups are not considered in policies, programmes and projects."*

Conflicts can be distinguished as value conflicts or interest conflicts (Aubert 1963). Value conflicts are based on different values and normative judgments; for example, over the question of whether or not a forest ecosystem that is habitat to a rare species should be taken out of use because of the intrinsic value of this species. Interest conflicts are based on conflicting interests of the allocation of limited resources, for example disagreements between forest owners and mountain bikers about which kinds of recreational uses the owners must tolerate. Environmental conflicts are often a combination of both value and interest conflicts. Conflicts about wind energy are a typical example where value and interest dimensions are combined. In wind energy conflicts, usually all conflict parties legitimize their position with ecological arguments. The energy transition blurred the conflict line between economy and ecology, which has characterized energy policy for decades. This change resulted in new actor and conflict constellations in energy policy decades (Mautz 2010). Wind energy conflicts are multi-level conflicts because they combine global problem dimensions such as climate change with regional problems such as land sealing, and local conflict aspects such as nuisance of local residents (Abbott 2010; Liljenfeldt 2015). A third type of conflict, in addition to value and interest conflicts, are factual conflicts, which are conflicts about facts or realities, for example regarding how many bats and birds are killed by wind turbines within a certain period of time. Factual conflicts can be solved by scientific research (Böschen 2010). Those different conflict types require different modes of conflict management. Interest conflicts require negotiations between conflict parties, factual conflicts require arguments, and value conflicts require discussion between actors with contradicting values (Hampel and Torgersen 2010).

Conflicts can be analyzed in different dimensions, the relevant conflict dimensions are: development, structure, process, effects, and conditions of its transformations (Saretzki 2010). In many conflicts, the dispute is not limited to the problem itself, instead, the definition, evaluation, or regulation of the conflict are also disputed (Saretzki 2010).

2.2.2 Conflicts and governance

Most forest conflicts are non-violent, but can cause serious economic, ecologic and social damage (Gritten et al. 2013). In some cases forest conflicts also have positive effects because they can serve as a starting point for a more effective and legitimate forest governance regime, or they can strengthen collaboration within a community (Gritten et al. 2013). Conflicts should not be seen solely as negative because their existence also proves the functioning of democratic systems where different opinions can be freely expressed. Disputes can also be constructive if successful conflict management mechanisms are employed (Raitio 2013).

Forest conflict research is important because the understanding of causes, development, and dynamics of forest conflicts is a fundamental precondition for establishing a governance system that allows successful conflict management (Mola-Yudego et al. 2012). How governance arrangements should be made in order to be legitimate in making decisions about conflicts is a relevant question in political science (Stubbs 2006). Developing strategies for the governance of conflict and the evaluation of different conflict governance options is an important motivation for forest conflict research (Eckerberg and Sandström 2013). "Governance" of conflict is hereby understood as the sum of, *"all institutions designed for the deliberative solving of collective problems, irrespective of the private or public character of the actors involved and the hierarchical or horizontal made of their (purposive) interaction"* (Mayntz 2009:80).

Most forest conflict research examines the developing world; less knowledge exists about forest conflicts in the developed, western world (Eckerberg and Sandström 2013). Analysis of forest conflict cases between different regional settings are of high scientific value because these kinds of analysis can provide insights about the general mechanisms of forest conflicts, apart from local specifics, and contribute to a general understanding of forest conflicts. Especially analyses with cases from different countries can deliver fruitful insights for the understanding of important factors of conflict development and the conditions of successful conflict management (Hellström 2001; Saretzki 2010).

2.2.3 Frames

Previous conflict research has suggested that different frames can be an important source of conflicts (e.g. Schön and Rein 1994). Framing is understood as the way things are understood by actors based on, "*structures of belief, perception, and appreciation*" (Schön and Rein 1994:23). All conflict participants need to agree on the same conflict frame; otherwise the different frames become part of the conflict (Hampel and Torgersen 2010). Different issue frames can pose a major obstacle for successful conflict management because it may not be possible to agree on a strategy when various parties perceive things completely differently (Rein and Schön 1994). Framing is also a key in transforming conflicts (Putnam and Wondolleck 2003). The regulation of controversies based on conflicting frames by actors requires the initial identification and description of these frames (Arts and Buizer 2009). A mu-

tual understanding of conflicting frames and their underlying values is necessary for successful conflict management because it enables communication between conflicting parties, and can support a joint search for compromise (Raitio 2013; Shmueli 2008).

2.2.4 Trust

Trust has been identified as particularly important factor for conflict development and management (Ayoko and Pekerti 2008; Balliet and Van Lange 2013; Beierle and Konisky 2000). A lack of trust between different stakeholders can be a driver for conflict (Nie 2003). The success of conflict management is impacted by the levels of trust between stakeholders, if the conflict participants have trust to each other it is more likely that a compromise between conflicting interests can be found (Lewicki and Wiehoff 2000).

2.3 Combination and application of theoretical approaches in the thesis

The literatures on multi-level governance, polycentricty and politics of scale are, analytically speaking, complementary to each other in the analysis of processes in governance systems with dispersed authority over several levels. The three presented theoretical approaches have different deficits and foci (Mwangi and Wardell 2012; Wissen 2009). The different foci of the three theoretical approaches are complementary because, in combination, they shed light on the examined phenomena from a more comprehensive perspective, making up for deficits of the other theoretical approaches. The complementary character of the theoretical approaches becomes evident in the following aspects: the role of institutions in political processes, problem-solving capacity of local self-governance, power relations between actors, motivations of actors, and the social construction of scale.

Multi-level governance is a useful theoretical perspective to study forest conflicts because it considers the role of institutions at different levels and complexity of decision-making processes between levels. Furthermore, multi-level governance focuses strongly on the effectiveness and efficiency of governance arrangements to solve conflicts, an issue which is relevant for the practical problems that are analyzed in this thesis. The perspective of polycentricity adds a focus on local self-governance mechanisms within multi-level systems. Politics of scale compensates for important deficits of the former perspectives. Politics of scale questions the assumption that actors are interested in finding solutions for problems. Instead, self-interests and power-relations are considered important elements of actor motivation. Furthermore, politics of scale offers an analytical perspective on the development on new levels and the reasons for re-scaling processes.

As described above, it has been argued, that multi-level governance theory contains some unsolved questions about its empirical and normative character (Knodt and Große Hüttmann 2006; Piattoni 2010). In order to contribute to the further development of multi-level governance theory, this thesis has applied multi-level governance as an empirical framework and discusses whether ongoing changes in forest governance provide empirical evidence for the concept by examining if those changes can be understood as a trend towards multi-level governance. Furthermore, this thesis contributes to the discussion about the contested legitimacy of multi-level governance by examining how actors governed by polycentric, multi-level systems perceive the legitimacy of multi-level governance.

This thesis contributes to the further development of the concept of polycentricity by examining how actors perceive polycentric governance arrangements and how they behave in them, which has not sufficiently been explored so far. Furthermore, it is discussed whether the design concept of polycentricity, which is assumed to be often successful in avoiding "tragedies of the commons," might also be successful in the governance of complex sustainability transitions.

The application of multi-level governance and related theories aims to contribute to the further development of environmental and natural resource conflict research by showing the value of these theoretical approaches for the analysis and management of environmental and natural resource conflicts.

3 Methods

3.1 Stakeholder approach

Recently, stakeholder analysis has become increasingly popular in natural resource management in order to understand potentially conflicting interests and existing conflicts between different natural resource user groups (Reed at al. 2009). However, there is no general consensus on how to define "stakeholder" (Table 1), and the term is used differently in different fields.

In this thesis, the term 'stakeholder' follows the definition of Reed at al. (2009) and defines stakeholders as all individual and collective actors who are affected by or can affect decisions. Even though the definitions of who is a stakeholder vary, there is a general agreement of the value of including the knowledge of stakeholders in research processes. This thesis integrated the knowledge of stakeholders by conducting interviews with relevant actors. Therefore, the findings are based on experiences and perspectives of those involved forest conflicts.

Table 1: Stakeholder definitions

Stakeholder Definition	Source
Stakeholders are those individuals or groups of individuals who either have some input into the decision making process or are affected by policy decisions on the social problem	Majchrzak 1984:28.
[…] any group of people, organised or unorganised, who share a common interest or stake in a particular issue or system […] they can be at any level or position in society, […]. The key- and often neglected stakeholders in NRM are […] and other small-scale resource users, but stakeholder may equally include policy-makers, planners and administrators in government or other organisations, commercial bodies, and more nebulous categories such as	Grimble and Wellard 1997: 175-176.

'future generations', the 'national interest' and wider society'.	
Stakeholders can be defined as actors who are affected by the issue, or who- because of their position have or could have an active or passive influence on the decision-making and implementation processes.	Varvasovsky and Brugha 2000: 341.
[…] who is affected by the decisions and actions […] and who has the power to influence their outcome	Reed et al. 2009:1933.

3.2 Case study design and case justifications

Case study research in the social sciences examines a certain phenomenon based on theories with the goal of expanding and generalizing theories by drawing theoretical conclusions based on observations of the social reality (Gläser und Laudel 2010; Yin 2014). Though it is true that in a case study only a single case or a few cases are studied in depth, it is the purpose of case study research to gain information on a larger group of cases by coming to some generalizable findings (Gerring 2007).

This thesis is based on a combination of five qualitative case studies with three cases on forest conflicts and forest governance with the aim to contribute to the further development of theories on actor behavior in environmental and natural resource governance. A qualitative case study research design was chosen because this type of research is suggested for research questions focusing on a complex real-world phenomenon, which cannot clearly be distinguished from the natural context and describing and explaining a contemporary subject (Yin 2014). Furthermore, the importance of energy transition creates a pressing need for case studies in this context (Chmutina and Goodier 2014).

A case, the unit of analysis within a case-study can be defined in many ways (Hellström 2001, Yin 2014). For example, in forest conflict research a case can be an individual conflict participant, a specific conflict, or a specific spatial, cultural, or political unit (Hellström 2001). The units of analysis in this thesis included a combination of different case-types:

- the interest group landscape in German forest governance in research paper [1],
- an informal local forest network in research paper [2], and
- a specific conflict within certain political-administrative units (wind energy conflicts in three focus regions: Lower Saxony, Rhineland-Palatinate, and Maine) in the research papers [3] and [4].

This combination of different case-types and different single case and comparative case study designs allowed studying the topic of this thesis in a comprehensive way from different analytical perspectives.

3.2.1 Interest groups in German forest governance

The case study of interest groups in the German forest governance landscape in research paper [1] examines the case of a whole political subsystem. Specifically, how interest groups react to changes in this system is examined.

The German forest governance system is characterized by a broad range of interest groups that differ substantially in their goals, strategies, organizational structure, and available resources. A strong dichotomy between conservation and economic interests characterized German forest governance traditionally (Hellström and Welp 1996; Mann 1998; Winkel and Sotirow 2011). Because of the diversity of the interest group landscape in forest governance, this case is particularly useful for studying how interest groups with different features within a governance system react to ongoing changes of this system. Since interest groups and sub-sections of interests groups from federal, state, and local level were considered in the interviewee selection, the case study applies an embedded multi-level perspective. This multi-level perspective allowed a comprehensive understanding of how different interest groups within one specific subsystem reacted strategically and organizationally to changes in governance structure. The findings of the case of the interest group landscape in German forest governance are also relevant for other policy sectors that are in the process of transforming to multi-level governance. The described findings on strategic and organizational adaptation of interest groups as a response to this governance transformation might also apply for other sectors. However, the generalizability of this case requires further research examining other policy sectors.

3.2.2 Informal local forest network

The second case examined, in research paper [2], was an informally organized local forest network in Lower Saxony. The network included, but was not limited to, state, municipal, and private foresters, forestry and timber companies, representatives of different recreational and environmental groups, planning and nature conservation authorities, politicians, and local renewable energy activists. These different stakeholders were asked about local decision-making processes in forest use and management and the relations and interactions of different state and non-state actors in local forest conflict governance processes.

The case of the informal forest network in the districts Uelzen and Lüchow-Dannenberg in Lower-Saxony were selected because they represent areas typically found in rural, forested regions of Germany. As a typical case, the findings may be transferable to the many comparable informal natural resource networks that exist in Germany. Furthermore, due to the close vicinity of Uelzen and Lüchow-Dannenberg to the Leuphana University Lüneburg access to the area was relatively easy, which allowed great flexibility in scheduling interviews based on the wishes of the participants.

Thus, the examined local forest network was an appropriate case for examining the dynamics in local natural resource networks. The case study helped to understand dynamics and mechanisms in local networks and illustrated socio-psychological factors that impact the functioning of networks in local forest governance.

3.2.3 A conflict in three different political-administrative units

For an in-depth analysis, a conflict case was selected to examine in three case studies the development and process of this conflict in different focus regions within and outside Germany in research papers [3] and [4]. The conflict about wind energy in forests is highly relevant for practitioners and policy makers because, in the context of energy transition, forests will be increasingly used for the realization of wind energy projects. Many participants in the expert interviews in the first empirical phase mentioned this conflict as highly relevant and argued that it will become even more important in the future. Therefore, this conflict is a typical example for a contemporary, highly relevant, multi-scale sustainability problem in forest governance, which also blurs established conflict lines.

The conflict was examined in three different political-administrative units to gain a deeper understanding of the phenomenon 'conflicts on wind energy in forests', its specific local manifestations, and implications for forest conflict governance. The three different political-administrative units consisted of the German states (Länder) Lower Saxony and Rhineland-Palatinate in Germany and the state of Maine, USA. These three regions were selected as the combination of regional case studies because they are characterized by some important similarities, but also because some important variances existed, which allowed for a reasonable comparison in terms of research interest.

The two wind energy conflict cases within Germany in Lower Saxony and Rhineland-Palatinate compared in research paper [3] constitute a case selection of complementary cases. Lower Saxony has, with only 25% of land area, a relatively low level of forest cover, Rhineland-Palatinate is one of the forest-richest states, with 42% forest cover (BWI 3 2014). Forests in Lower Saxony are predominantly privately owned, whereas in Rhineland-Palatinate, municipally owned forests have the highest share (BWI 3 2014). Lower Saxony already has the highest amount of wind energy with 5,616 installed turbines at the end of 2014 (Statistika 2015). Rhineland-Palatinate had, at the same time, only 1,472 installed turbines (Statistika 2015). Most important was the different legal situation for wind energy projects in forests. In Lower Saxony, based on the Land Use Development plan, it is only under very special circumstances legally possible to use forests for wind energy projects, which made the realization of projects impossible thus far. In contrast, Rhineland-Palatinate was the first state to begin realizing projects in forests, and the government also supports the use of forests for that purpose.

The wind energy conflict case studies in Rhineland-Palatinate, Germany and Maine, USA compared in research paper [4] constitute a selection of two similar cases. Both focus regions were located in western, democratic societies to enable a reasonable comparison. Both states are very forest-rich, and wind energy plays an increasingly important role in energy regeneration, causing conflict about forest use. Both states have an important history of forestry and timber industry but because of the economic decline of this sector, remote areas suffer from structural economic problems. Therefore in both states there is a need for economic development. Because of the remarkable forest landscapes, tourism is seen as an important economic sector, conflicting with commercial use of landscapes. In sum, the two selected regions are characterized by comparable conditions but are part of different governance systems of different countries.

3.3 Data collection and analysis

The empirical data collection of this thesis consisted of six phases:

1. **Stakeholder analysis and actor landscape mapping**
    (Basis for interviewee selection in the empirical phases 2, 4, and 5).

2. **Expert interviews at the national level in Germany**
    (Partially data basis for research paper [1]).

3. **Conflict mapping**
    (Data basis for the selection of the conflict case)

4. **Focus region I: Lower Saxony, Germany**
    (Complete data basis for research paper [2], partial data basis for research paper [3])

5. **Focus region II: Rhineland-Palatinate, Germany**
    (Partial data basis for research papers [3] and [4]

6. **Focus region III: Maine, USA**
    (Partial data basis for research paper [4])

3.3.1 Stakeholder analysis and actor landscape mapping in German forest governance

The first empirical step involved a stakeholder analysis of the German forest governance landscape. The stakeholder analysis was done to identify actor groups who are affected by, or can affect, forest governance.

First, forest-related state and non-state actors were identified based on previous studies on the German forest sector (Hellström and Welp 1996; Mann 1998; Memmler and Schraml 2008) a web search and the analysis of participation lists of forest-related events, e.g. the National Forest Program. Later on, a few additional stakeholders were added to the list based on the expert interviews.

In total, 72 forest-related state- (8) and non-state (64) organizations were identified as relevant at the national level in forest governance (Appendix 2). These 72 stakeholders were categorized into 9 groups based on their main interests in forests:

-   Forestry (10),
-   Timber industry (7),
-   Forest workers (5),
-   Environment and nature conservation (17),
-   Forest certification (3),
-   Hunting (3),
-   Recreation user (9),
-   Renewable energies (7),
-   Water (3), and
-   State-actors (8).

These stakeholders were mapped based on their main interests in forests, and conflicting interests were identified.

3.3.2 Expert interviews at the national level in Germany

The second data collection phase involved qualitative, problem-centered expert interviews. The expert interviews were conducted between September 2011 and November 2012. The aim of the expert interviews was to get an understanding of different perspectives and interests in forests and to map the forest conflict landscape in Germany in the face of energy transition and climate change.

Experts are defined as individuals with special, partially privileged access to information about a certain stakeholder groups and/or a certain subject. Therefore, experts are in possession of special knowledge, which distinguishes them from other individuals (Gläser and Laudel 2010; Meuser and Nagel 2000). Often, the expert status is related to a professional position, e.g. in a non-governmental organization or a governmental agency, but can also be based on volunteer work in interest groups or initiatives (Meuser und Nagel 2009). The interviewed experts were viewed as representatives for a group of actors with similar interests in forests (Bogner und Menz 2009a).

The previously compiled actor map served as a basis for the selection of interview participants. The expert selection was based on different perspectives and interests in forests and the goal of the interviewee selection was to consider forest stakeholder groups as different as possible (e.g. in terms of strategy, membership, level of professionalization).

The interviews were based on an interview guide (Appendix 3). During the research process a few questions were changed slightly, but the general structure and scope of the guide stayed the same. The main interview topics included: current conflicts about forest area use, the effects of energy transition and climate change on conflicts about forests, how the interviewed organizations perceive ongoing changes in forest governance, and how they strategically act and organize in forest-centered and forest-related policy processes at national, European and international level. Special focus was given to the question of which role interest groups play in decision-making. The expert interviews had the goal of identifying judgments, perceptions, and evaluations of forest conflict governance by different forest stakeholder groups.

Initially, one expert from every stakeholder group category was contacted and interviewed. Further interview participants were contacted in an iterative process, based on the recommendations for other interview participants of the initially interviewed experts, and based on the conflict groups mentioned in the first interviews. The interviews were continued until data saturation was reached, which was when no new data emerged from the latest interviews. In total, 23 experts were interviewed in 22 interviews from the national level in Germany (Appendix 4). The willingness to participate in interviews was high; only two invited organizations denied participation in an interview because of lack of time. Initially, the interview participants were contacted by mail. The interview invitation letter provided information about the content and goal of the research project. Next, the invited experts were contacted by phone to ask if they would be willing to participate in an interview and to arrange an interview appointment. Ten interviews were conducted face-to-face in the offices of the interview participants, 12 interviews were conducted as phone interviews. No differences in duration or con-

tent of the interviews conducted face-to-face or as phone interviews were noticeable. The interviews lasted between 30 minutes and two hours, with most interviews lasting approximately one hour. All interview participants agreed to the recording of the interview with an audio recorder. The interview recordings were fully transcribed. The interviews were analyzed in a qualitative content analysis (Mayring 2007). The analysis software MAXQDA was used to organize the coding of the expert interviews based on a coding manual (Appendix 15).

3.3.3 Conflict mapping

Based on the information collected in the expert interviews, forest conflicts relevant for the interviewed experts were mapped. First, text segments referring to conflicts were coded in the expert interview transcripts. In total, 112 text segments were coded referring to conflicts. These text segments were thematically clustered. In total, 40 different conflicts were mentioned by the interviewed experts. The identified conflicts were categorized into seven conflict groups:

- Conservation (includes eight conflicts, e.g. old beech forest conservation vs. use)
- Energy (includes six conflicts, e.g. wind energy in forests)
- Climate change (includes four conflicts, e.g. non-native forest species)
- Recreation (includes seven conflicts, e.g. geocaching off-road)
- Hunting (includes eight conflicts, e.g. unleaded ammunition)
- Employment in forests (includes three conflicts, e.g. minimum wage for forest worker)
- General guidelines and priorities (includes four conflicts, e.g. Forest Stewardship Council (FSC) vs. Programme for the Endorsement of Forest Certification Schemes (PEFC))

3.3.4 Focus regions

Three regional studies were conducted to understand the specific development, process, and effects of a case study conflict and its implications for forest conflict governance. In order to have comparable data, both the data collection and analysis were done in a very similar manner in each of the following focus regions:

- Lower Saxony, Germany,
- Rhineland-Palatinate, Germany, and
- Maine, USA.

Since the approach of the regional studies was the same, the applied methods for the three focus regions are presented together. First, key stakeholders, such as local forest offices, non-governmental organizations, local companies or citizen initiatives were identified based on a web search and contacted by email or mail. Further interview participants were identified based on a network sampling method (Appendixes 9 and 10 for lists of interview participants). The interviewee selection was similar in the three focus regions, but adapted to specific local circumstances. The interview participants were contacted by phone to arrange an interview appointment a few days after the initial email/mail contact by mail (Appendix 12 for an example of the contact process with the interview participants). The interview guide was similar to the one used for the expert interviews at the national level, but focused on the case study conflict wind energy in forests and was adjusted to fit local circumstances in the three

focus regions (Appendixes 5, 6, 7). The interviews in Lower Saxony were conducted in July and again between September and November 2013, the interviews in Rhineland-Palatinate were conducted in August 2013, and the interviews in Maine were conducted between September and November 2014. In Lower Saxony 24 interviews (with 24 interviewees), in Rhineland-Palatinate, 20 interviews (with 24 interviewees), and in Maine 20 interviews (with 22 interviewees) were conducted. All interview participants, except one in Rhineland-Palatinate, agreed to the recording of the interview. In the one unrecorded interview detailed notes were taken. The interviews were fully transcribed (Appendix 14 for the transcription guidelines).

The interview transcripts were analyzed in a qualitative content analysis using MAXQDA.

There are no generally accepted standards for the development of a coding manual in qualitative research. There is a controversy between different schools of qualitative research whether or not categories should be developed before starting the coding, based on theoretical knowledge or if the categories should be developed during coding based on the data material (Kelle und Kluge 2010). This thesis combined these two different approaches to qualitative data analysis so as to integrate the advantages of both methods. The interviews were analyzed based predominantly on a deductive category system, based on the theoretical background of the thesis for the research papers [1], [3], and [4]. Those categories were refined in sub-categories and additional categories were added based on inductive category development. Research paper [2] is based on an inductive approach with categories generated from the data. "Category" is hereby understood as term for the classification of objects (e.g. individuals, groups, events, etc.) which can be used for the indexing, description and explanation of data (Kelle and Kluge 2010). After coding all interviews, a synoptic analysis was conducted (Kelle und Kluge 2010). Text segments of the same category were organized in tables for a comparative analysis. Variances and types of the categories were identified. Finally, the findings for different categories were aggregated.

4 Discussion of the methodological approach

Whereas in quantitative research the quality criteria of reliability, validity, and objectivity are a generally accepted standard for the evaluation of research, no clear consensus exists in qualitative research about criteria for the evaluation of research processes (Steinke 2008).

Steinke (2008) suggests seven criteria for the evaluation of qualitative research: qualitative research should be appropriate, intersubjectively comprehensible, empirically grounded, coherent and relevant, reflect the limitations of its generalizability and the role of the researcher.

4.1 Appropriateness of research process

A qualitative approach has been applied in all four research papers. A qualitative method was selected because the research questions in the research papers are "how questions" and aimed at understanding the way individual and collective actors were thinking and behaving within specific situations. To answer these kinds of questions the choice of qualitative methods is indicated.

Qualitative interviews were the most important data for this thesis. Qualitative interviews were selected, as opposed to other qualitative methods, to gain information about the direct

experiences and perceptions of the interviewees. The interviews were also triangulated with other relevant information (documents, websites, and media sources) to gain a broad understanding of the examined cases.

The appropriateness of the selection of interview participants is a crucial point in qualitative research design that strongly affects the findings of a study (Gläser und Laudel 2010). The orientation of previous studies in the field, as done in this thesis, tends to disadvantage new actors in the field. However, due to the combination of interview partner identification and selection web and literature searching, analyzing of participant lists of forest events, and asking interview participants for other relevant actors in the field, a broad variety of stakeholders could be identified. The interviewee selection was considered to be saturated when no further relevant stakeholders were suggested by the interview participants. Thus, it can be assumed that all relevant stakeholders actively involved in the conflicts studied in the cases have been considered in the data collection.

The qualitative interviews were conducted partially as face-to-face interviews and partially as phone interviews. It was not possible to conduct all interviews as face-to-face interviews because of a lack of financial resources to travel to all interview participants in person. Literature on qualitative methods is rather critical about phone interviews, because it is argued that the interviewer has less control over the interview situation and a loss of information has to be suspected (Christmann 2009; Gläser and Laudel 2010). Those methodological concerns could not be confirmed when conducting the interviews. Even though it is not possible to compare a face-to-face interview with a phone interview with the same interview participant, the phone interviews and the face-to-face interviews could be compared in terms of length (Appendix 8) and content. The length of interviews was comparable (and their variation) and no variance in the depth of information was noticeable.

Most phone interviews were conducted in the empirical phase of the expert interviews at the national level. These experts were used to provide information about the positions of their organizations to researchers, journalists, politicians, and other interested individuals. Furthermore, no questions about the private life of the interview participants were asked, instead interviews were solely focused on the professional experiences of the interview participants. Therefore, the interview content was not considered to be sensitive, which might have required a higher level of trust building measures with the interview participants before starting the interview.

Some expert interview participants seemed to feel more comfortable with a phone interview situation. Two interview participants looked up additional information during the phone interview on the internet and on their computer, which they might not have done in a face-to-face interview at a conference table without direct access to their computer. An additional advantage of the phone interviews was the higher flexibility of meeting time and day since the interviewer did not have to travel to the interview, and some interviews were spontaneously re-scheduled to have more time for the interview. In contrast, several face-to-face interviews had to be finished after one hour when participants had to leave for another appointment. Disadvantageous of the phone interviews was the fact that the facial expressions of the interview participants were not visible. This made the reactions of interview participants about some questions more difficult to evaluate. Furthermore, it was sometimes difficult to estimate, if an

interviewee was still thinking about a question and might add additional information or if they were waiting for the next question, as was discussed by Christmann (2009).

Furthermore, it was not possible to gain an impression of the offices of the interviewed organizations, which provided additional information about the resources of the interest groups, especially for the analysis of research paper [1]. In the regional case studies only one interview was conducted as a phone interview with a participant from Lower Saxony who did not want to meet in person, for reasons that were not clear. This interview did indeed suffer from a lack of useful content. However, since the person did not seem to have a great willingness to participate in the first place, it is also unlikely that a face-to-face interview would have been better in terms of length and information content. In the overall evaluation of the mix of face-to-face interviews with phone interviews in the data collection, this approach is evaluated as unproblematic for the reliability of the collected data based on the aforementioned reasons. Even though phone interviews have some disadvantages compared to face-to-face interviews, they also have some advantages, and the amount of interviews conducted would have been lower if only the face-to-face interviews were conducted. Sufficient data saturation could only be reached with the inclusion of the phone interviews, which is seen as more important for the quality of the collected data than an unlikely possibility of a data bias based on the mix of those face-to-face and phone interviews.

The interviews have been analyzed using a qualitative content analysis (Mayring 2007). This type of interview analysis has been selected for several reasons. Qualitative content analysis allows for an explorative indexing of the data material. At the same time, a systematic approach is ensured. Furthermore, due to the high amount of interviews and transcript pages, a more time-consuming method of analysis, such as hermeneutic techniques, would not have been possible due to limited time resources in the research process. Thus, it is assumed that under consideration of the research goals and the available resources the choice of qualitative content analysis constitutes the best available analysis option.

The effect of choosing computer-supported data analysis versus analysis without technical support and the choice of a specific program (for example NVivo, MAXQDA, ATLAS/ti) has been discussed in the methods literature (Kuckartz 2006). However, concerns about the effects of using MAXQDA could not be confirmed since the program only provides support for organizing data material, the analysis still needs to be done by a researcher. For the analyzing researcher, it is easier to keep the overview of all relevant transcript segments if a software program helps to organize them. Therefore, the likelihood of missing a relevant text segment is higher without a software program for qualitative analysis. Furthermore, it is easier for others to retrace the conclusions of the analyzer if the data is organized by a software program. Thus, computer-supported data analysis of qualitative data can help to increase the transparency of qualitative research.

4.2 Intersubjectively comprehensible

In order to make research findings intersubjectively comprehensible, a careful documentation of the research process is necessary. Important elements of the research processes have been documented and are available in the appendices of this thesis (e.g. the interview guides, overviews of the interview participant selection, transcription guidelines). The research process

followed the suggestions of methods literature on qualitative research (Bogner and Menz 2009a; Bogner and Menz 2009b; Gläser and Laudel 2010; Glesne 2006; Kelle and Kluge 2010; Mayring 2007) to make the applied methods intersubjectively comprehensible. Interview analysis and coding in groups is recommended to improve the quality of qualitative data analysis (Steinke 2008). This suggestion could not be followed because the author of this thesis was the only researcher on this topic. Coding by others and testing the intercoder reliability would have been a potential method for improving the quality of this thesis further.

Most of the interviews were conducted in German, but the findings were presented in English papers. Therefore, a translation of the quotes used was necessary. The validity of the translated interview quotes has been ensured by a re-translation of the translated quotes in German. The translation has been done by the author, and these translations were proof-read and corrected by an English native speaker. In some cases, especially when colloquial language had been translated, the translations were also discussed with the proof-reading English native speakers. A German native speaker with very good English skills with no knowledge of the original transcripts or any other details about the interviews or interview participants conducted the re-translation. The re-translations were compared to the original transcript segments. In cases of variances in meaning, the translation was changed, and again re-translated to ensure the validity of the translation. However, the re-translations differed slightly in word choice from the original transcript segments (Table 2). This is evaluated as unimportant since the purpose of this translation process was to ensure that the meaning is maintained.

Table 2: Examples for translation validation of quotes

Original transcript segment	Translation	Re-translation
Föderalismus ist ein großes Thema, dass immer wieder zu Problemen führt. Ich denke schon, dass es sinnvoll wäre, wenn zumindest auch Bundesebene, von der Bundesregierung oder vom Parlament klare Leitlinien vorgegeben werden. Weil es ist ja auf Landesebene auch die Situation, dass jedes Land macht, was es will. […] Wo dann letzten Endes zu viel und zu unkoordiniert gemacht wird.	Federalism is a big issue that always leads to problems. I do think that it would be reasonable if at least the federal level, the Federal Government or Parliament would give clear guidance. Because at the state level, it is the situation that each state does what it wants. [...] Where then ultimately too much is done and far too uncoordinated.	Föderalismus ist eine wichtige Angelegenheit die immer zu Problemen führt. Ich glaube, dass es angemessen wäre, wenn wenigstens auf Bundesebene also die Bundesregierung oder der Bundesrat klare Vorgaben machen würden – denn, auf Landesebene ist die Situation so, dass jedes Land tut was es will. Dort wird dann letztendlich zu viel zu unkoordiniert getan.
Also alles was jetzt den Artenschutz anbelangt, das kann man halt nicht in Verbandsgemeindegebieten betrachten. Also gerade wenn das mobile Arten	Everything concerning the protection of species cannot be considered at the local scale. Especially if it is a mobile species, as bats and birds,	Alles, was den Artenschutz angeht, kann nicht auf lokaler Ebene betrachtet werden. Vor allem wenn es eine wandernde Spezies, wie Fle-

sind, wie nun mal Fleder-mäuse und Vögel sind, also dann muss man einfach den übergeordneten Blick haben und sehen wo sind Haupt-vorkommen, wo sind die Hauptzugvogellinien.	then you just have to have the bigger perspec-tive. Check main occur-rences, check where the main migratory lines are.	dermäuse oder Vögel sind. Dann muss man einfach die größere Per-spektive haben. Überprü-fe Hauptvorkommen, überprüfe wo die Haupt-zuglinien sind.

In qualitative research, the validity of translated data material is a critical issue. Even a small inaccuracy in the translation can change the meaning of the statement of the interview partici-pant. Even if the data translation is done with a very high accuracy, the meaning of the inter-view quote can become slightly changed. For example, this change in meaning can be based on the facts that for some expressions a direct translation might not exist, or because of some cultural meaning and ways of communicating, which are distracted by verbatim translation. Even though research findings based on qualitative data in languages other than English are increasingly published in English, the issue of the validity of translated data material is rarely openly addressed. No clear practice has been developed in international publications to specif-ically address this issue. International journals with strict word limits do not often give the opportunity to present data in the original language in addition to the translated interview quotes. However, changing practices could enhance the transparency and credibility of quali-tative research.

4.3 Empirical grounding

The empirical foundation, or the empirical grounding, of the developed or tested theories should be ensured in qualitative research. The findings of this thesis are based on 86 qualita-tive interviews with 93 interviewees and triangulation of other relevant data sources, such as governmental documents, websites, and media sources. Data saturation was reached by con-tacting further interviewees until no further stakeholder types were suggested by the inter-viewees. By considering interviewees with diverse backgrounds, interests, and perspectives the formation of the theoretical model and types is based on a large variety of interview data. Furthermore, the different cases shed light on the examined phenomena from different per-spectives and ensure a comprehensive empirical grounding for the developed conclusions on actor behavior in complex multi-level governance systems. The contribution to theory devel-opment is discussed in further detail in sections 5 and 6 of this framework paper.

4.4 Coherence

Coherence of findings is another important aspect of evaluating qualitative research. The cri-teria of coherence evaluates if findings and theory developed during the research process are internally consistent (Steinke 2008). The application of a multiple-cases embedded case study design allowed a comprehensive perspective on the studied phenomenon. The findings of the different cases and within cases were coherent to a very high degree. Findings of the first case study on interest group behavior in a changing forest governance landscape could be con-firmed in the case studies on wind energy conflicts in forests, particularly in the typology on actor behavior in research paper [4]. The findings on the relation of trust and conflict in re-search paper [2] were also confirmed by the interviews in Rhineland-Palatinate and Maine.

Even though the complex relationship of trust and conflict has not been analyzed systematically in the cases Rhineland-Palatinate and Maine, the interviews indicated that identified mechanisms were also relevant in these cases. The different perspectives on wind energy conflicts identified in research paper [3] were also confirmed by the interviews conducted in Maine. The frames of the interviewees on wind energy in the interviews conducted in Maine were not systematically analyzed, but the different identified perspectives seemed to also be relevant for the conflict structure in Maine.

4.5 Relevance

This thesis examined a timely topic, forest conflicts in the face of energy transition and climate change. The findings of thesis are relevant for practitioners, policy makers, and multi-level governance scholars. The practical and theoretical implications of the findings are presented in the sections 5 and 6.

4.6 Limitations

Since this thesis is based solely on qualitative data, the generalizability of the findings is limited. Further studies with more cases in different contexts or quantitative studies could verify the findings, and evaluate under which conditions the identified processes, mechanisms, and factors also apply to other cases.

An important aspect influencing the research design was the aspect of what was possible based on available resources and conditions of the funding. Particularly, the case selection was to a large extent based on conditions of the incubator funding (geographic limitations) and also the choice of Maine, USA as an international case study, was based on what was possible rather than on the question of what would be the best international case study choice of all potential international case studies in the world. However, even though this thesis faced constraints based on these contextual factors, the choice and combination of cases still allowed a comprehensive analysis of the phenomenon studied.

Further specific limitations of each research paper are discussed within the manuscripts and publications.

4.7 Researcher's role

Since qualitative interviews are a form of social interaction, the interviewer influences the research process. It can be assumed that the level of detail and depth in which the interview participants shared their experiences and perceptions were impacted to a certain extent by the person of the interviewer, for example by the degree of interpersonal skills of the interviewer. In the literature different factors are mentioned, which can impact the answers of the participant. Most of those factors are outside of the control of the interviewer (Abel and Behrens 2009). Two factors related to the interviewer are emphasized in the literature as having an important impact on the answers of the participant: the relation of status and gender between interviewer and interviewee because they may impact the perception of competence of the interviewer by the interview participant (Meuser and Nagel 2009). Furthermore, in the international case study the interviewer's role as a foreigner might have impacted the answers of the interview participants.

It is very difficult to estimate the effect of those factors and the effect of the interviewer on the research process since no other interviewers were involved in the process of data collection, which would allow a comparison of data collected by different interviewers. However, it can be assumed that at least some of the interview participant's answers would have varied slightly if an interviewer with very different characteristics would have conducted the interviews. Further influence of the researcher on the research process can be assumed in the data analysis. The interviews have been recorded and fully transcribed, which allowed an analysis that was independent of the memories of the interviewer. The coding of the interview transcripts and the data aggregation within the analysis process are other critical aspects where the researcher could potentially influence the research process. As previously discussed, the coding and analysis in a team could have helped to estimate the effects of the researcher on the analysis and interpretation of the data.

5 Results and theoretical discussion

5.1 How energy transition and climate change influence forest governance

Conflict landscapes in different political subsystems are not static but change dynamically over time. Nevertheless, forest conflict landscapes are characterized by very slow changes and long-term trends. Based on the expert interviews, 40 conflicts were identified constituting the current forest conflict landscape in Germany (Table 3). The general conflict lines characterizing the forest conflict landscape are mostly similar to previous studies on conflict landscapes in Germany (Hellström and Welp 1996; Mann 1998). However, climate change and energy transition are new elements in the forest conflict landscape, fundamentally changing dynamics between actors in this system. The mapping of the current forest landscape showed that climate protection and energy production are seen as new, respectively renewed, functions of forests, in addition to other social, economic, and ecologic functions. These new functions partially align and partially conflict with other forest functions. This changed conflict landscape was described similarly by interview participants at both the national and state level in Lower Saxony and Rhineland-Palatinate, and in the local forest network examined within Lower Saxony. Climate change and energy transition influence the forest conflict landscape in four ways: as cause of new conflicts, as new arguments in old conflicts, as a cause of new actors entering forest networks, and as a cause of changed actor and interest constellations in forest governance.

First, the new interests related to climate change and energy transition were causing new conflicts; for example, about the best adaptation strategies to prepare for changes in climatic conditions, or about the construction of wind turbines in forests as illustrated in research paper [3] and research paper [4]. The relevance of this new type of forest conflict has already been described as highly relevant in previous forest policy literature (Liebal and Weber 2013). The intensity of the local manifestations of these new conflicts were likely to be related to pre-existing factors and conditions in local forest governance as illustrated in research paper [2]. The findings of research paper [2] indicate that in regions with high trust levels new conflicts are less likely to escalate.

Second, climate change and energy transition are used as arguments in already existing conflicts, for example in conflicts about non-native species. Proponents of non-native species argue that under changing climatic conditions it would be necessary to increase the share of Douglas fir in stands to ensure timber production. Contrarily, opponents of non-native species argued that under changing climatic conditions it would be even more important to lean towards natural tree species compositions because the natural vegetation would have the best adaptive capacities to deal with changing growing conditions. Therefore, the assumed changes in circumstances of forest management in the face of climate change and energy transition resulted in the reemergence of old conflicts. This refreshment could be observed at the national level in the discourse between lobbyists representing different interests in forests, but also at the local level in concrete manifestations of conflicts.

Third, new actors were entering forest governance with new interests in forests related to energy transition and climate change, for example wind energy companies and climate change mitigation NGOs. These new actors were changing the established actor landscape in forest governance and modified existing power and actor constellations. As shown in research paper [1], new actors in forest governance were an important driving force for further fragmentation of forest governance. The change of actor constellations beginning in the 1980s, with an increasing involvement of actors with conservational interests, contributed to the multi-level character of forest governance (Hellström and Welp 1996; Humphreys 2004; Mann 1998; Weber et al. 2000). Further changes in actor constellations because of these new actors related to climate change and energy transition also contribute to further fragmentation of forest governance. Furthermore, as illustrated in research paper [2], changes in actor constellations in established forest networks can impact the trust levels between different stakeholders. Therefore, new actor constellations can increase the likelihood of conflicts during a certain period of network reconfiguration. Research papers [3] and [4] illustrate examples of new conflicts related to new actors (specifically wind energy companies) with new interests in forests.

Fourth, new interest coalitions and conflict lines have been developed between actors with previously contradicting or shared interests based on new conflicts and interests related to energy transition and climate change. For example, conservation groups and paper mill interest groups campaigned together against the energetic use of wood. Another example for changed actor constellations were nature conservation and environmental protection groups which had previously collaborated, but became opponents in conflicts over wind energy in forests because of the conflicting priorities of climate change mitigation and nature conservation as illustrated in research paper [3].

Table 3: Conflicts mentioned by experts

Conflict category	Conflict	Mentioned by [Interviewee acronyms]	Sum
General guidelines	Multifunctional forest use vs. segregation	E2, E4, E5/E6, E7, E8, E12, E18, E19	9
	Deliberation between conservational, economical, and recreational inter-ests/meaning of "sustainable forestry"	E2, E4, E7, E8, E11, E12, E13, E14, E17, E18, E19, E21	12
	FSC vs. PEFC	E15, E19	2
	Owner vs. Society: Who should decide?	E14, E18	2
Conservation	Non-use to allow natural development of forests vs. sustainable harvesting	E1, E2, E4, E5/E6, E7, E8, E15, E16, E17, E18, E19, E23	13
	Implementation of Natura-2000	E2, E16	2
	Non-native tree species	E2, E5/E6, E8, E14, E18, E19	7
	Genetic modified tree species	E3, E8	2
	Forest conversion towards more natural ecosystem types versus plantation of eco-nomically most beneficial tree species	E5/E6, E7, E8, E14, E16, E17, E18, E19, E23	10
	Introduction of legally binding „Best practice" recommendations	E8, E15	2
	Amount of deadwood to leave during timber harvest	E8, E17	2
	Protection of old growth beech forests	E12, E15, E17, E19	4
Energy transition	Material vs. energetic wood use	E1, E2, E5/E6, E13, E14, E17	7
	Subsidization of energetically used woods	E5/E6, E14, E17	4
	Intensification of harvesting measures versus nature conservation	E1, E8, E12, E17	4
	Wind energy projects in forests vs. recrea-tion and conservation	E2, E4, E15, E17, E18, E20	6
	Expansion of power grids above forests	E10, E15, E16, E18, E23	5
	Gas pipeline construction through forests	E22	1
Climate change	Most effective climate mitigation measures in silviculture	E2, E11, E12, E14	4
	Financial compensation for owner for climate change mitigation services of forests	E7	1

	Reduction of game densities to allow natural climate adaptation	E2, E8, E21	3
	Best climate adaptation strategy	E5/E6, E7, E8, E14, E16 E17, E18, E23	9
Recreation	Increased/changed interests of recreational users vs. conservation and use	E2, E19	2
	Scenery and landscapes vs. economic interests	E15, E19	2
	Motor cross	E2	1
	Horse riding	E2, E22	2
	Mountain biking	E22	1
	Geocaching	E2, E15	2
	Costs of obligation of forest owners to safeguard forests for hazards of recreational users	E2, E18	2
Hunting	Browsing damages versus economic and ecological interests	E2, E3, E4, E7, E8, E12, E15, E16, E17, E21, E23	11
	Unlimited rambling of red deer	E21	1
	Lead-free ammunition	E14	1
	Hunting technique/trap hunting	E16, E21	2
	Hunting management plans	E16, E21	2
	Interests of forest owner and minimum periods for hunting tenures vs. interests of hunters and their autonomy	E16, E21	2
	Discussed changes in state and federal hunting laws	E16, E21	2
	Horse riders vs. hunters	E22	1
Work in forests	Dead wood vs. job safety of forest workers	E1	1
	Work in forestry versus non-use for conservational purposes	E2, E4	2
	Minimum wages for forest workers	E13	1

The spatial scale of discourses on forest conflicts was fundamentally changed by climate change and energy transition. Forest conflicts received a fundamentally new dynamic based on international processes and global interdependencies. The global problem of climate change contributed to a globalization process of the governance of the forest conflict landscape in Germany. This globalization of forest conflict governance also becomes apparent in the increasingly fragmented forest governance landscape dispersed on a diversity of vertical and functional levels as discussed in research paper [1]. Climate and energy policies are new functional levels for forest-related decision-making. Therefore, the discourse on climate change and the goal of energy transition are additional driving forces of the shift towards mul-

ti-level forest governance and contribute to further fragmentation of forest policy as illustrated in research paper [1].

5.2 Actor perceptions and actor behavior

This thesis shows how actors involved in forest conflicts within a multi-level governance system perceive this multi-level, polycentric system. Research paper [1] provides evidence that many interest groups active in the German forest governance landscape feel overwhelmed in their attempt to understand and observe every level of action at the same time within the complex, fragmented, multi-level system. Research paper [3] illustrates that level preferences for decision-making in conflicts within multi-level systems can be related to different perceptions or frames of an issue. Different levels within a multi-level governance system are associated with different functions, strengths, and weaknesses by stakeholders. The empirical findings show that scale choice is often a normative decision. Often, no objective "best" decision-making level exists, instead, different levels are perceived as the most suited governance level by stakeholders with conflicting interests, based on conflicting problem perceptions indicating different scales of action. Research paper [4] illustrates how actors think about polycentric, multi-level governance systems. Generally, most actors had a positive attitude towards multi-level governance systems. However, it was also criticized that complex governance systems tend to be chaotic and less efficient in decision-making. Furthermore, it is illustrated in research paper [4] in greater depth, which strengths and weaknesses are associated with different levels within multi-level systems. Research paper [4] shows that actors in different polycentric governance settings share the same perceptions of the features of different decision-making levels within a multi-level governance system. Local levels were considered to be better in considering local wishes, needs, and knowledge and at enabling a high degree of participation of those directly affected. Higher levels were considered to be better in considering long-term and large-scale effects and in sufficiently taking non-economic interests into account. Furthermore, research paper [4] shows that level preferences and level choice within multi-level systems are also related to a tradition and culture of decision-making. Research paper [4] provides evidence that multi-level, polycentric governance systems were generally perceived as having a high degree of legitimacy in the minds of stakeholders.

This thesis shows that different competing, overlapping, and nested decision-making levels were considered as an opportunity for interest realization by some actors; others felt helpless and overwhelmed in complex, multi-level systems. Actors apply different strategies to organize and realize their interests within multi-level governance systems. This thesis confirms that non-state actors have an important function in linking processes and ideas from different levels (Espinosa-Romero et al. 2014). Particularly in the context of studies on the transition towards renewable energy the importance of considering the roles and the behavior of actors has been emphasized (Blanchet 2015; Howard 2015; Kern and Smith 2008; Mattes et al. 2015). Therefore, the findings of this thesis on actor behavior in multi-level governance constitute a valuable contribution to the research field.

Specifically, research paper [1] shows how interest groups responded strategically and organizationally to recent changes in the overall forest governance landscape. Different coping strategies among interest groups organized on multiple levels, and interest groups

organized on a single organizational level were observed. Particularly interest groups organized on a single organizational level took advantage of venue shopping opportunities (Baumgartner and Jones 1993) within the multi-level character of forest governance. Interest groups organized at multiple levels tended rather to adapt their organizational structure to new venues such as the EU. The challenges and opportunities of interest groups lobbying in a changed forest governance landscape have been discussed in previous literature (Bjärstig, 2013; Hogl, 2000; Roose 2003; Weber and Christophersen 2002). The findings of these previous studies were confirmed, and the knowledge of the responses of interest groups to changes in their policy field was able to be further developed. Specifically, the importance of learning processes of actors in multi-level systems was confirmed (Pralle 2003). Research paper [3] illustrates how actors involved in multi-scale conflicts about wind energy projects in forests apply different rescaling strategies to change the level of decision-making (Table 4). Up-scaling, down-scaling, and fit-rescaling strategies have been described previously in the literature (Oates 2002; Young 2002) and could be observed in the conflict about wind energy in forests in the German states of Lower Saxony and Rhineland-Palatinate.

Table 4: Re-scaling strategies

Re-scaling type	Definition
Up-scaling	Shift of decision-making power at a higher governance level, e.g. from the community level to the state level. (Oates 2002)
Down-scaling	Shift of decision-making power at a lower governance level, e.g. from the national level to the district level. (Oates 2002)
Fit re-scaling	Shift of decision-making power from a political-administrative unit to a bio-geophysical unit, e.g. from state level to the spatial scope of a certain forest ecosystem. (Young 2002)

Research paper [4] confirms the findings of the research papers [1] and [3] and proposes an actor typology that describes actor behavior within polycentric, multi-level and multi-scale systems. Six different actor types of conflict participants in polycentric conflict governance systems were identified: the Linker, the Creator, the Maintainer, the Power Shifter, the Mobile Learner, and the Overwhelmed & Passive (Table 5).

Table 5: Actor types in polycentric, multi-level and multi-scale governance systems

Actor type	Description of actor type
Linker	This actor type has a complex role in polycentric governance processes by linking decision-making arenas at different levels with each other. These actors link processes by advocating certain interests over several layers of decision-making arenas or by transferring ideas from the local level to a higher level or vice versa.
Creator	Someone who creates new decision-making arenas within existing governance systems and therefore makes the governance system more polycentric. The creation of new decision-making arenas is often motivated by the wish to solve a problem by developing a more suitable decision-making arena than the pre-existing ones.
Maintainer	This actor type tries to maintain existing governance structures. This actor type is often motivated by power considerations because s/he would lose some or all power to a newly created decision-making arena. This type is often a state-actor who is actively involved in the design and maintenance of conflict governance structures, but also non-state actors can be arena Maintainers if they strengthen and support existing power allocations.
Power Shifter	This actor type tries to change the distribution of power between decision-making arenas at different levels. Power Shifters can be active when they have the legal position to re-direct decision-making power. But this actor type can also be a passive Power Shifter who advocates in favor of a re-allocation of power to other decision-making arenas without having the power to actually change the power distribution between different decision-making arenas.
Mobile Learner	Usually a non-state actor who advocates his or her interests in different decision-making arenas at different levels; for example, a local citizen initiative. During a conflict process, the Mobile Learner continuously increases knowledge about the functioning of different arenas, e.g. courts, local planning boards, or state level decision-making. In a learning-by-doing behavior, this actor tries every available arena to realize interests and moves between different arenas in its actions. The Mobile Learner adapts to polycentric conflict governance systems and sees advantages in the multi-level nature of conflict decision-making arenas. If advocacy in one arena is not successful s/he can try again another competing or complementing arena.
Overwhelmed & Passive	Usually a non-state actor who has a strong interest in a conflict but does not possess the knowledge or other resources (e.g. time, money) to become actively involved in decision-making processes. This actor type has usually a very negative attitude about polycentric conflict governance because the complexity of these structures makes it impossible for this actor to actively participate in decision-making processes about controversial issues.

5.3 Applicability and limitations of used approaches to explain conflicts

This thesis illustrates the value of multi-level governance and related theoretical approaches for the analysis of forest conflicts and their governance. As illustrated above, climate change and energy transition cause further fragmentation of forest governance and make forest governance more multi-level, create additional venue-shopping opportunities and bring new actors into forest governance, causing new power constellations in the policy field. Level choice and the relation of state and non-state actors in decision-making are important aspects of conflict governance, thus the theoretical approach yielded valuable insights in forest conflicts and the importance of scale construction in conflict discourses could be illustrated.

Research paper [1] confirmed the assumption of the reconfiguration process in forest governance (Edwards and Kleinschmit 2013; Giessen 2013), which can be conceptualized as a shift towards multi-level governance. Furthermore, research paper [1] discusses the increasing importance of non-state actors in forest-related decision-making, which is seen as a central element of multi-level governance. Additionally, research paper [2] focuses on the relation of state and non-state actors in decision-making about conflicting interests in forest use and management at a local level. State and non-state actors are organized in informal forest networks at the local level. For the successful management and avoidance of forest conflicts in those networks, participatory decision-making modes were identified as important factor.

The distribution of responsibilities between different decision-making levels in multi-level governance systems is an important issue (Benson and Jordan 2010; Dore and Lebel 2010, Koontz 2002; Moss and Newig 2010; Oates 2002). Research paper [3] focuses on the reasons for conflict over specific ways of power allocation between levels within multi-level governance systems. Thereby, research paper [3] illustrates the importance of discourses and negotiating processes between different state and non-state actors over the most appropriate level for decision-making about wind energy conflicts in forests.

Particularly in the research field of human geography, the discursive nature of scale construction has been emphasized (Delaney and Leitner 1997; Hüesker and Moss 2015). Research paper [3] illustrates the importance of scale construction and rescaling processes in conflict discourses in multi-level governance systems. Research paper [4] shows how stakeholders of two different polycentric governance settings perceive polycentric governance systems. The understanding of polycentric governance was thus oriented toward the understanding of multi-level governance according to the notions of Hooghe and Marks (2003).

This thesis illustrates the value of theories that focus on a dispersion of decision-making over several levels for the analysis of forest conflicts and their governance. However, multi-level governance and related theories have their limits for the explanation of forest conflict governance processes because some important factors cannot be captured with this approach.

Social-psychological factors as presented in research paper [2] and problem frames as discussed in research paper [3] turned out to be quite important for the understanding of conflict

development and governance. Especially at a local level, individual action and the relations between individuals turned out to be crucial for the understanding of conflict processes and set the preconditions for conflict governance. Concepts such as trust or frames are not explicitly considered as important factors in those theoretical approaches and can therefore not sufficiently be captured with the analytical perspective of multi-level governance and related approaches. Other concepts need to be applied as helping theoretical concepts in order to explain some important factors, which cannot analytically be captured within these frameworks. Furthermore, the approach of multi-level governance does not offer any predictions about future trends or developments. Thus, the approach is rather useful as analytical framework and perspective of past and current events.

6 Conclusions and outlook

6.1 Recommendations for practitioners and policy makers

The findings of this thesis can help practitioners in natural resource, energy and environmental management, such as policy makers, members of administration and interests groups, to better understand causes and development of existing and potential conflicts between different stakeholders. This understanding can help to manage conflicts more successfully. Wind energy conflicts have some unique characteristics, but are also similar to other energy conflicts and share general mechanisms with all natural resource and environmental conflicts. Therefore, the findings of this thesis are widely applicable in natural resource, energy, and environmental management. Furthermore, the practical implications of the findings can help policy makers to design natural resource, energy and environmental policies more successfully. In the following, ten recommendations are listed which sum up the practical applications of the findings of this thesis.

1. Consider actor constellations in participation processes at different vertical levels

This thesis has shown that not every kind of interest has the same representation and influence at every decision-making point. Decision-making based on participatory processes needs to take these different actor constellations at different levels into account. A stakeholder participation process at municipality, state, national, or European Union level will consist of very different stakeholders. This also implies that participatory decisions made at a certain governance level cannot simply be transferred to another higher or lower level. The needs and wishes of stakeholders at that higher or lower level might differ substantially from the wishes and needs of those who were involved in the decision-making. Decisions with an impact on different levels need to consider the wishes, needs and concerns of stakeholders from all impacted levels in order to avoid later conflicts with stakeholder groups which were not considered sufficiently in the decision-making process.

2. *Consider that not every actor will react the same way to a certain method of decision-making*

This thesis has shown that any given natural resource, energy, and environmental governance setting can be perceived very differently by different stakeholders and stakeholder groups. Meanwhile, at least some stakeholders will usually be satisfied with the way decision-making is organized, while others will disagree. This disagreement with the way decisions are made can be based on the feeling that the governance system is too complicated, or the impression that there is not an opportunity to participate in decision-making in a meaningful way. A governance design that fits every stakeholder probably does not exist. However, awareness for different types of stakeholder perceptions and reactions to the way decisions are made is an important first step to improve decision-making. The actor typology proposed in research paper [4] can help politicians to understand how different actors might deal with a certain governance setting. Disadvantaged actors, such as the "Overwhelmed & Passive" actor of the proposed typology could be supported by special services, such as a "Stakeholder Agency" that could be established at regional level, to inform and council stakeholders as an independent third party in natural resource, energy and environmental management decisions. However, to ensure financing and independence from third party interests of such an institution would be challenging.

3. *Consider different priorities at different vertical and functional levels*

Decision-makers at different decision-making points at different levels tend to have diverse goals and priorities. This is a challenge especially in the governance of complex multi-scale problems, which require actions from decision-makers at different levels. A first step in dealing with this challenge could be to make different goals and priorities transparent for everyone involved in or affected by the decisions being made (see 6). If a better understanding of different goal dimensions is realized, it might be easier to find compromises about different decision-making points. However, this will always remain a challenge and enough time should be planned in project timelines to deal with this challenge. Otherwise, a later escalation of conflicts based on these different goal dimensions of stakeholders from different levels is likely.

4. *Try to understand the conflict frames of stakeholders involved in environmental conflict*

This thesis has illustrated that a conflict over wind energy in forests can be about a lot of different things at the same time (e.g., the protection of global climate, the economic development of the village, the scenery of a mountain popular among recreationists, or the protection of a rare bat species). The awareness that different conflict participants can have different understandings of what a conflict is actually about is important for finding the right communication strategies in conflict management approaches. A first step for increasing the understanding of different conflict frames between involved conflict participants, conflict managers, and decision-makers could be very clear and transparent communication among all affected parties about how they view the conflict and how they frame it. Different communication arenas need to be established, taking different communication preferences of

diverse stakeholders into account (see 6.).

5. *Distinguish between normative, interest and factual arguments in environmental conflict*

Classic studies on conflict have already recommended differentiating between types of conflicts and different types of arguments within these conflicts, namely value and interest conflicts (Aubert 1963). This thesis has confirmed the importance of distinguishing between value and interest dimensions in environmental conflict. Furthermore, factual dimensions have also played an important role, for example about whether or not climate change exists, how many bats and birds are actually getting killed by wind energy, how much nuisance is factually caused by turbines, if neighboring properties lose value because of wind energy projects, and if wind energy makes a region less attractive for tourism.

Value, interest, and factual dimensions in environmental and energy conflicts need to be addressed in different ways. Solving factual conflicts lies in the interest of the overall society and therefore needs to be supported by enhancing research and the development of adequate monitoring techniques. If factual conflicts can be solved, it will also be easier to find compromises for interest conflicts. For example, if the local residents of a planned wind energy project are mostly against the project because they are concerned about the value loss of their property, some financial compensation could substantially help to de-escalate the conflict. Value conflicts are the most difficult to approach, and this type of conflict often remains unresolved. Typically, value conflicts are related to different conflict frames (see 4.). Therefore, enhancing communication between different stakeholders can be an important first step in managing value-related conflicts. Furthermore, to influence the formation of values and the willingness to tolerate the values of others, it is important to approach value conflicts in the long-term. Value formation and attitudes towards other values are formed early in life and are difficult to change in the later stages of life. However, since most natural resource, energy and environmental conflicts are long-term problems, it is worth investing in long-term measures to tackle them. Therefore, education and outreach is an important recommendation as the findings of research paper [2] indicate the importance of education for value formation (see 9.).

6. *Enhance communication between different stakeholders*

Enabling communication between different stakeholders is important for increasing mutual understanding in order to find compromises between different interests. However, different stakeholders have different ways of communicating and different preferences for communicating their concerns and ideas. Therefore, different communication options are needed in natural resource, energy and environmental governance. These communication arenas could be, for example, physical, such as round table meetings, virtual, such as blogs, forums and other online and multimedia tools, or printed, such as discussion pages in the local newspaper. Furthermore, it is necessary to organize the exchange of concerns and ideas expressed in these different communication spheres. This exchange needs to be organized by decision-makers or facilitators in order to allow all involved parties to get a broader understanding of the discussed issue.

7. Increase transparency in decision-making

This thesis has shown that a lack of transparency in decision-making can be a major cause of conflict in natural resource, energy and environmental governance. In some of the cases examined, conflicts escalated to a large extent because of the way the decision was made, not only over the decision itself. In particular, when stakeholders had the feeling that secrets were kept because the way decisions were being made was not transparent, conflicts were likely to develop or escalate. Therefore, decisions in natural resource, energy and environmental governance should be made as transparently as possible to increase their acceptance, independent from the actual outcome of a decision.

8. Find new, innovative ways of balancing costs and benefits of controversial decisions

New problems might often require new solutions and new ways of thinking about integrating different wishes and needs. These new solutions can be based on the development of new forms of governance, for example, local self-governance mechanisms in the forms of 'solidarity pacts' as they were developed in Prüm or Rheinböllen in Rhineland-Palatinate. However, new solutions can also be based on innovative forms of sharing costs and benefits of controversial decisions in natural resource, energy or environmental management. Conflicts about renewable energy projects can be reduced if residents benefit from the project as well, instead of only seeing and maybe hearing them. These benefits can be, for example, the financing of community facilities which could not exist without financial support, such as public pools, music schools or better child-care facilities as was done in some the cases examined. Additionally, incentives such as free or cheaper electricity for households that can see the projects from their homes could offer a way of sharing cost and benefits in a way that is perceived as fair by residents. Conflicts with nature conservation can be reduced if some parts of the financial profits of the projects are used to improve species and habitat protection at other places.

9. Invest in outreach and education

This thesis has shown that values and attitudes play an important role in natural resource, energy and environmental conflicts. For example, most people accept highways, even though they are noisy, ugly, and smelly, as parts of cities and landscapes. Highways are widely accepted because the opportunity for fast, individual transportation by car is evaluated as so important that the disadvantages of highways are tolerated. This high level of acceptance is based on values related to individual mobility, which developed over many decades. Decentralized energy generation is, although nothing new compared to last centuries, a relatively new phenomenon for people currently living. Acceptance and values related to renewable energies need time to form within the population. As illustrated in the case of the local forest network in research paper [2] and in the cases about wind energy conflicts in forests illustrated in the research papers [3] and [4], values play an important role in forest conflicts related to climate change and energy transition. Therefore, outreach and education is important for changing values and attitudes about renewable energies and their impacts.

10. Apply trust building measures in local informally organized networks

In order to reduce natural resource, energy, or environmental conflicts between different stakeholders at the local level, the findings of this thesis imply that more emphasis should be given to trust building measures in informally organized natural resource networks. Sources of trust were already outlined and recommended in some of the points above. However, this thesis has shown that the relationship between trust and conflict is dynamic, and trust levels between different stakeholders can change over time. Therefore, it is important to work on trust between stakeholders in local networks continuously by applying trust building measures, such as communication, participation, transparency, or community outreach. This might be, for example, forest days where the general public is invited to learn more about forest management, invitation of school classes to learn more about forest use by working in forests for a week, or information and round table events to inform and discuss management decisions with stakeholders.

6.2 Conclusions

This thesis aimed to provide empirical insights about how forest conflicts, in the face of energy transition and climate change, impact forest conflict landscapes in different parts of Germany, and in other regions of the world. Specifically, how energy transition and the discourse about climate change impact on the multi-level governance of forest conflicts in Germany has been examined. Climate change and energy transition are new elements in the forest conflict landscape, fundamentally changing dynamics in this system. The mapping of the current forest landscape has shown that climate protection and energy production are seen as new, respectively renewed functions forests, in addition to other social, economic, and ecologic functions. These new functions partially align and partially conflict with other forest functions. Climate change and energy transition influence the forest conflict landscape in four ways: as cause of new conflicts, as new arguments within old conflicts, as cause of new actors entering forest networks, and as cause of changed actor and interest constellations in forest governance. This thesis has confirmed that changing circumstances of land use can bring new stakeholders in forest networks and can change actor constellations in forest policies (Beland Lindahl and Westholm 2012). These dynamics in actor constellations change existing conflict landscapes, power constellations and preconditions for conflict governance. Furthermore, climate change and energy transition cause further fragmentation of forest governance. Forest governance is currently in a reconfiguration process, which can be conceptualized as a shift towards multi-level governance.

In order to contribute to the understanding of actor perceptions within multi-level governance systems, this thesis examines how actors involved in conflicts perceive different decision-making levels of forest governance. Actors associate different levels with different functions, strengths, and weaknesses. Local decision-making levels are considered to be better in considering local wishes and needs, and allow participation of those who are most affected in the decision-making process. Higher decision-making levels are considered to be better in considering cross-scale interactions and realizing strategic long-term goals. The perceptions of appropriate level choice can be based on frames. Therefore, conflicts over the most

appropriate level for decision-making can be based on conflicting frames of what a decision is about. The empirical findings have shown that level choice is a normative and/or cultural decision, often no objective "best" decision-making level exists. Some actors consider different competing, overlapping, and nested decision-making levels an opportunity for interest realization; others feel helpless and overwhelmed in complex, multi-level systems.

Furthermore, it has been examined how those actors organizationally and strategically adapt to multi-level governance landscapes. Different coping strategies among interest groups organized on multiple levels, and interest groups organized on a single organizational level were observed. Particularly, interest groups organized on a single organizational level took advantage of venue shopping opportunities. Interest groups organized at multiple levels tended rather to adapt their organizational structure to new venues such as the EU. Different re-scaling strategies (up-scaling, down-scaling, fit re-scaling) are applied by actors to increase their chances of interest realization. Non-state actors have an important function in linking processes from different levels. Different types of actor behavior have been identified in multi-level polycentric systems: the Linker, the Creator, the Maintainer, the Power Shifter, the Mobile Learner, and the Overwhelmed & Passive.

The potential of three theoretical approaches on multiple levels of governance and their interplay (multi-level governance, polycentricity, politics of scale) has been tested on its applicability to understand and explain forest conflict processes. Level choice and the relation of state and non-state actors in decision-making are important aspects of conflict governance, thus the theoretical approach yielded valuable insights in forest conflicts. Furthermore, the importance of scale construction in conflict discourses was proven empirically.

However, multi-level governance and related theoretical approaches have their limits for the explanation of forest conflict governance processes because some important factors cannot be captured with this approach. For example, social-psychological factors (e.g. trust) and conflict frames are important for the understanding of conflict development and governance. Furthermore, no predictions about future development are possible with the theoretical approach. Thus, multi-level governance and related theories need other concepts and theories helping them to fully explain and understand forest conflicts.

This thesis contributes to the further development of multi-level governance theory by providing empirical evidence for the trend towards multi-level governance as a contemporary phenomenon in forest politics, by proving its value for the analysis of conflicts, and by contributing to the further understanding of the behavior, strategies, and perceptions of actors involved in complex multi-level governance systems through the presentation of findings based on extensive empirical data from five qualitative case studies. Furthermore, tangible recommendations on how to design conflict governance systems in forestry and other natural resources that allows decision-making on conflictive issues, which is perceived as effective and legitimate by actors involved in those conflicts have been given.

This thesis contributes to the knowledge of changes in forest conflict landscapes in the face of energy transition and climate change, and contributes to the understanding of changing interests in forests of society. These changing interests and modified priorities in the deliberation of different forest functions and goals may result in a new understanding of

multi-functional, sustainable forest use. We are living in a decade of enormous challenges for the governance of forests. The German forestry claims to be the inventor of the concept of "sustainability". The concept of "sustainable forest use", as developed by Hanns Carl von Carlowitz in 1713 served successfully as a guideline for forest use and management for more than 300 years. Changing times might bring new circumstances, practices, and forest functions, but since the idea of "sustainability" has important roots in the context of forest management, forest practitioners, policy makers and scientists have a special responsibility to follow this tradition and to defend the idea against counterforces to ensure the protection and utilization of forest resources to fulfill the needs of present and future generations.

6.3 Future research

Three main topics, which are relevant for future research, were identified based on the findings of this thesis:

1. Application of theoretical approaches on level and scale in decision-making in comparative environmental conflict governance research.
2. Application of theories on level and scale in decision-making in the context of sustainability transitions.
3. Particularities of different decision-making points within multi-layered, multi-scaled polycentric governance systems.

6.3.1 Theories of level and scale of decision-making in environmental conflict governance

This thesis has shown that the perspective on level and scale of decision-making can yield valuable insights into environmental conflicts. The scale and level of decision-making substantially impacts how the decisions are made, who actually decides, and who can, and to what extent, influence the decision being made. Further research is needed to fully understand the implications of allocation of decision-making authority between different functional and vertical levels to govern different types of environmental conflicts. More comparative studies combining different types of environmental conflicts, countries and cultures are needed to gain better insights about the generalizability of the findings of this thesis.

The empirical analysis of this thesis has shown, particularly in research paper [3], that the scaling of decision-making can constitute a core piece of environmental conflict. It has been shown that wind energy conflicts in Lower Saxony and Rhineland-Palatinate over the most appropriate decision-making level were based, to a large extent, on conflicting frames about what this decision constitutes. The application of frame theory proved to be valuable in understanding the underlying causes of conflicts over the most appropriate decision-making level in environmental management. Furthermore, the findings of this thesis, particularly in research paper [3], question the assumption that there is an objective best level or scale in environmental conflict governance. Instead, the normative nature of level or scale choice should be given more consideration. The normative nature of scale or level conflicts has, so far, remained widely unexplored and deserves more attention in future research.

It has been argued that traditional forms of top-down government of the sovereign national state are being transformed by re-scaling processes towards multi-level governance (Piattoni 2010; Benz 2006). Within this transformation process, the roles, strategies and motivations of

different actors deserve special attention as has already been shown in this thesis, particularly in the research papers [1], [3], and [4]. Of special interest are hereby non-state actors because of their assumed changed role of being more strongly involved in decision-making than previously to the shift towards multi-level governance. Interest groups are of special importance in environmental conflict governance research. Their participation in decision-making is supposed to increase the legitimacy and quality of decisions, but may in fact increase inequalities if different interests do not have equal opportunities to influence decision-making (Jordan and Maloney 2007; Scholte 2010). It has been illustrated in this thesis, particularly in research paper [1], how interest groups perceive the trend towards multi-level governance in forest politics. The transfer of forest policy to new decision-making points at different levels changed the composition of interest groups active in that policy field because not every interest was able or wanted to adapt its organizational structure to the new levels. Thus, recent changes in the forest policy landscape, which can be conceptualized as trend towards multi-level governance, not only changed the state, but also the power structure of interest groups and the overall interest group landscape. Some interest groups became more influential during the multi-level governance transition, others lost influence or became almost completely excluded from new, relevant venues. Understanding changes in power constellations based on changes in scale or level of decision-making are crucial for the evaluation of the implications of environmental governance decisions. Therefore, in future research, the effects on actors of level and scale choice in decision-making needs much more in-depth study than possible in the context of this thesis.

6.3.2 Theories of level and scale of decision-making in transition processes

Sustainability transitions are an important challenge in environmental governance. Most likely, the transition towards renewable energies has recently received the most attention in transition research (e.g. Blanchet 2015; Howard 2015; Kern and Smith 2008; Mattes et al. 2015), but other sustainability transitions are equally important. Other important sustainability transition challenges are, for example, the transition towards more sustainable agricultural systems, or the transition towards more effective and sustainable management systems of renewable and non-renewable resources. Not much is known about the effective governance of sustainability transitions. Although research on historical transition processes showed that those processes were not only the result of a certain governance configuration, but also the result of a complex interplay between processes and configurations at different points within the overall system (Geels 2002; Verbong and Geels 2007), the allocation of decision-making authority between decision-making points within transition governance systems matters for the success or failure of the transition process.

In the field of common-pool resources a lot of research has been done examining how to design governance systems to ensure sustainable resource use. However, whether or not the identified design principles for ensuring sustainable use of small-scale natural resources also apply to transition processes is not well understood. This thesis demonstrated, particularly in research paper [4], that some stakeholders doubted the ability of multi-level, polycentric governance systems to successfully govern the transition towards renewable energies. The limits of the governance design concept of polycentricity were already discussed for large-scale commons (Araral 2014). The findings of research paper [4] indicate that sustainability transi-

tions might be another field where advantages of the design principle of polycentricity do not fully apply. Future studies are needed to examine whether the findings about the merits of polycentricity in natural resource management also apply to the governance of complex transition processes.

6.3.3 Understanding of the particularities of different decision-making points

Closely related to the two topics outlined above for further research, is the further understanding of the particularities of different functional and vertical decision-making points within multi-level systems. The choice of decision-making levels is an important issue. Due to the multi-scale nature of global change (Kok and Veldkamp 2011; Gibson et al. 2000) with interaction of local, regional, national, and international dimensions, the choice of the most appropriate level of action is often not straightforward. Transition governance and environmental conflict governance both require the allocation of decision-making authority at certain levels, actors, and sectors. If different ways of allocating decision-making authority between levels, actors, and sectors are not neutral in their features, as the findings of this thesis indicate, this allocation of decision-making authority can set the preconditions for the outcome of decision-making.

This thesis has shown that different decision-making points tend to have different priorities in complex environmental decisions, which require trade-offs between different dimensions of sustainable development. The integration and combination of these different priorities is one of the major challenges of multi-level, polycentric governance system. How exactly this combination and integration process can become a success is not completely clear yet, and requires further research. Additionally, different decision-making points also have different strengths and weaknesses, but which decision-making points are most effective and legitimate in which particular field is less well known, and findings on this question are contradictory. More comparative studies combining different types of decisions, countries and cultures are needed in order to gain better insights about the generalizability of the findings of this thesis, namely regarding the particularities of different decision-making points. Furthermore, how multi-level governance structures can be utilized to reach better outcomes through successful interplay of different level, as argued in the concept of polycentricity (Ostrom 1999), and how to avoid joint decision-making traps (Poteete 2012) is also not quite clear yet, and requires more research.

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RESEARCH PAPERS

Paper [1]: Interest groups in a changing governance landscape

Paper [2]: Trust in natural resource conflicts

Juerges, Nataly; Alisa Weber; Jens Newig; Jessica Leahy: The Role of Trust in Local Natural Resource Management Conflicts: A Case Study from Forest Management in the German State of Lower Saxony

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The Role of Trust in Local Natural Resource Management Conflicts: A Case Study from Forest Management in the German State of Lower Saxony

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Abstract

Managing conflicts between different stakeholders is an important part of forest management at a local level. Trust is thought to be an important factor in conflict management. We examined how stakeholders in an informally organized forest network perceive the role of trust in the development and management of natural resource conflicts. Based on 24 qualitative semi-structured interviews conducted in the German state of Lower Saxony, a model is proposed based on 12 factors that are perceived by the interviewed stakeholders to interact with the relationship between trust and conflict. The findings imply that more emphasis should be placed on trust building measures in informally organized natural resource networks in order to manage natural resource conflicts between different stakeholders on a local level.

Keywords: Communication, Conflict, Forestry, Germany, Stakeholders, Trust, Trust Model

Introduction

Understanding preconditions for successful conflict management or resolution are of great relevance to natural resource practitioners and scientists interested in utilizing participatory decision-making as a method of environmental management. Of particular interest are the factors that play a role in creating, managing, and resolving natural resource conflicts (Parkins 2010, Lachapelle and McCool 2012, Bergmann and Bliss 2004, Leahy and Anderson

2008). Throughout several disciplines, trust has been identified as particularly important for conflict management.

Ayoko and Pekerti (2008) identify an inverse relationship between conflict intensity and trust. In the psychological literature, a meta-analysis by Balliet and Van Lange (2013) suggests that, in situations with highly conflicting interests, trust is positively related to cooperation. In the environmental management literature, Beierle and Konisky (2000) discuss the importance of two-way communication for trust building. These studies offer evidence and information about how trust interacts with conflict. However, empirical investigations that focus specifically on the relationship between trust and conflict are missing. While Höppner (2009) offers an extensive list of factors impacting trust development in environmental planning, conflict is not included in this analysis. In the context of participatory environmental management, conflict can often be a cause of unsuccessful decision-making (Beierle and Konisky 2000), thus it deserves serious consideration by researchers and natural resource professionals alike.

Abstract concepts such as trust are important to understand because they impact the everyday lives of those engaged in environmental management. However, its abstract nature makes it elusive and difficult to pin down (Möllering 2006). In participatory environmental management, Carr (1998) argues that the importance of trust cannot be overstated. Senecah (2004) stresses this point by explaining that all the literature on effective participatory processes can be condensed to issues of trust. Discussions of participatory planning legitimacy in general (e.g. Newig 2012), and the role of trust in these processes are ever increasing (e.g. Laurian 2009, Leach and Sabatier 2005, Tuler and Webler 1999). Leach and Sabatier (2005) found a positive relationship between trust and the level of agreement in long-term environmental management networks, suggesting that trust is related to a group's ability to reach a durable decision.

The aim of this paper is to examine the relationship between trust and conflict as understood by stakeholders involved in participatory forest management. We hope to provide practical insight into how trust can be created and maintained by natural resource managers involved in participatory decision-making based on understanding stakeholder conceptualizations by those involved in planning processes. In order to empirically examine what factors affect trust building from the perspective of stakeholders, we conducted a case study on an informal network of forest stakeholders in the German state of Lower Saxony. By asking participants to discuss their experiences with trust and conflict throughout their years in forest management, we aim to create a model that traces the development of trust and its relation to conflict as understood by the interviewed stakeholders.

Many researchers reflect theoretically on the importance of trust in management in general and in natural resource management in particular (Mayer et al. 1995; Schoorman et al. 2007; Stern and Coleman 2015). However, widely unknown is how stakeholders in local natural resource networks understand how different factors impact the relationship between trust and conflict based on their own experiences and observations in their local network. Forestry presents a particularly good context for this research given the diverse interests that must be satisfied, which can be a source of intense conflict among stakeholder groups involved in forest management (Gritten and Saastamoinen 2010, Tuler and Webler 1999, Evans et al. 2010). By increasing our understanding of sources of conflict development in participatory forest management and how these conflicts can be effectively managed, strategies for local conflict management can be improved.

First, the theoretical background of the relationship between trust and conflict is discussed. Then, the results of 24 qualitative, problem-centered interviews are presented, and a model presenting factors related to trust building and interaction with conflict is proposed. The results show that trust plays an important role in managing forest conflicts at the local

level in the understanding of the stakeholders engaged in a local forest network. The findings indicate the importance of considering trust in conflict management strategies.

Theoretical Background

Participation in natural resource governance allows those that will be affected by a decision to influence the process (Lynn 2013) through communication among participants (Newig and Kvarda 2012). When methods of participation are utilized, negotiations are a way to identify common goals and downplay the role of competition (Beierle and Cayford 2002). However, when stakeholders with adversarial or competing interests are asked to work together, conflicts may arise. The importance of trust in participatory decision-making has already been identified (e.g. Abbas et al. 2014, Parkins 2010), but the role of trust in managing conflict and the factors impacting this relationship specifically in these processes presents a gap in the literature.

Conflict has many sources including differing values (Needham and Vaske 2008), process inequity (Smith and McDonough 2001), and unique contextual factors (Hunt, Lemelin, and Saunders 2009). However, Nie (2003) maintains that conflict is a characteristic of democracy, and the presence of conflict indicates that the democratic system is functioning correctly. Senecah (2004) supports this argument by pointing out how conflict can be important for enacting social change. However, while conflict can be useful, when it escalates, long-lasting feelings of skepticism and distrust in "elected officials, democracy, and each other" (Senecah 2004, p. 14) are likely to occur. If disagreement exists alongside distrust, the result is often unwillingness to compromise, defensiveness, and a desire to "win" the argument (Lewicki and Wiethoff 2000). At this point, conflict becomes negative. In a similar vein, successful regulation or resolution of conflict can have a positive effect on levels of trust. In

their study on values, conflict, and trust in environmental participatory planning, Beierle and Konisky (2000) found that the process of constructive debate increased feelings of goodwill, and increased awareness and understanding of the perspectives of the other parties involved. Thus, we refer specifically to management of conflict in order to avoid escalation into an unproductive situation characterized by defensiveness and distrust. However, trust and conflict stand in a dialectical relationship to each other in that trust can continuously increase and decrease at any time based on ongoing events within the network.

The role of trust in conflict management

Issues encountered in natural resource management are often characterized as "wicked problems," consisting of various complexities and interdependencies that make it difficult to avoid conflict (Nie 2003). There are many competing interests that must be considered when making decisions about how to sustainably utilize a natural resource, which typically involves economic, ecological, and conservation interests. With such diverse interests, the potential for intense conflict is high. However, when trust is present, social bonds and shared commitments can be developed. These bonds encourage open and honest interaction (Lijeblad et al. 2009). Davidson et al. (2004) examined the relationship between trust and conflict and found that, in high trust situations, involved parties were more likely to use cooperative negotiation strategies and less likely to use uncooperative strategies such as avoiding and dominating. Additionally, they found that satisfaction with outcomes was significantly higher among the high trust dyads in the study. They found that trust mitigates perceptions of risk, that is, the risk of 'losing face' or being taken advantage of in the situation. Thus, fewer resources are spent trying to mitigate this risk, and these resources can then be spent focusing on how to find a solution to the issue at hand. Ayoko and Pekerti (2008) also found an inverse relationship between trust and conflict intensity, which suggests that the presence of trust has an attenuating impact

on conflict. Furthermore, Raedeke et al. (2001) argue that a lack of trust makes conflicts feel more threatening to those involved in it. A study by Carr (1998) supports these findings by proposing that the presence of trust increases one's willingness to take risks when using collaborative methods of public forest management; emphasizing that in order to collaborate successfully, one must look beyond one's own personal desires, and consider things from another perspective, which involves risk.

Trust can act as both a driver and as a byproduct of conflict over natural resources (Nie 2003), implying that while the presence of trust may help to avoid or at least regulate conflict, the presence of conflict can also impact trust. This is advantageous because it suggests that it is possible to transform a distrusting relationship into a trusting one. When conflict does arise, Lewicki and Wiethoff (2000) stress that it can be worked through relatively easily when trust is present. However, when distrust is present, conflict can often become destructive. They conclude that the level of trust present in the relationship serves to shape the emergent dynamics of the conflict. The literature clearly demonstrates the existent relationship between trust and conflict; however, the lack of a comprehensive model that represents how stakeholders of natural resource management understand the relationship between trust and conflict represents a gap that must be addressed in order to make trust a more practically applicable concept.

Methods

A qualitative case study, based on a single-case design (Yin 2014), was conducted in the German state of Lower Saxony. A case is hereby understood as "a spatially delimited phenomenon" (Gerring 2007, 19). Our case, an informal forest network in two districts of Lower Saxony made up of different stakeholders with conflicting interests, has been designed to examine the understanding of stakeholders involved in this network about the theoretical nature of the relationship between trust and natural resource conflict.

The study focused on two neighboring districts that both rely on forests for local economic support. These two districts were selected because they represent mostly rural areas with high forest surface cover, and offer conditions typically found in rural, forested regions of Germany. Former and existing disagreements about forest use and management were often based on conflicting priorities between recreational forest users and forestry, such as conflicts between off-road mountain bikers or geo-cachers and forest owners and forest administration over the limits of recreational forest use. Other previous conflicts existed between conservation groups and forestry over harvesting intensities or specific forest management aspects, such as tree species choice, management of Natura-2000 areas, or wind turbine construction. The decision-making processes about forest use and management in the case include different forms of participation, such as regular round-table meetings and communication between forestry authorities and the local communities and interest groups.

A total of 24 qualitative, semi-structured interviews were conducted with various forest-related stakeholders and decision-makers (Table 1). Initially, actors in "key positions" such as local foresters, forest owners, representatives of local forestry or timber companies, and members of local nature conservation or forest-related recreational groups were contacted. Further interviewees were identified using a network sampling method, which was carried out by asking interviewees to identify other actors in the region involved in forest use and management. State level actors were also interviewed to gain a more broad perspective of the relationship between trust and forest conflicts within Lower Saxony. The data were considered saturated when interviewees suggested no further additional organizations or key actors. This method of stakeholder identification ensured that all relevant stakeholders, engaged in forest use and management in the area, were considered in the interviewee selection. Due to the demographic structure in the area most interviewees were over 50 years of age, and were active in the local forest network for many years. Thus, the interviews illustrate the partici-

pant's experiences with the development of the relationship between trust and conflict in the case study region over a long period of time.

Table 1. Interests represented in interviews

		# of interviews
State actors		
	Politicians of environment committee	5
	Ministry of forestry	1
	State forest service	2
	Local chamber of agriculture	1
	County association	1
	Town forestry office	1
	Local nature conservation authority	1
	Planning authority	1
Non-state actors		
	Environmental and nature conservation groups	4
	Recreation groups	2
	Forestry owner association	1
	Renewable energy business	1
	Timber business	1
	Private forestry business	2
Total		24

The interviews were conducted in German[1] following a common, semi-structured interview guide, with relatively open questions that could be adapted to interviewee knowledge and experience. Interviews focused on local conflicts related to forest area use and management, the role and meaning of trust in conflict management, and on sources of trust and distrust in the local forest networks. For example, interviewees were asked about previous conflicts in the area and about which factors and actions contributed to the regulation of conflicts based on their own observations and perceptions. Each interview was recorded and later transcribed. The analysis and model construction were done in German. Only the example quotations in the article were translated into English. The translation was done together by two of the authors, an English native speaker and a German native speaker. Especially the translations of text pieces with colloquial language were discussed in detail by the translating authors to ensure the accuracy of the translations.

The data were analyzed using a grounded theory approach (Charmaz 2014; Glaser and Strauss 1967) using MAXQDA (Verbi GmbH, Berlin, Germany). To give the interview material its initial structure, the interview manual was used to create categories (e.g. experiences in previous conflicts, sources of trust and distrust). To further structure the data, additional categories were derived from the interviews through an iterative, bottom-up process of coding and data aggregation. Memos were used to pre-structure the concepts used by the interviewees and to develop additional categories by the analyzer (Charmaz 2014; Glaser and Strauss 1967). Finally, factors that contributed to the development of trust and conflict as understood by interviewees were identified. Based on these factors, a conceptual model visualizing how interviewees made sense of relationships between the identified factors, trust, and conflict was developed (Eisenhardt 1989). The categorization of these factors is the result of a subjective interpretation process, and is therefore a result of the analyzer's data interpretation. However, we feel that the presented categorization of these factors constitutes an optimal data structure.

Results and Discussion

How interviewees conceptualized trust

The interviews confirmed that trust is indeed a highly abstract construct. Among the interviewees, no generally shared understanding of trust could be identified. Although almost every interviewee agreed that trust matters, interviewees found it difficult to define trust succinctly. Trust and trust sources were not clearly distinguished by interviewees, which made it difficult to work with the concept of trust analytically. This finding confirms previous literature, in that it has also become widely accepted that trust is multi-dimensional and consists of situation specific constructs (Stern and Coleman 2015). For example, Sako (2000) distinguishes between 'types' of trust including competence and goodwill trust. "Competence trust

requires a shared understanding of professional conduct…Goodwill trust can only exist when there is consensus on the principle of fairness" (p. 89).

Two different main perceptions of trust of the interviewees were identified that correspond to two concepts established in the literature: competence trust and goodwill trust. The relationship between forest administrators and the local population was often described as being characterized by trust in the competence of local forest administrators:

"First of all, the people in [Town] *trust the competence of the forester, that's a matter of a fact, the town forester is a relatively well-known person in town, it was like that with my predecessor, and it is the same with me."* [Town forester]

Another forester provided an example that related to the idea of goodwill trust:

"If we work in protected areas, we assure the local nature conservation authority that we will stick to existing rules. This requires trust because they cannot come around every day to control us. They let us do our work. And if they came after 14 days and we had not stuck to what we said, they could not change it anymore. Trust is important; I think we justify their trust because we stick to agreements. This is the foundation of our cooperation—that they can trust in what we are saying." [Forester of small-scale private owned forests]

While some interviewees referred to both trust dimensions when they were asked to describe how they understand trust, most referred either to competence trust or to goodwill trust. Definitions related to goodwill trust dominated the definitions given by the interviewees.

How interviewees understand the relationship between trust and conflict

The interviewees perceived trust as important for the development and management of conflict in their local network. However, interviewees suggested several factors that are also necessary for this relationship to function effectively. It appeared that trust acted as a foundation upon which the proposed factors functioned with one another. These factors then strengthened trust when they were successfully utilized. Twelve factors were thought to be relevant (Figure 1). Not only did they work together with trust to reduce conflict, but they also aided in creating or undermining trust from the perspectives of the interviewees. These factors were categorized by the primary analyst into contextual factors, stakeholder interaction factors, decision-making process factors, and value formation factors. It is important to emphasize that communication plays an extremely important role in facilitating not only trust building, but also many of the identified factors, such as transparency. The model begins with contextual factors, which stakeholders use to establish base levels of trust or distrust. Then, based on interaction with fellow stakeholders, process factors related to decision-making, and other value related factors, trust either increased, decreased, or remained at the initial level. The trust level between stakeholders within an informal natural resource network was seen as a two-way relationship with conflict by the interviewees. A lack of conflicts or successfully regulated conflicts can increase trust between stakeholders, however, the escalation of conflicts can destroy existing pre-trust and makes conflict regulation more difficult. The levels of trust then impact the ability of the group to manage conflict.

Contextual Factors

1. In-Group Membership

2. Skilled Facilitation

3. Past Experiences

Stakeholder Interaction Factors

4. Boundary Spanners

5. Communication

Decision-Making Process Factors

6. Procedural Justice

7. Participation in Decision-Making

8. Transparency

Value Formation Factors

9. Active Involvement in Forestry

10. Forest Related Education

11. Shared Forest Values

12. Respect for Differing Forest Values

Level of trust or distrust among stakeholders

No conflict

Conflict

Conflict escalation

Conflict regulation

Figure 1: Model on stakeholder understanding of the relationship between trust and conflict

Contextual Factors

Contextual factors refer to the general environment present before the decision-making process begins. The interviews suggest that these factors are typically formed based upon the experiences and expectations of those involved (Table 2).

Table 2. Contextual factors relevant for trust

Factors	Definition	Example from Interviews
1. In-group membership	Refers to the familiarity that the stakeholders have with one another (e.g. a person who has lived in the village for many years).	*"My predecessor worked for almost 40 years in this forestry office and I have worked in this position for more than 20 years, continuity is really important in my opinion"*
2. Presence of an actor who acts as a facilitator	Presence of actors who are good at facilitating and mediating between different interests.	*"There is a woman in the state forest service [...]. It works very well there. [...] She found a very good method of cooperation, also with the nature conservation authority; they have a lot of unity."*
3. Past experiences	Positive and negative experience which might impact an actor's perceptions and judgments of the current situation.	*"The politicians plan a road construction through the forest, a big, connected forest ecosystem, and our district is in debt anyway. Thus, we try to stop that and we will be successful, we succeeded already six years ago with the same issue. Then, we all worked together and pulled together, hunters, conservationists, forestry, and the endeavor was stopped."*

Interviewees had the perception that when the network is made up of actors that identify with each other in some way (*in-group membership*), actors are likely to hold a more trusting attitude. Being an in-group member creates a sense of community that does not exist for actors that have not previously participated in decision-making. Cheng and Daniels (2005) similarly found that, at least initially, in-group membership can greatly impact perception of others.

When there is an actor present who is a talented *facilitator* (which might be formally appointed or emerge informally), the presence of this well-connected individual, could be useful in creating a trusting environment. This is in agreement with Robinson et al. (2011), who found that group organization relies heavily on individuals skilled at bringing people together. Furthermore, the presence of a skilled facilitator may be useful for encouraging actors who have previously felt marginalized (Evans et al. 2010).

When the *past experience* with this network has generally been good, the actor is likely to hold a more trusting attitude. Conversely, if the contextual factors includes unfamiliar members, if there is an actor who is difficult to work with, or if there have been negative past experiences in the network, it is likely that they will approach the process with a more distrusting attitude. Past experience plays an important role in estimating the trustworthiness of others. When actors have had positive experiences with others, they are more inclined to feel they can trust them in the future. However, negative past experiences may increase perceptions of risk, which decreases willingness to trust. These results are supported by McEvily et al. (2006), who found that without past experience the actor is forced to rely on whatever information is available to make their decision (e.g. knowledge of a stakeholder's organizational affiliation).

While these findings suggest that contextual factors play an important role in creating an environment where actors can establish trust, it is also important to point out that initial levels of trust merely reflect a starting point. Practically speaking, it is important to be aware of these factors for determining how actors might feel about one another, in order to design the process accordingly.

Stakeholder Interaction Factors

Here, we refer to the interaction that occurs between actors (Table 3). When stakeholders have the opportunity to interact with one another, their initial level of trust will increase or decrease based upon the conclusions they draw from these interactions. In participatory decision-making, it is necessary for stakeholders to interact with one another. The interviewees suggested that there are two factors that determine the nature of these interactions: the presence of boundary-spanning agents and communication. Other studies support the idea that behaviors and actions of stakeholders, and how these are perceived matter a great deal in producing successful outcomes (Tuler and Webler 1999, Smith and McDonough 2001, Lachapelle and McCool 2012).

Table 3. Stakeholder interaction factors relevant for trust

Factors	Definition	Example from Interviews
4. Presence of boundary span-ners	Actor involved in two or more different stakeholder groups who can link different interests.	*"Our method of forest management does not conflict with environmental or nature conservation NGOs. On the contrary, the former town forester was member of Friends of the Earth; I am a member of Birdlife. We are totally connected to the environmental NGOs, we work together very openly. Meanwhile in other forestry districts they have a lot of criticism about forest management, we have no conflicts at all with conservationists for 40 years."*
5. Communication	Dialogue, exchange of ideas, and information flow with other stakeholders about how to best manage a forest.	*"Our forest management is nature oriented, but also really open and honest. We harvest old oak trees close to downtown, and we communicate what we are planning to do—that is really important. We invite local citizens to watch harvesting measures, we communicate via the local newspaper, and I give public presentations and guided tours in our town forest. I think all these things contribute to the lack of conflict over forest management in our town."*

When *boundary-spanning agents* are present, this encourages *communication* among the groups this actor is involved with. Key individuals with strong connections are pivotal in bringing together people with different ideological backgrounds, as demonstrated by Robinson (1996). These actors are particularly useful because they are personally involved in more than one stakeholder group, and can understand different perspectives.

Communication is fundamental for creating trust; it is only through communication that actors can get to know the ideas and motives of their peers. For the interviewees, communication is understood as a central factor for successfully resolving conflict. One interviewee described his experiences with round-table meetings after they were established in the area by pointing out the importance of learning about the perspectives of others:

> *"You can also learn quite a lot from the perspective of the other participants. We are talking in plain language and say clearly what we don't like, but the way we interact with each other has changed; we talk to each other now. Previously, we had mocked each other in the local media for decades, and we had achieved basically nothing. Nowadays we achieve significantly more for the environment."*

[Volunteer in a nature conservation organization]

Communication was considered a central factor by the interviewees in the relationship between trust and conflict, which is in agreement with many studies in the natural resource management literature (e.g Beierle and Konisky 2000, Raedeke et al. 2001, Wagner and Fernandez-Gimenez 2008). Only through communication can the opportunity to understand a differing perspective be created (Beierle and Konisky 2000). Communication was necessary to increase positive transparency. Furthermore, communication created opportunities to identify shared-values, or to gain a better understanding of the reasons one might maintain a dif-

ferent value (Beierle and Konisky 2000). However, constructive communication needs to be supported by a skilled facilitator and/or an adequate communication structure and process to foster trust building processes. Otherwise, communication between conflict participants can develop into endless repetitions of positions instead of constructive work on conflict resolution (Fisher and Ury 1999). Our practical conclusion is that NRM managers can create opportunities for interaction, for example by the establishment of regular round-table meetings with a skilled facilitator. Through interaction, actors are able to create a clearer picture of their peers through communication, and trust can be built.

Decision-Making Process Factors

Decision-making process factors relate to the design and perceptions of the actors during the actual decision-making process (Table 4). The process structure directly impacts the ability of stakeholders to interact with each other, which affects the likelihood of trust building.

Table 4. Decision-making process factors relevant for trust

Factors	Definition	Example from Interviews
6. Procedural justice	Perception that the procedures used to make decisions allows all interests to be considered equally.	*"And if you agree to inform the locals, to take them on board, to take their concerns seriously, it usually turns out so that people are ok with the overall concepts. Maybe doing a participatory process for the locals and so on."*
7. Participation in decision-making	Ability of interested stakeholders to be involved in decision-making (e.g. at round tables).	*"For the designation of nature reserves we established round-table working groups where interested organizations could participate. That was really a positive experience for us as authorities, because we had time to deal with all the different interests and demands and search for compromises. In the formal designation process you don't have the time to deal, in so much detail, with all the different interest and then you do not get the acceptance. It takes time and energy, but it's worth it for all participants."*
8. Transparency	Refers to the degree of clarity with which decisions are made, and how they came to be made.	*"We speak openly about the requirements of forest management we have to fulfill. For example, we had our last FSC audit last week, and we also present all these things on information charts. The local residents can also watch when we are harvesting; the people can really share what is going on in the town forest."*

Perceptions of *procedural justice* and the opportunity to *participate in decision-making* were both understood as important factors for creation of trust and feelings of goodwill. Mannigel (2008) argues that having the opportunity for participation increases perceptions of transparency by increasing awareness and understanding, and that participation also creates the opportunity for actors to be educated on more technical aspects of natural resources (Evans et al. 2010).

Perceptions of *transparency* played an important role in helping actors understand how a decision was reached and how input was utilized. Studies by Smith and McDonough

(2001) and Stern (2008) support the finding that perceptions of fairness are important for trust building. In ensuring that decisions are made fairly and transparently through consideration of the needs and wishes of all relevant stakeholders, participation is encouraged because actors see that their contributions are valued (Tuler and Webler 1999). Thus, it appears that when adequate opportunity to participate is ensured, perceptions of transparency can be increased. However, the perceptions and observations of the interviewees also indicated that rather the quality of participatory processes and the kind of communication matters more than the quantity of those factors. Fortunately, mangers are able to control nearly all of these factors. Adequate time and opportunity can be given to relevant actors to discuss the problem with one another, and clear communication about how a decision will be reached can be provided. Furthermore, civic engagement can be strengthened by creating options for participation of stakeholders with diverse interests in forest management decisions.

Value Formation Factors

Value formation factors relate to perceptions of respect, presence of shared values, and levels of involvement in forestry (Table 5). As stakeholders increase their levels of interaction, they discover shared values. When actors have shared values, they have more reason to trust. Similarly, when they are able to gain understanding for differing values, they have less reason to distrust. Environmental issues are particularly susceptible to conflict because opinions about natural resources are commonly value-based (Gritten and Saastamoinen 2010). Values are typically associated with identity, and having that value challenged can feel very personal; thus, the individual will be more motivated to pursue conflict (Putnam and Wondolleck 2003).

The interviewees suggested that being actively involved in forestry is important for creating shared values, and for gaining respect for differing values. This was accomplished through a

reciprocal relationship between involvement and education. Active involvement in forestry topics creates opportunities for learning, which creates opportunities for understanding. This is important because differing values can act as a barrier for conflict resolution (Gritten and Saastamoinen 2010, Raedeke et al. 2001). Conversely, shared values and respect for differing values increase manageability of conflicts because those factors enable stakeholders to debate interests rather than the individual values. This perception of the interviewees corresponds to previous findings in the conflict management literature (Fisher and Ury 1999).

Table 5. Value formation factors relevant for trust

Factors	**Definition**	**Example from Interviews**
9. Active involvement in forestry	Includes any active use of the forest (e.g. use of self-harvested timber, etc.).	*"The citizens take their firewood out of the forest by themselves. They enjoy it, and instead of just giving them the prepared wood, I get the people in the forest so they experience the forest and work there, which helps the people appreciate forests. They bring their kids, who help to get the wood into the car, this has positive effects."*
10. Forest-related education	Refers to the process of learning about forests, forestry, ecosystems and forest functions.	*"The [district] forestry office, they have three forest workers who go into schools, do projects in the schools to create awareness and understanding. This should be supported. I would appreciate it if they could do more of these things."*
11. Shared forest values	Recognition of a shared understanding about priorities of forest use and management or human-forest ecosystem relation (e.g. the extent of conservation in relation to use intensity).	*"Here in our district, we still have a relatively idyllic world, our district is shaped by agricultural production and even the representatives of the nature conservation organizations are reasonable. In a constructive dialogue we can agree on management guidelines, also together with the forest authorities, in other districts with a more urban population nearby, it's different."*
12. Respect for differing forest values	Respect for perspectives on forests that are different than one's own understand-	*"Geocaching, if you think about that, what kind of hobby is that?[...] On the other hand, if you have 40,000 caches online in Lower Saxony, I cannot say that these people are all mad as a hatter. I do*

	ing about priorities of forest use and human-forest ecosystem relation.	*not share the same enjoyment in what they are doing, but I came to the conclusion that the forestry administration has to do something about that. My colleagues said I am crazy to meet with these geo-cachers, but I reached out to them, and together we developed a paper with recommendations for ecologically sound geocaching in forests."*

A two-way relationship exists between *active involvement in forestry* and *forest related education*. When actors are educated about the forest and its uses, they are more likely to become actively involved, the more they become active, the more things they will learn about the forest. Additionally, active involvement in forestry and forest-related education appear to be important for creating *shared forest values,* or at least in creating *respect for differing forest values,* even if they don't necessarily agree. Generally, mutual understanding and respect for differing interests and values can be increased if stakeholders participate in the actions of stakeholders with other interests in forests. Thus, we recommend the collaborative involvement of stakeholders into other's interests in forests to increase mutual understanding.

We conclude that active involvement in forestry increases the opportunity to learn about different aspects of forest management. Through this learning, there is greater possibility that respect for differing values can be fostered. Identification of shared values and acknowledgement of differing values provides a basis on which stakeholders can relate to one another, increasing the likelihood that trust can be built (Leahy and Anderson 2008, Needham and Vaske 2008). Here, the practical implication is that actors should be encouraged to be actively involved in forestry. For example, forest managers might schedule events related to education, e.g. a "work in the forest day" in the local forest with volunteers, or local residents where they get the opportunity to harvest timber for their own domestic heating use.

Conclusions

The aim of this paper was to examine how stakeholders involved in participatory forest management understand the relationship between trust and conflict within their local network. As a result, a model based on 12 factors that influence this relationship, as understood by the interviewees, has been constructed. The perceptions of the interviewees suggest that when trust is present, conflicts may be more easily managed. When conflict is present, successful management of conflict can encourage trusting relationships.

While we believe this study offers valuable implications for both theory and practice, it is not without limitations. The generalizability may be limited by the cultural context of the study and the specific characteristics of the case, and may not generalize well to cultures with different attitudes about how easily to trust, and what is perceived as conflict. Additionally, generally high levels of trust and low levels of conflict characterize the case described in this study. Therefore, it would be valuable to compare our model of trust and conflict in different cultural settings, as well as among networks characterized by differing levels of trust and conflict.

This paper supports the assertion that the relationship between trust and conflict is important for social exchange, but that it is also complex. In practice, the model provides recommendations for managers on how to create a successful participatory decision-making process. The factors that matter in the understanding of the interviewees might serve as a "checklist" that mangers can use to gauge current feelings of trust among participants; the process can then be designed in order to promote communication, cooperation, and feelings of goodwill. If conflict does arise, the presence of trust allows actors to work through conflict via these factors. While further research is needed to understand each factor in isolation, the findings of this study make it clear that in order to reduce conflicts between stakeholders in participatory decision-making, emphasis should be given to trust building measures.

Notes

1. The original German versions of the quotations are available through the authors.

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Paper [3]: Frames in scalar conflicts

Paper [4]: Stakeholder perceptions of polycentricity

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Stakeholder perceptions of polycentric governance in wind energy conflicts: An actor typology

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Abstract

This case study examines wind energy conflicts in forested landscapes in Maine, USA and Rhineland-Palatinate, Germany. Specifically, actor perspectives on polycentric governance and its legitimacy to manage this complex conflict were evaluated based on 40 qualitative, semi-structured interviews with decision-makers and important stakeholders from various sectors. Generally, polycentric governance systems of wind energy issues were seen positively and considered as having high legitimacy. Even though different individuals had varied perceptions, the aggregated perceptions of the two polycentric systems in Maine and Rhineland-Palatinate as well as the factors that generally constitute legitimacy in wind energy conflict governance were quite similar in both cases. Some actors benefit from polycentric governance settings, while others face disadvantages because they are overwhelmed by the complexity of multiple decision-making arenas. An actor typology is proposed to describe different stakeholders within a polycentric energy governance setting. The results indicate that the findings about the advantages of polycentricity for the governance of small-scale common pool resources might be marginally transferable to the governance of energy transitions.

Keywords: Actor typology; Legitimacy; Multi-level governance; Polycentricity; Renewable energy; Wind energy

1 Introduction

In the context of natural resource management problems, the concept of polycentricity has become a promising approach, although there is no general, shared definition of polycentric governance. Different authors describe polycentric governance as system of overlapping jurisdictions, competing institutions, or formally independent but interlinked centers of decision-making, whereas others focus on systems of self-organization at a local scale (Aligica and Tarko 2011; McGinnis and Walker 2010; Ostrom et al. 1961). For the purpose of this study, polycentric governance is understood as a system of multi-level governance (Hooghe and Marks 2003), with multiple overlapping and competing jurisdictions at different nested levels with considerable independence from each other (Ostrom et al. 1961). These authorities include governmental bodies and administration at local, regional, state, and federal level.

Advocates of polycentric governance arrangements believe that they are more effective in governing multi-scale problems (Andersson and Ostrom 2008; McGinnis and Walker 2010; Ostrom 1999; Sovacool 2011). Since the transition towards a renewable energy system is seen as a complex multi-scale problem (Goldthau and Sovacool 2012; Mattes et al. 2015), there is a need to more fully explore the polycentric governance approach in energy contexts. However, existing studies on polycentricity focus mainly on natural resource management issues (Nagendra and Ostrom 2012; Ostrom 1990). There are few studies in energy governance that apply the concept of polycentricity (Grollman 1997; Sovacool 2011).

The perspective of actors on polycentricity and how they act in polycentric systems is of high practical and theoretical relevance for energy transition managers, policy makers, and researchers. The transition towards a sustainable, renewable energy system requires action on

multiple levels and needs to take multi-scale interactions into account (Poocharoen and Sovacool 2012; Smith 2007). The allocation of responsibilities between decision-making arenas is an important question because of increasingly complex governance systems that include many levels, and the complex multi-scale character of many sustainability problems (Cash and Moser 2010; Gibson et al. 2000; Poteete 2012). Therefore, it has been argued that more research is needed in energy and climate governance applying the concept of polycentricity (Sovacool 2011).

The importance of actors in the transition towards renewable energies has been illustrated in previous energy governance research (Blanchet 2015; Howard 2015; Kern and Smith 2008; Mattes et al. 2015). Furthermore, it has been argued, in order to be successful, that polycentric systems should not be "too complicated for the different actors involved" (Andersson and Ostrom 2008: 74). Despite this, it is widely unknown how involved actors perceive polycentric systems. There is a paucity of studies that focus on how actors think about, act in and create polycentric governance systems (Espinosa-Romero et al. 2014; Hüesker and Moss 2015; Pellikka and Sandström 2011). These questions are crucially connected to the legitimacy of polycentric energy governance. The legitimacy of a governance system tends to be contested by the evaluations of the governed actors (Black 2008). Therefore, it is important to know how these actors perceive the legitimacy of the governance system (Rantala 2012). A governance arrangement that is disliked by its actors or that systematically disadvantages certain actor groups is likely to suffer from legitimacy problems (Black 2008; Pellikka and Sandström 2011).

To fill these research gaps, this international case study empirically examines conflicts about wind energy in forests in two different, polycentric governance systems in the states of Maine, USA and Rhineland-Palatinate, Germany. Wind energy can support sustainable economic development of rural communities, contribute to energy independence, provide climate protection, and contribute to a transition to low-carbon, non-nuclear economy (saving fossil fuels such as oil and gas). Due to limited open land project sites in forest-rich regions, forests have moved increasingly into the focus of wind energy project developers. The construction of wind turbines in forests has also been controversial in various instances. Changes to forest landscapes are highly criticized and it is argued that the trade-offs between the advantages of wind energy projects on one side, and biodiversity conservation and visual impact on the other side, are too high. Wind energy conflicts are complex problems with different spatial dimensions from the global to local levels (Abbott 2010; Liljenfeldt 2015). This multi-scale conflict is mirrored in complex polycentric governance systems which have gradually developed to manage these conflicts between different actor groups. A wide variety of stakeholders is typically involved in conflicts about wind energy projects (Howard 2015), e.g. wind energy companies, land owners, nature conservation and environmental protection groups, local residents, or recreationists. This conflict is a typical example of a contemporary and highly relevant multi-scale sustainability problem in energy governance. Therefore, wind energy conflicts provide an excellent opportunity to advance polycentric governance theory, as well as tangible recommendations to those involved in energy transition.

Specifically, we address four research questions in this study:

1) How do different actors involved in wind energy conflicts in forests perceive the polycentric governance system regulating this conflict?
2) What constitutes legitimacy in wind energy governance for those actors?
3) How do actors involved in wind energy conflicts view different decision-making arenas at different governance levels within polycentric systems, and what similarities or differences exist between the two case study areas?

4) What typology does best describe actors involved in polycentric conflict governance systems?

There is a growing need to conduct more studies including cases from different countries, because this kind of analysis can provide insights about the general implications of polycentric governance independently from specific cultural contexts. Furthermore, the importance of energy transition creates a pressing need to focus on renewable energy case studies (Chmutina and Goodier 2014).

2 Theoretical background

Polycentric governance arrangements are described as systems with multiple overlapping and competing jurisdictions at different nested levels with considerable independence from each other (Ostrom et al. 1961). These polycentric systems form in combination of bottom-up processes, for example by the formation local self-governance systems, and top-down processes by state actors with the formal authority to create governmental bodies. The concept of polycentricity has become increasingly important to analyze the diversity of possible institutional arrangements at different scales that govern environmental problems (Aligica and Tarko 2012; Araral 2014; Newig and Fritsch 2009).

2.1 Arguments in favor and against polycentric governance designs

Polycentric governance arrangements are thought to be more successful at addressing complex challenges in environmental and natural resource governance (Andersson and Ostrom 2008; McGinnis and Walker 2010; Nagendra and Ostrom 2012; Ostrom 1999; Sovacool 2011). Advocates suggest polycentric governance arrangements as performing better in solving complex problems because the strengths and weaknesses of decentralized local decision-making and centralized top-down decision-making can achieve better performance through their interplay (McGinnis and Walker 2010; Ostrom 1999). In a governance design with multiple overlapping and competing jurisdictions, other decision-making arenas could intervene in cases of governance failure by another governing unit. Furthermore, different governance units could learn and copy from each other if an effective and efficient governance system is in place somewhere, allowing an evolutionary improvement of rules (McGinnis and Walker 2010; Ostrom 1999; Sovacool 2011; Aligica and Tarko 2012).

Even though polycentricity has often been advocated, there are also key criticisms. It has been argued that polycentric governance systems are messy, chaotic, and inefficient, cause confusion, and suffere from coordination problems (Sovacool 2011). Different decision-making units could block each other, resulting in a joint decision trap (Poteete 2012). Furthermore, it was argued that, in polycentric systems, unintended consequences are likely to occur, causing injustice (Aligica and Tarko 2011). Based on these different arguments in favor and against polycentric governance designs, it is necessary to study how conflict participants acting within polycentric systems perceive them.

2.2 Polycentricity and Legitimacy

The legitimacy of governance systems has been defined as the acceptance and agreement of the governed actors to the systems rules, allocation of power, and to the exercise of this power, even if against their own interests (Schmidt 2013; Wallington 2008). Debates on the concept of legitimacy in polycentric systems have become increasingly important in recent environmental governance research (Newig and Kvarda 2012; Suškevičs 2012; Wallington 2008).

Especially in land use governance, a tension between legitimacy and efficiency exists (Liljenfeldt 2015). It has been stated that the legitimacy of polycentric systems face some serious challenges, such as jurisdictional integrity (Black 2008; Peters and Pierre 2005; Skelcher 2005).

Legitimacy has been described as a context specific concept and can be very different between places and actors (Black 2008; Schmidt 2013). Different actors judge the legitimacy of a governance system based on their own criteria. For example, actors may view legitimacy in accordance with laws, the pursued goal of the system, or the procedure of decision-making itself. Actors may also base their judgments on a particular ideology or certain values (Black 2008; Suškevičs 2012). The sources of legitimacy make it difficult to pin down the concept empirically (Rantala 2012). Suškevičs (2012) analyzed the legitimacy of multi-level biodiversity governance based on four legitimacy criteria: compatibility with legal frames and informal rules, inclusiveness, accountability, and transparency. This analysis showed that multi-level systems with various decision-making points faced several challenges to satisfy these criteria. The accountability criterion is often contested in polycentric governance systems (Papadopoulos 2005; Poteete 2012). Moreover, aspects of participation are critically discussed and have impacts on the legitimacy of polycentric governance systems (Papadopoulos 2005; Skelcher and Torfing 2010). For the functioning of a governance system, it is important that decision-makers are considered as legitimate, especially for non-state actors involved in decision-making. In the case of polycentric governance systems there is a strong need for acceptance in their role as rule-maker by other actors since they are usually not democratically elected (Black 2008; Wallington 2008).

The concept of legitimacy can be distinguished by three dimensions: 1. input legitimacy, which evaluates who is involved in decision-making and how the process of decision-making is organized; 2. throughput legitimacy, which evaluates the process of decision-making itself; and 3. output legitimacy, which evaluates the outcome of decision-making (Newig and Kvarda 2012; Rantala 2012; Scharpf 1999; Schmidt 2013; Skelcher and Torfing 2010). In wind energy planning, a trade-off between input-legitimacy and output-efficiency exists because a deliberative wind energy planning process with meaningful participation of all stakeholders can be a barrier for the efficient realization of projects (Liljenfeldt 2015). Because of the varied evaluations of legitimacy, this study contributes to understanding the perceptions of legitimate governance by those involved in wind energy conflicts.

2.3 Different levels within polycentric governance arrangements

Polycentric governance arrangements have been characterized by a combination of decision-making points at multiple hierarchical and functional governance levels. It is argued that different levels could address unique aspects of problems. The integration of local solutions for complex problems is seen as crucial for the success of natural resource governance designs (McGinnis and Walker 2010). Previous studies show that local governance could better consider local knowledge about the governed resource, which can lead to better adapted governance solutions (Andersson and Ostrom 2008; Andersson et al. 2014). Local governance also has its downsides, especially in cases of conflict between different stakeholders. Without external conflict resolution mechanisms, conflicts can escalate and continue for a long time (Andersson and Ostrom 2008).

It has also been argued that local actors lack the strategic ability to realize complex innovations (Koschatzky and Kroll 2008). This aspect is especially important in the context of energy transition governance. A growing body of research has examined the issue of most suitable levels for energy planning (Pasemeni et al. 2014). This literature confirms the importance of

the local level, but also emphasizes the necessity to consider cross-scale dynamics of energy governance (Pasemeni et al. 2014). Different governance levels often have different policy objectives; these objectives could even be in conflict (Koschatzky and Kroll 2008). The integration of multi-level policy goals is one of the major challenges of polycentric systems (Koschatzky and Kroll 2008). Regional level actors are considered as having an important function in this integration process because they have knowledge about local levels but also the ability to be strategic and coordinate actions at a larger scale (Smith 2007). Therefore, it has been argued that regional actors need to be integrated in nationally coordinated policy processes to bridge local and national levels to reach desired outcomes of decentralized actions (Koschatzky and Kroll 2008). To address those issues, this study examines how different levels within polycentric systems are perceived by actors involved in wind energy conflicts.

2.4 Actor behavior in polycentric governance systems

Even though there is some agreement about the value of combining different decision-making levels to reach more sustainable governance outcomes (Gruby and Basurto 2014), the question of how to allocate power is less clear. How responsibilities between different decision-making arenas should be distributed is continuously discussed and negotiated between different state and non-state actors. The allocation of responsibilities between different levels matters in environmental management and is a highly political question (Mostert 2015). Different levels differ in power relations of actors and different decision-making scales can therefore come to diverse decisions on how to govern an environmental problem (Hüesker and Moss 2015; Swyngedouw 2005). Actors apply different scalar strategies to increase their influence (Hüesker and Moss 2015). In the context of polycentric natural resource governance systems, non-governmental organizations play an important role in bridging different governance levels and in enabling integration of local stakeholders in decision-making processes (Espinosa-Romero et al. 2014). However, there is still no sufficient knowledge about the types of stakeholder action within polycentric governance settings; therefore this study attempts to categorize different actor types within polycentric conflict governance systems.

3 Methods

We examined the conflict over wind energy projects in forests in two cases with different polycentric governance systems.

3.1 Case study design and case selection

The multi-scale nature of wind energy conflicts and the theoretical perspective of this study were mirrored in the case study design. We applied a multiple cases embedded design, including several governance-levels from local to national level in the analysis (Yin 2014). The conflict about wind energy in forests was studied by analyzing wind energy conflict cases within two different polycentric governance-settings. One case study was conducted in Maine, USA with a focus at the local level in Penobscot County in the towns of Lincoln and Clifton. The other case study was conducted in Rhineland-Palatinate, Germany with focus at the local level in Rhein-Hunsrück district in the municipalities Simmern and Rheinböllen. The two selected regions were characterized by comparable conditions. Both cases were located in western, democratic societies to enable a reasonable comparison. Both states were heavily forested, and wind energy plays an increasingly important role in energy regeneration, causing conflict about forest use. Both states have an important history of forestry and timber industry but because of the economic decline of this sector, remote areas suffer from structural economic problems. Therefore in both states there was a need for economic development. Because of

the remarkable forest landscapes, tourism was seen as an important economic sector, conflicting with commercial use of landscapes.

3.1.1 The state of Maine

The state of Maine is located in the northeastern USA, bordering with Canada. In terms of land area and population, it is one of the smaller states. Wind energy conflicts in forests are a relatively new phenomenon in Maine since the realization of the first project in 2006. Conflicts are becoming more common with increasing numbers of planned projects. The governance of wind energy in Maine is a combination of national, state, and local level decision-making. The polycentric governance system is characterized by a relatively clear distribution of tasks between different decision-making arenas. The town planning boards of the municipalities have planning authority and can decide on wind energy ordinances with zoning suitable for wind energy projects. Therefore, the local level had far-reaching responsibilities in wind energy governance. However, project permitting is a multi-layered process which also requires permits from state and national levels to ensure certain environmental standards. Furthermore, federal tax laws impact the financial incentives for wind energy projects. In conflicts about wind energy projects, courts also play an important role if project permits are appealed by project opponents. The county level between local and state level is weak and has little to no legal importance for wind energy governance.

3.1.2 The state of Rhineland-Palatinate

Rhineland-Palatinate is located in western Germany. In terms of land area and population, it is one of the smaller states. Rhineland-Palatinate is considered a pioneer of wind energy projects in forests in Germany but, due to the large amount of projects and associated changes of landscapes, wind energy increasingly faces much opposition from local residents. The wind energy governance system combines national, state, regional, and local level decision-making. Wind energy planning in Rhineland-Palatinate is based on the principle of countervailing influence, meaning that decision-making arenas at different governance levels need to include previous zoning decisions of higher or lower levels in their plans. Compared to Maine, regional planning authorities allocated between local and state level are more important in zoning processes. However, due to recent controversial changes in legislation, the regional planning level lost most of its power to the municipalities in wind energy planning. In some municipalities, local self-governance mechanisms have been developed in that different communities voluntarily agreed on the concentration of wind energy at one site with best wind conditions and financial benefits were shared between surrounding communities. This mechanism was intended to keep some areas free of wind energy. Furthermore, legislation from the European Union and international agreements impacts the realization of wind energy projects by setting certain environmental standards and protection of culturally important scenery. The permitting is based on a single-level decision-making of the districts for smaller wind energy projects and of a combined decision-making of district and state planning authorities for larger projects.

3.2 Data collection and analysis

Problem-centered qualitative interviews were conducted with individual and collective stakeholders on local, regional and state levels in both states (Table 1). The interview participants were selected according to the principle of complementarity and included a broad variety of forest and wind energy stakeholders. Initially, some "key actors" such as state forest services, wind energy companies, environmental and recreational interest organizations, local residents, and forest owners were contacted. Further interviewees were identified by using a network sampling method, asking interview participants about further contacts with engagements in

conflicts about wind energy in forest areas. The data were considered saturated when no further additional organizations or key actor groups were suggested as important interview candidates by interviewees. This method of stakeholder identification ensured that all relevant interests were included in the interviews. In total, 20 interviews (with 22 interviewees) in Maine and 20 interviews (with 24 interviewees) in Rhineland-Palatinate were conducted at local, regional, and state levels, combined. In both case study regions, similar stakeholders were selected for the interviews. Some modifications in the interview participant selection were made because of differences in the interest group landscapes and relevant governmental structures.

The interviews followed a common, semi-structured interview guide where questions could be adapted to individual knowledge and experiences of the interviewees. The interviews were designed to focus on conflicts related to wind energy projects in forests and the interviewee perception about wind energy conflict governance. Additional written sources (e.g. newspaper articles, webpages, governmental documents) were collected and triangulated to gain a deeper understanding of conflict development, process and structure in the two case study regions.

	Maine	Rhineland-Palatinate
I. State		
Politics	3	5
Administration	4	8
II. Civil Society		
Environment and Nature Conservation	1	3
Livelihood and Recreation	5	3
III. Companies and special interest groups		
Wind Energy	4	2
Forestry and Timber Industry	4	2
Tourism	1	1
Total	**22**	**24**

Table 1: Represented actors in interviews in both cases

The collected data was analyzed by a qualitative-content analysis (Glesne 2006). The interviews were coded using MAXQDA. The category system focused on perceptions of the governance system, features of different decision-making arenas, factors that constitute legitimacy in conflict governance, and actions of the interviewees within the governance system. In an iterative process of data agglomeration and clustering, the actor typology was developed.

4 Results

4.1 How actors involved in wind energy conflicts perceive polycentricity

The perception of polycentric wind energy governance was comparable between Maine and Rhineland-Palatinate. The arguments in favor of polycentric governance arrangements were similar to the theoretical arguments stated in the literature. Most interviewees held a predominantly positive attitude towards the polycentric wind energy governance system (Graph 1). For example, a member of the town administration near a realized controversial wind project

in Maine described her perception of the polycentric conflict governance system very positively:

> *"It was a tiered process ... had federal, state and local necessary to get the permitting ... I'm grateful that it was a three-tier process because you had the people with the knowledge and the education ... if ... things weren't considered appropriately, ... the court system is in place."* (Maine)

Maine

Different decision-making scales (community, state level) consider different issues

Includes different needs and knowledge of different levels

Ensures consideration of a broad range of factors

Both

Polycentric governance helps to adapt rules to local circumstances

Allows including all interested parties in appropriate ways

Fit to specific circumstances and needs

Wrong decisions can be changed by other decision-makers

Different decision-makers control each other which increases legitimacy

Multiple decision-making arenas allow mutual learning and evolutionary development of rules

Different decision-making arenas have different strength and can come to better results in interplay with each other

Different problems require different scales of action

Rhineland-Palatinate

If one level cannot fulfill its function properly other decision-makers jump in

Polycentric nature conservation governance increases species and habitat protection compared to a single-level decision-making point

Graph 1: Positive arguments about polycentric conflict governance provided by case study interviewees

Interviewees argued in favor of polycentric governance arrangements because it gives the opportunity for mutual learning of different decision-making arenas:

> *"We present to the districts the successful models of local self-governance and ask them to think about that model within their districts with the municipalities. We give them a blueprint and they can try with that as a starting point."* (Rhineland-Palatinate)

However, there were also some critical voices that would prefer a more monocentric governance system (Graph 2). A lack of efficiency in decision-making was one of the core arguments mentioned against polycentric conflict governance. The ability to govern a successful

transition towards renewable energies was doubted. Other arguments against polycentricity were mentioned. For example, the danger of a "race to the bottom" (e.g. in species protection) in an evolutionary development of rules by different competing and overlapping jurisdictions was raised as a concern.

Maine

Towns choose the least costly governance system if they can choose between different regulatory bodies but the cheapest regulatory body is not necessarily the best one in terms of effectivity and legitimacy

Wastes time and money, every decision takes long

More chaotic, less systematic and less efficient

Processes are too long and complex

Both

Can become a barrier to project realization because decision-making is more difficult, complex, and time consuming

Causes chaos

Different decision-making arenas can re-do decisions of others, which makes realization of plans or ambitious goals difficult or even impossible

Rhineland-Palatinate

Polycentric governance system can foster conflict between different decision-making arenas

Danger of "race to the bottom", e.g. in nature conservation and environmental protection

Different rules at different places is unfair

Graph 2: Negative arguments about polycentric wind energy conflict governance provided by case study interviewees

Interview participants in Maine criticized the polycentric governance system for making project realization difficult:

> *"Every level that we add ... I believe it becomes redundant and a road block."*
> (Maine)

Even though there were many similarities in actor perceptions in the two systems, there were also some important differences between Maine and Rhineland-Palatinate. Some interview participants in Rhineland-Palatinate found it unfair or unreasonable to have varied rules at different places, while interview participants in Maine did not. This difference in perception seemed to be based on the fact that Maine, as a home-ruled state, is generally more based on bottom-up decision-making instead of top-down decision-making, which is culturally rooted in Rhineland-Palatinate.

4.2 How actors involved in wind energy conflicts think about legitimacy

Legitimacy is one of the core dimensions to evaluate governance systems. The interviewed actors had clear ideas about which factors constituted legitimacy in governance (Table 2). Most interview participants widely agreed in the dimensions of legitimacy in conflict governance, independent from their actual positions and roles in the conflict cases. Input, throughput, and output legitimacy criteria were mentioned by interviewees when they described their ideas of legitimate wind energy conflict governance.

Input Legitimacy	Mentioned in
Administration needs to have the resources to properly review projects	Maine only
Combined decision-making of different governmental organizations	Maine only
Control of decision-makers by other authorities	Maine only
Cooperation of and legal participation of those who live nearby	Maine only
Distribution of power to the right authorities	Maine only
Structured participation process	Maine only
Tax based financing of public processes (e.g. stakeholder processes) instead of donor financing	Maine only
If one decision-making arena fails another jumps in	Rhineland-Palatinate only
Inclusion of standards of higher decision-making levels in lower level regulations	Rhineland-Palatinate only
Third party monitoring of standards	Rhineland-Palatinate only
Competence of decision-makers	Both
Neutrality of decision-makers	Both
Participation of those directly affected	Both
Participation of organized interest groups	Both
Throughput Legitimacy	
Equal opportunities for all interests to participate in discussions	Maine only
Decision-making without political pressure	Maine only
Opportunity to express opinions without negative consequences	Maine only
Consent-seeking	Rhineland-Palatinate only
Clear legal rules and detailed regulations on how to make decisions	Both
Communication	Both
Consideration of local knowledge	Both
Equal consideration of different interests	Both
Decisions based on facts instead of values	Both
Decision-making based on expert knowledge	Both
Decision-making independent from financial interests	Both
Information of the general public about the decision-making process	Both
Orientation at the general well-being in decision-making	Both
Transparent deliberation of all aspects	Both
Transparency	Both
Output Legitimacy	
Fair distribution of costs and benefits	Rhineland-Palatinate only
Governmental learning and improvement over time	Rhineland-Palatinate only
Decision considers "the broader picture"	Both
Effectivity	Both
Overarching governance goals and cohesive strategy to achieve them	Both
Participation in financial benefits of those who live near by	Both

Table 2: Factors that constitute legitimacy in wind energy governance for conflict participants

The importance of considering all interested parties in decision-making was mentioned by nearly all interview participants in both cases:

> *"You have to understand all sides of the issue … you have to have a balanced really well facilitated discussion about that policy issue."* (Maine)

Decision-making control by other authorities was mentioned as a central argument for the high level of legitimacy of polycentric conflict governance. For example, this aspect was mentioned by local residents that were advocating against a planned wind energy project in Maine:

> *"It was really good that there's a mechanism in place where we could take … this local decision looked at by an outsider … if your small town has gone afoul and you have a strong grievance against what's happened locally, … but we still were able to take the decision … and argue to someone else with more power and say, this wasn't done correctly."* (Maine)

In both cases, a lack of legitimacy was perceived in the form of a lack of neutrality of decision-makers. For example, interviewees in Maine believed this was because of political pressures:

> *"Unfortunately, the weak link … is …that departments…are not entirely neutral and independent and they are affected by appointees from Governors."* (Maine)

The assumption that there is a trade-off between legitimacy and efficiency in wind energy governance was shared by the interview participants in both cases. Polycentricity was considered as relatively inefficient compared to a monocentric decision-making system. Factors that constitute legitimacy for many actors are also considered as inefficient (e.g. participation, mutual control of different decision-making arenas, or considerate deliberation of different interests). The polycentric permitting system of wind energy projects in Maine, especially, was considered as highly inefficient by several interview participants:

> *"You have to do the two-step process, you do one step at one agency, then you have to go to a different agency to do the second step. That's really a waste of time and money … whether you're supporting or opposing it … turned out to be a really stupid idea."* (Maine)

4.3 Actor perceptions of different decision-making arenas

Different decision-making levels were associated with different strengths and weaknesses by interviewees in Maine and Rhineland-Palatinate. The opinions about different levels were very similar in the two cases: local level decision-making arenas were considered as being good in enabling participation of residents and in considering local knowledge, wishes, and needs in their decision-making. Higher levels were considered as being better by having "the broader picture" in mind, considering large-scale impacts of wind energy, environmental protection and landscape protection, and taking the general goals of energy policy into account. In Maine, the importance of tradition and local identity in the distribution of power between different decision-making arenas was emphasized in the interviews. Local level decision-making was considered as part of the culture. In contrary, in Rhineland-Palatinate top-down planning was culturally more accepted and more established. In both cases, an important part of the discussion about the design of wind energy conflict governance systems was how to distribute decision-making power between decision-making arenas at different levels.

4.3.1 Local decision-making arenas

Local decision-making was strongly favored by many interview participants in Maine for cultural reasons:

> "We're a state that loves its local control ... that's what we have. ... There are times when local control is great because those communities understand the needs, wants and desires of their community. Sometimes it can be a drawback if you're trying to make sort of a systemic change ... if you're trying as a society to move ... into more clean energy, sometimes local control can be challenging. But that doesn't mean that we should do away with." (Maine)

Local decision-making was also considered as advantageous because of the comparably easy access to decision-makers. In Rhineland-Palatinate, it was argued that local self-governance would be more effective in distributing costs and benefits of wind energy projects. In Maine, it was also argued that the local level has a higher legitimacy than the state level because special interest group lobbyists would be less influential in local decision-making processes.

There were also several interviewees, mainly in Rhineland-Palatinate, who criticized the high power allocation at the local level. They argued that local decision-makers cannot consider all complex interdependencies related to wind energy. It was criticized that the implementation of energy transition would be too uncoordinated without sufficient consideration of nature conservation:

> "We see a very big danger that the energy transition runs on ... very chaotic. ... Other essential goods obviously go to the dogs. ... Envy and a competition between the communities develop ... We wish that purely technically sound central planning, with many nature conservation arguments, would be done." (Rhineland-Palatinate)

Furthermore, it was argued that no optimal spatial allocation of wind energy projects could be reached from the local level. It was argued that financial interests at the local level would be too high to enable a legitimate deliberation of all project impacts because people would be too egoistic to consider large-scale and long-term effects.

4.3.2 Regional decision-making arenas

The regional level included all governance levels above the local level and below the state level. In Rhineland-Palatinate three different levels between local and state level existed: district level, and two different special purpose jurisdictions for planning, the regional planning communities and the structure and approval management organizations. In Maine, a county level existed, but this level had limited decision-making powers. The difference in importance of decision-making arenas between the local and state level was one of the major differences between the two governance systems of wind energy conflicts in these two cases.

It was argued that regional planning could consider larger scale aspects much better, such as bird migration routes:

> "Everything concerning the protection of species cannot be considered at the local scale. Especially if it is a mobile species, as bats and birds, then you just have to have the greater perspective. Check main occurrences, where are the main migratory lines." (Rhineland-Palatinate)

Whereas Rhineland-Palatinate had a long tradition and experience with regional planning, Maine had no significant experience with decision-making arenas at the regional level in wind

energy conflict governance. The lack of regional planning tradition was mentioned as a central argument against those decision-making arenas, even though they might yield advantages in governance outcome:

> *"Counties in Maine have historically been ... meaningless. ... there have been efforts, ... trying to beef up the planning at a county level, ... that would be much better ... but, there's so much political resistance here to it that nobody has figured out a successful way to get anything bigger, anything between the towns and the state."* (Maine)

In both cases, it was argued that the regional level would be better to ensure a systematic, coordinated, and efficient energy transition with consideration of other interests. It was argued in favor of regional level energy governance because energy transition has spillover effects in other parts of the world, and local decision-makers could not consider all the complex interdependencies related to this issue. It was argued that regional decision-making in energy governance would be a good compromise between knowing about local circumstances and thinking more strategically in larger dimensions.

4.2.3 State level decision-making arenas

In both cases interviewees agreed that some aspects of wind energy governance should be regulated by state level decision-making arenas in cases where the problem scale extends beyond the spatial scale of municipalities. Impacts on scenery and energy prices were often mentioned as examples for aspects of wind energy that require decision-making at the state level, for example from an interviewee in Maine:

> *"I think if something is good or bad for everybody, than those things should be decided at the legislative level ... If you're driving up most of the Maine corridors now you see towers ... Everybody's gonna be impacted by the electricity price ... There's a lot of impacts ... that come down on everybody's back."* (Maine)

Some interview participants feared too strong an influence of lobbyists at the state level, and therefore argued against state level decision-making arenas. For example an interviewee in Maine argued:

> *"You could be seduced into the idea, well, if the State would just come up with a law that just protects people...but at the state level, there's way more lobbying from the industry than at the local level, ... I'd rather keep the mechanisms that exist in place and hope that the citizens have their act together and create ordinances that are respectful of people's rights."* (Maine)

4.3.4 National level decision-making

The national level was seen as important to set general guidelines and goals in energy policy in both cases. In Rhineland-Palatinate it was argued by many interviewees that a successful transition towards a renewable energy system could only be realized by a systematically planned top-down approach:

> *"The capital ... is supposed to organize a successful energy transition. ... how can you plan it, if the states don't know how many wind turbines they will have in five years and how much electricity. There must be an overall concept. There has to be a demand analysis first. Many people have to sit together and must make a basic concept, well-planned."* (Rhineland-Palatinate)

In Maine, this argument was less prominent in the interviews but was also shared by few interview participants. In general, interview participants in Maine agreed that national level decision-making in energy policy influences the actions of state level decision-making arenas.

4.4 Actor behavior in polycentric governance systems

The described actor behavior of different conflict participants was generally similar in both governance systems (Table 3). Six different actor types of conflict participants in polycentric conflict governance systems were identified: the Linker, the Creator, the Maintainer, the Power Shifter, the Mobile Learner, and the Overwhelmed & Passive.

The Linker is often a collective non-state actor; for example, an environmental interest groups or a wind energy company. This actor type has a complex role in polycentric governance processes by linking decision-making arenas at different levels with each other. These actors link processes by advocating certain interests over several layers of decision-making arenas or by transferring ideas from the local level to a higher level or vice versa. For example, an employee of an environmental organization in Maine explained:

> *"We were involved in that legislative process ... to make it harder for companies to do wind power ... And we are usually in contact ... with the community ... they might identify or know of issues that we might not know ... the kind of really local environmental knowledge that we might not have."* (Maine)

The Creator is someone who creates new decision-making arenas within existing governance systems and therefore makes the governance system more polycentric. The creation of new decision-making arenas is often motivated by the wish to solve a problem by developing a more suitable decision-making arena than the pre-existing ones. A local mayor from Rhineland-Palatinate explained how a local self-governance mechanism was created:

> *"We agreed on a so-called "solidarity pact" ... we have twelve villages ... and we made an agreement about the distribution of the financial benefits of the wind energy projects with the goal of achieving a reasonable distribution of those benefits."* (Rhineland-Palatinate)

Often, this actor type is a state actor who follows the formal legitimation of designing and redesigning the architecture of the state. In some cases, this function can be also fulfilled by a non-state actor, e.g. by certification organizations, or if the state voluntarily decides to give some power away to a non-state actor.

The Maintainer is often a counterforce of the Creator because this actor type tries to maintain existing governance structures. An interviewee in Maine, for example, argued that wind energy planning should be maintained at the state level Land Use Regulation Commission instead of transferring the decision-making to another governmental agency:

> *"The Land Use Regulation Commission ... had ... reasonable ways to approach that ... they zoned the territory ... left fairly large expanses available for production use."* (Maine)

This actor type is often motivated by power considerations because s/he would lose some or all power to a newly created decision-making arena. This type is often a state actor who is actively involved in the design and maintenance of conflict governance structures, but also non-state actors can be arena Maintainers if they strengthen and support existing power allocations.

The Power Shifter is a counterforce to the Maintainer. This actor type tries to change the distribution of power between decision-making arenas at different levels. Power Shifters can be active when they have the legal position to re-direct decision-making power. For example, the state government in Rhineland-Palatinate took away decision-making power from regional planning authorities and gave it to local municipalities instead. But this actor type can also be a passive Power Shifter who advocates in favor of a re-allocation of power to other decision-making arenas without having the power to actually change the power distribution between different decision-making arenas. For example, some environmental organizations in Maine argued in favor of county level planning, instead of planning mainly based on local ordinances:

> *"Having some sort of regional planning for wind would make a lot of sense ... not every town is gonna be appropriate for wind and the impacts in one town may hit a different town."* (Maine)

The Mobile Learner is usually a non-state actor who advocates interests in favor or against wind energy projects in different decision-making arenas at different levels; for example, a local citizen initiative. During the conflict process, the Mobile Learner continuously increases knowledge about the functioning of different arenas, e.g. courts, local planning boards, or state level decision-making. In a learning-by-doing behavior, this actor tries every available arena to realize interests and moves between different arenas in its actions. The Mobile Learner adapts to polycentric conflict governance systems and sees advantages in the multi-level nature of conflict decision-making arenas. If advocacy in one arena is not successful s/he can try again another competing or complementing arena. A member of a citizen's group in Rhineland-Palatinate described the activities of her group:

> *"We write comments, we seek contacts with politicians. ... We gave up here in the region, because it's pointless. ... We formed nationwide alliances ... with citizens' initiatives. ... We did a federal press conference in Berlin ... we call for a [wind energy] moratorium ... and that the federal level makes rules for the state governments about the implementation of the energy transition."* (Rhineland-Palatinate)

The Overwhelmed & Passive is usually a non-state actor who has a strong interest in the realization or non-realization of wind energy projects but does not possess the knowledge or other resources (e.g. time, money) to become actively involved in decision-making processes. Therefore this actor type usually has a highly negative attitude about polycentric conflict governance because the complexity of these structures makes it impossible for this actor to actively participate in decision-making processes about controversial conflicts. One wind energy opponent from Maine described:

> *"We didn't know the rules of the state, like state law about public meetings or public information ... we didn't really know what ordinances were hardly."* (Maine)

Actors involved in conflicts can change their type, e.g. an initially Overwhelmed & Passive actor can transform into a Mobile Learner during the conflict process if the initial state of helplessness can be overcome. The Maintainer might become a Creator during conflict processes if any events occur that change the perception about the appropriateness of existing governance structures to successfully manage existing conflicts. Sometimes individuals might also change their actor type if they change their role in a conflict process; for example, if an interest group employee becomes a state actor, e.g. in a governmental agency, with other interests and tasks in the conflict.

Actor type	Description of actor behavior	Example from cases
Linker	Mobility between different arenas	Some actors are fluid in their actions between different decision-making arenas (e.g. citizens groups engaging against projects, wind energy companies and some environmental organizations).
	Level transgressing linking of different decision-making arenas	Environmental organizations in Rhineland-Palatinate and Maine connect local knowledge about planned projects with state-level lobbying.
Creator	Creation of new decision-making arenas	Local mayors in the Hunsrück mountains developed a local self-governance mechanism to reduce conflicts about the distribution of financial benefits and impact on landscapes.
Maintainer	Prevention of the creation of new decision-making arenas	Regional planning authorities in Rhineland-Palatinate argued against the creation of local self-governance systems to regulate wind energy projects, instead they argued in favor of a regulation by regional planning.
	Focus of activities on one decision-making arena	Some actors stick to one established single decision-making arena, e.g. many state-level interest groups in both case study regions (mainly because of intra-organizational reasons).
Power Shifter	Change in power distribution between different governance levels	Government of Rhineland-Palatinate took power away from regional planning authorities to give more power to municipalities.
	Advocacy for shift of decision-making power	In Rhineland-Palatinate environmental organizations lobby in favor of shifting decision-making power to planning authorities, state level, or national level.
	Institutional learning from experience	Governance design is going through adaptation process in response to wind energy conflicts, for example planning boards in Maine did or re-did wind energy ordinances; State Development Program and Wind Energy Enactment were developed in Rhineland-Palatinate.
Mobile Learner	Learning	Local residents from Maine and Rhineland-Palatinate went through substantial learning process in understanding how different decision-making arenas work and how they can use different decision-making arenas to advocate their interests in the wind energy conflict.
Overwhelmed & Passive	Does not have organizational capacity to participate in decision-making because of too many decentralized decision-making processes	Some environmental organizations in Rhineland-Palatinate and Maine do not have the financial and time resources to participate in every wind energy decision-making process, although they would have the legal right to do so.
	Desperation based on complexity of governance system	A private wind energy project developer in Maine seemed surprised about the many required permits by different authorities and the different arenas (e.g. different courts) used by wind energy opponents.

Table 3: Examples for behavior in polycentric conflict governance systems of different actor types

5 Discussion

The transition towards renewable energies is seen as a complex multi-scale problem (Goldthau and Sovacool 2012; Mattes et al. 2015). Polycentric governance has been advocated for complex, multi-scale problems (Andersson and Ostrom 2008; McGinnis and Walker 2010; Ostrom 1999; Sovacool 2011) but its applicability in energy governance had not widely been explored. Sovacool (2011) argued that more research is needed in energy governance applying the concept of polycentricity. This study followed this appeal, and showed that the concept of polycentricity can yield valuable insights into wind energy conflict governance.

The first research question sought to understand how different actors involved in wind energy conflicts in forests perceive the polycentric governance system regulating this conflict. We found that theoretical arguments for polycentric governance arrangements to solve complex problems were shared by interview participants involved in wind energy conflicts (Andersson and Ostrom 2008; McGinnis and Walker 2010; Ostrom 1999; Sovacool 2011). Generally, stakeholders in both cases had a positive attitude about polycentric governance systems. Polycentric governance was seen as a system that enables adaptive conflict governance and allows decisions that take local and expert knowledge from different levels into account. However, criticism on polycentricity described in the literature (Sovacool 2011) was also shared by interviewees in both cases. For example, the interviews and the literature both identify polycentric governance systems as sometimes chaotic, inefficient, and time-consuming. There were also some critical voices, who argued that polycentric governance would be disadvantageous for the realization of complex tasks. For example, the successful transition towards renewable energies may be stymied if decision-making processes are too slow, too chaotic, and different decision-making arenas would continuously block each other's decisions. This phenomenon was already previously described as a joint decision-making trap (Poteete 2012). It has been argued that a successful transition towards renewable energies requires a strategic long-term political approach (Kern and Smith 2008). This study showed that the ability of polycentric systems to implement strategic long-term energy policy has been doubted by stakeholders in two different polycentric systems. The findings imply that policy makers should allow the development of polycentric systems for decision-making about wind energy. However, those policies should try to reduce negative aspects of polycentricity and find ways to make the realization of complex goals possible, such as the transition towards renewable energies.

The second research question aimed to understand which factors constitutes legitimacy in wind energy governance for actors involved in wind energy conflicts. Even though different individuals differed in their evaluations of legitimacy, the aggregated evaluations of legitimate wind energy conflict governance design criteria were very similar in the two cases in Maine, USA and Rhineland-Palatinate, Germany. Therefore, this study showed that the perceptions of legitimate governance of this conflict is not only limited to a specific context. This finding confirms previous arguments (Black 2008; Schmidt 2013). The low efficiency of polycentric wind energy conflict governance was also seen as the result of a trade-off between efficiency and legitimacy in conflict governance design as it was described in previous literature on energy governance (Liljenfeldt 2015). These findings imply that policy-makers need to decide on an appropriate balance of efficiency and legitimacy in the governance of renewable energy transition. Furthermore, the findings imply that experiences on how to organize energy governance that is perceived as legitimate by stakeholders might be widely transferable to other contexts, as least within western democratic cultures. Furthermore, the findings indicate that research findings on perceptions of legitimacy might be also widely transferable to other contexts and problems.

The third research question sought to examine how actors involved in wind energy conflicts view different decision-making arenas at different governance levels within polycentric systems, and what similarities or differences exist between the two case study areas. Actor perceptions of which decision-making points were most suited for dealing with certain aspects of wind energy conflict governance were very similar in both cases. Decision-making arenas at local levels were considered better for enabling participation of those directly affected and in considering local knowledge and thus also confirmed arguments in the literature in favor of integrating local levels in decision-making (Andersson and Ostrom 2008; Andersson et al. 2014). Higher level decision-making arenas were considered better in considering long-term and large-scale impacts and the planned and systematic realization of complex goals. This also confirmed previous arguments in the literature (Koschatzky and Kroll 2008). Power allocation between decision-making arenas had been described as an increasingly important question because of complex governance systems that include many levels and the complex multi-scale character of sustainability challenges (Cash and Moser 2010; Gibson et al. 2000; Poteete 2012). Especially in energy governance, the distribution of power between different levels has been seen as an important issue (Pasemeni et al. 2014). This study showed that the preferences for power allocation between levels are strongly based on the tradition and culture of decision-making. Policy makers need to take local culture and tradition of power allocation between levels into account to ensure the acceptance of wind energy conflict governance by stakeholders. Furthermore, more comparative studies are needed to evaluate the effects of different ways to allocate power between levels on policy outcome.

Fourth, this study aimed to develop a typology that describes actors involved in polycentric conflict governance systems. Few studies have examined how actors involved in complex problems think about and act in polycentrism (Espinosa-Romero et al. 2014; Hüesker and Moss 2015; Pellikka and Sandström 2011). It had been argued that regional levels are important to bridge the gaps between local and national actions (Smith 2007). Espinosa-Romero et al. (2014) showed the importance of non-governmental organizations in bridging different levels and in integrating local stakeholders in decision-making processes. These findings have been confirmed by this case study. Furthermore, this study showed that the role of actors bridging different levels is not only limited to non-governmental organizations. Wind energy companies, with their outreach to local communities and parallel lobbying activities at state and national levels, also fulfill an important function in linking different governance levels in wind energy conflicts. These findings indicate that coordination and linking activities between decision-making points are mainly carried out by civil society and market actors in polycentric systems. The proposed typology shows that some actors create and utilize polycentric governance systems successfully whereas other actors are disadvantaged because they lack the resources or skills to advocate their interests in polycentric systems. The proposed actor typology in this study will help practitioners and researchers to understand conflict processes in polycentric governance settings better and to estimate the impacts of changes in governance design on different actors. Policy makers need to take the varied effects of polycentric systems on different actors into account when deciding on renewable energy conflict governance systems, including wind. The applicability of actor typologies in other policy contexts should be tested in future research.

This study is not without limitations. Since both cases are based in Western democratic societies, the findings might not be applicable to other cultural or political contexts. Furthermore, both cases were located in federal states; actor perceptions of state and national levels might be different in countries with centralized state systems. The findings are based on cases of wind energy conflicts only. The perceptions of polycentric governance system for other energy or natural resource conflicts with involvement of different stakeholders might differ. Fu-

ture studies are needed to examine this. Therefore it is of special interest to examine empirically if the findings about the assumed merits of polycentricity also apply to the governance of complex transition processes. This kind of study could improve knowledge about how to design governance to enable a successful transition towards a more sustainable world.

6 Conclusions

This study examined how actors involved in wind energy conflicts in two different countries with different polycentric governance systems perceive polycentricity, which factors constituted legitimacy in wind energy governance for them, and how they acted in these polycentric systems. The study showed that the perceptions of polycentric governance systems, different decision-making levels within polycentric systems, and the aggregated evaluations of legitimate wind energy conflict governance were very similar in in the two cases in Maine, USA and Rhineland-Palatinate, Germany. We also learned that cultural differences exist concerning preferences for power allocation between levels. A typology was proposed that described actors within polycentric systems. Wind energy conflicts have some unique characteristics, but are also similar to other energy conflicts and share general mechanisms with many other natural resource conflicts. Therefore, the findings of this study are widely applicable in energy and natural resource conflict management. The concept of polycentricity was developed and predominately empirically tested in the context of small-scale, locally governed commons (Araral 2014). The transition towards a sustainable energy system is a completely different sustainability challenge (Goldthau and Sovacool 2012). This challenge includes the governance of small, medium, and large-scale common goods (e.g. landscapes, global climate,) but also private goods (e.g. privately owned land of project sites). Governance settings which worked successfully to avoid local tragedies of the commons are not necessarily effective in governing a complex transition process. The limits of the approach were already discussed for large-scale commons (Araral 2014); sustainability transitions might be another field where advantages of the design principle of polycentricity do not apply in every case. It will be important for future studies to carefully study and suggest a path forward for polycentric governance systems in this new context.

Acknowledgments

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Appendix 1: Authors' contributions to the manuscripts and articles publication status

(According to § 9, § 12, § 14 of the guideline for cumulative dissertations)

Article #	Short Title	Author status and percentage of authorship	Factor (§14)	Publication status (Guideline § 9)
1	Interest groups in a changing governance landscape	Co-author with predominant contribution [Überwiegender Anteil] NAJ= 70% JEN= 30%	1	Date submitted: 3 February 2014 Major revisions, Date decision received: 27 March 2014 Date resubmitted: 20 June 2014 Date accepted: 27 July 2014 Date published: January 2015 In: Forest Policy and Economics 50, pp. 228-235.
2	Trust in natural resource conflicts	Co-author with equal contribution [Gleicher Anteil] NAJ=40% ALW=40% JEN=10% JEL=10%	1	Date submitted to Society and Natural Resources: 27 November 2014 Major revisions, Date decision received: 19 February 2015 Date resubmitted: 14 April 2015 Major revisions, Date decision received: 04 August 2015 Rejected, Date decision received: 05 January 2016

3	Frames in scalar conflicts	Co-author with predominant contribution [Überwiegender Anteil] NAJ= 95% JEN= 5%	1	Date submitted: 30 January 2015 Major revisions Date decision received : 26 April 2015 Date resubmitted: 16 June 2015 Accepted 08 August 2015 In: Land Use Policy 49, 426-434.
4	Stakeholder perceptions of polycentricity	Co-author with predominant contribution [Überwiegender Anteil] NAJ=75% JEL= 15% JEN=10%	1	Date submitted: 22 July 2015
Sum (min. 3)			*4*	

Authors abbreviations:

ALW= Alisa Weber

JEN= Jens Newig

JEL= Jessica Leahy

NAJ= Nataly Jürges

Presentations at conferences and workshops

(According to § 9b, guideline for cumulative dissertations)

Article #	Presentations at conferences and workshops
1	**/**
2	Presented as a poster at the 20st International Symposium on Society and Resource Management, 12 June 2014, Hannover, Germany.
3	The typology has been presented and discussed with stakeholders as part of a presentation at the *Energiedialog* at the 15th of May 2014 in Dannenberg, Lower Saxony.
4	Presented as a poster at the 20th Conference of the Society of Human Ecology, October 2014, Bar Harbor, Maine USA.

Information regarding the publication medium

(According to § 16 guideline for cumulative dissertations)

Article #	Publication medium	Journal Metrics	Peer review system used
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2			
3	Land Use Policy	Impact Factor (2013): 3.134	Double-blind review process (two reviewers)
4	Energy Policy	Impact Factor (2013): 2.696	Double-blind review process

Protocol of contributions

Detailing the relative contributions of co-authors of a paper according to §12, guideline for cumulative dissertations

Full reference: Juerges, Nataly; Jens Newig (2015): How interest groups adapt to the changing forest governance landscape in the EU: A case study from Germany. Forest Policy and Economics 50, 228-235.

Date submitted: 3 February 2014

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	Author name	Share (%)	Details of contribution	Signature
1.	Nataly Juerges	70	Participation in the conceptual development of the manuscript, data collection and data analysis, literature search, participation in the development of the structure and line of argument of the manuscript, writing of all sections of the manuscript.	
2.	Jens Newig	30	Participation in the conceptual development of the manuscript, participation in the development of the structure and line of argument of the manuscript, feedback on several versions of the manuscript, suggestion of additional literature.	

Protocol of contributions

Detailing the relative contributions of co-authors of a paper according to §12, guideline for cumulative dissertations

<table>
<tr><td colspan="5">Full reference: Juerges, Nataly; Alisa Weber; Jens Newig; Jessica Leahy: The Role of Trust in Local Natural Resource Management Conflicts: A Case Study from Forest Management in the German State of Lower Saxony

Date submitted: 27 November 2014

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Date of protocol: 29 July 2015</td></tr>
<tr><td></td><td>Author name</td><td>Share (%)</td><td>Details of contribution</td><td>Signature</td></tr>
<tr><td>1.</td><td>Nataly Juerges</td><td>45</td><td>Data collection and data analysis, predominant role in model development, participation in the conceptual development of the paper's storyline, participation in literature search, writing of the methods section and predominant in writing of the results section, participation in writing the discussion section, equal contribution with ALW in writing the introduction and conclusions sections.</td><td></td></tr>
<tr><td>2.</td><td>Alisa Weber</td><td>45</td><td>Participation in model development, participation in the conceptual development of the paper's storyline, predominant in literature search, writing of the theory section, participation in writing of the results section, predominant in the writing of the discussion section, equal contribution with NAJ in writing the introduction and conclusions sections.</td><td></td></tr>
<tr><td>3.</td><td>Jens Newig</td><td>10</td><td>Participation in the conceptual development of the paper's storyline, participation in model development, feedback on several versions of the manuscript, participation in the development of the justification for the paper.</td><td></td></tr>
</table>

Protocol of contributions

Detailing the relative contributions of co-authors of a paper according to §12, guideline for cumulative dissertations

<table>
<tr><td colspan="5">Full reference: Juerges, Nataly; Jens Newig (2015): What role for frames in scalar conflicts? Land Use Policy 49, 426-434.

Date submitted: 30 January 2015

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<tr><td></td><td>Author name</td><td>Share (%)</td><td>Details of contribution</td><td>Signature</td></tr>
<tr><td>1.</td><td>Nataly Juerges</td><td>95</td><td>Conceptual development, data collection and analysis, literature search, development of the manuscript's structure and line of argument , writing of all sections of the manuscript.</td><td></td></tr>
<tr><td>2.</td><td>Jens Newig</td><td>5</td><td>Feedback on the penultimate versions of the manuscript, suggestion of additional literature.</td><td></td></tr>
</table>

Protocol of contributions

Detailing the relative contributions of co-authors of a paper according to §12, guideline for cumulative dissertations

Full reference: Juerges, Nataly; Jessica Leahy; Jens Newig (under review): Stakeholder perceptions of polycentric governance in wind energy conflicts: An actor typology.

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	Author name	Share (%)	Details of contribution	Signature
1.	Nataly Juerges	75	Predominant in the conceptual development of the paper, literature search, data collection and data analysis, development of the manuscript's structure and line of argument, writing of all sections the manuscript.	
2.	Jessica Leahy	15	Participation in the conceptual development of the paper, participation in the interviewee selection, participation in the preparation and organization of the interviews in Maine, participation in the development of the structure and line of argument of the manuscript, feedback on the initial paper outline and several versions of the manuscript.	
3.	Jens Newig	10	Participation in the conceptual development of the paper, feedback on the initial paper outline, the last and the penultimate versions of the manuscript, suggestion of additional literature.	

Appendix 2: Identified forest stakeholder at the national level

Stakeholder Category	#	Identified Stakeholder Organizations
Forestry	10	• Deutscher Forstverein • Arbeitsgemeinschaft Deutscher Waldbesitzer • Deutscher Forstwirtschaftsrat • Forstausschuss des Deutschen Städte- und Gemeindetags • Deutscher Landkreistag • Verband Deutscher Forstbaumschulen • Arbeitsgemeinschaft naturgemäße Waldwirtschaft • Kuratorium für Waldarbeit und Forsttechnik • Deutscher Bauernverband • DLG Ausschuss für Forstwirtschaft
Timber industries	7	• Deutscher Holzwirtschaftsrat • Gesamtverband Deutscher Holzhandel • Hauptverband der der Deutschen Holz und Kunststoff verarbeitenden Industrie und verwandter Industriezweige • Verband Deutscher Papierfabriken • Verband der Deutschen Holzwerkstoffindustrie (VHI) • Vereinigung Deutscher Sägewerksverbände • Arbeitsgemeinschaft der Rohholzverbraucher
Employment in forests	5	• Bund Deutscher Forstleute • IG Bauen-Agrar-Umwelt • Deutscher Forstunternehmer-Verband (DFUV) • Fachgruppe Forstwirtschaftliche Lohnunternehmer • Bundesverband Freiberuflicher Forstsachverständiger
Renewable Energies	7	• Bundesverband für Erneuerbare Energien • Bundesverband BioEnergie • Deutscher Biomasseverband • Bundesverband für Brennholzhandel und Brennholzproduktion • Deutscher Energieholzpellet Verband • Plattform Nachhaltige Biomasse • Bundesverband Windenergie
Recreational User	9	• Deutscher Wanderverband • Deutscher Sportbund (DSB) • Mountainbike Verband Deutschland e.V. (MTBvD) • Allgemeiner Deutscher Fahrradclub (ADFC) • Deutscher Tourismusverband e.V. (DTV) • Kuratorium für Sport und Natur • Vereinigung der Freizeitreiter und –fahrer in Deutschland • Deutsche Reiterliche Vereinigung

		• Deutscher Imkerbund
Hunting	3	• Deutscher Jagdschutzverband • Ökologischer Jagdverein • Bundesverband Deutscher Berufsjäger
Certification	3	• FSC • PEFC • RAL Gütezeichen
Water	3	• Vereinigung Deutscher Gewässerschutz • Bundesverband der Energie und Wasserwirtschaft (BDEW) • Deutscher Verband für Wasserwirtschaft, Abwasser und Abfall
Environmental, nature, and landscape conserva-tion	17	• WWF • Greenpeace • Robin Wood • BUND • NABU • Deutscher Naturschutzring (DNR) • Verband Deutscher Naturparke • NaturFreunde Deutschland • PrimaKlima • Schutzgemeinschaft Deutscher Wald • Schutzgemeinschaft Deutsches Wild • Grüne Liga • EuroNatur Stiftung • DBU Naturerbe GmbH/Projekt Wald in Not • Deutscher Verband für Landespflege e.V. (DVL) • Deutsche Landeskulturgesellschaft (DLKG) • Bund Heimat und Umwelt in Deutschland e.V. (BHU)
State-Actor	8	• Bundesministerium für Ernährung, Landwirtschaft und Verbrau-cherschutz • Bundesministerium für Umwelt, Naturschutz und Reaktorsicher-heit • Bundesamt für Naturschutz • Umweltbundesamt • Bundesanstalt für Immobilienaufgaben • Bund/Länder-Arbeitsgemeinschaft Wasser (LAWA) • Bund/Länder-Arbeitsgemeinschaft Naturschutz (LANA) • Bund/Länder-Arbeitsgemeinschaft Boden (LABO)
Total	**72**	

Appendix 3: Interview guide expert interviews in Germany

Zum Einstieg würde ich zunächst gerne wissen:

1. Wie und wann sind Sie zum *[Name der Organisation]* gekommen?

2. Was sind zurzeit die wichtigsten Themen für Ihre tägliche Arbeit beim *[Name der Organisation]* ?

Zunächst möchte ich auf die gegenwärtige Situation der forstlichen Flächennutzung in Deutschland eingehen:

3. Es gibt unterschiedliche gesellschaftliche Ansprüche an den Wald. Die Nutzung des Waldes umfasst verschiedene wirtschaftliche, ökologische und soziale Ziele. Durch diese unterschiedlichen Nutzungs-interessen können Konflikte entstehen. Welche Nutzungskonflikte sind nach Einschätzung des *[Name der Organisation]* besonders hervorzuheben?

4. Welche Ansprüche an den Wald sind aus Sicht vom *[Name der Organisation]* besonders wichtig?

5. Wie bewertet der *[Name der Organisation]* das Konzept der multifunktionalen Forstwirtschaft?

Die Energiewende ist zurzeit ein wichtiges Thema in der aktuellen politischen Diskussion. Im Folgen-den möchte ich gerne auf die Energiewende und ihre Auswirkungen auf die Landnutzung in Deutsch-land eingehen.

6. Inwieweit spielt die Energiewende beim *[Name der Organisation]* für das Arbeitsfeld Wald eine Rolle?

7. Verändert sich Ihrer Einschätzung nach das Spannungsfeld zwischen den verschiedenen Nutzungs-interessen in Wäldern durch die Energiewende?

8. Sehen Sie Möglichkeiten durch die Energiewende neue Arbeitsplätze in Wäldern zu schaffen? Welche Rolle spielen KMU?

9. Ein wichtiges gesellschaftliches Thema ist zurzeit die Nutzung von Biomasse für die Energieversor-gung. Insbesondere wird diskutiert, in welchem Umfang fossile Energieträger durch Holz-Biomasse ersetzt werden können:

a. Welchen Beitrag wird die Forstwirtschaft zur Energieversorgung nach Einschätzung vom *[Name der Organisation]* künftig leisten?

b. Entstehen nach Einschätzung vom *[Name der Organisation]* stärkere Konkurrenzen zwischen stoff-licher und energetischer Nutzung von Holz als bisher?

c. Wie sehen Sie die Entwicklung der Nachfrage nach Holz in diesem Zusammenhang?

10. Wie bewerten Sie die Möglichkeit einer verstärkten energetischen Nutzung von Holz im Hinblick auf Umwelt- und Naturschutzziele?

11. Wie bewerten Sie die Möglichkeit Wälder als Standorte für Windenergieanlagen zu nutzen?

12. Im Zusammenhang mit der Energiewende wird auch der Ausbau der Stromnetze diskutiert. Wie bewerten Sie die Nutzung von Waldflächen für den Ausbau der Netze?

Im Folgenden habe ich einige Fragen zum Klimawandel und mögliche Auswirkungen auf die forstliche Landnutzung in Deutschland:

13. Viele Wissenschaftler prognostizieren Klimaveränderungen, andere Wissenschaftler widersprechen diesem. Wie geht der *[Name der Organisation]* mit diesen unterschiedlichen Aussagen um?

14. Welche Rolle spielt das Thema „Klimawandel" für das Themenfeld Wald beim *[Name der Organisation]*?

15. Bei der Diskussion um den Klimawandel geht es zum einen um Klimaschutzmaßnahmen, zum anderen um Maßnahmen zur Klimaanpassung, um auf mögliche Klimaveränderungen zu reagieren. Werden diese beiden Themenfelder beim *[Name der Organisation]* diskutiert?

16. Könnte nach Einschätzung vom *[Name der Organisation]* der Beitrag zum Klimaschutz durch die Forstwirtschaft gesteigert werden?

17a. Inwiefern besteht nach Einschätzung vom *[Name der Organisation]* Bedarf für die Forstwirtschaft, sich an die von vielen Wissenschaftlern prognostizierten Klimaveränderungen anzupassen?

b. Sind Ihnen Beispiele bekannt, wo solche Maßnahmen bereits durchgeführt werden? Sind diese ausreichend?

c. Welche Rolle spielen Ihrer Einschätzung nach fremdländische Baumarten dabei? Wie bewerten Sie die Pflanzung fremdländischer Baumarten mit Hinblick auf den Klimawandel?

d. Ist die potenzielle natürliche Vegetation nach Einschätzung vom *[Name der Organisation]* ein angemessener Orientierungsmaßstab, insbesondere unter Berücksichtigung des Klimawandels?

e. Ist es aus Sicht vom *[Name der Organisation]* eine Möglichkeit, auf die natürliche Anpassungsfähigkeit von Bäumen zu setzen und keine Anpassungsmaßnahmen durchzuführen?

18. Wie werden sich nach Einschätzung vom *[Name der Organisation]* Klimaanpassungsmaßnahmen auf Umwelt- und Naturschutz auswirken?

19. Vorhin haben wir über die unterschiedlichen gesellschaftlichen Ansprüche an den Wald gesprochen. Verändern sich durch den Klimawandel Ihrer Einschätzung nach die vorhin beschriebenen Konkurrenzen zwischen verschiedenen Interessen an der Waldnutzung?

Ich möchte Ihnen gerne noch einige Fragen über die Rolle vom [Name der Organisation] in waldpolitischen Entscheidungsprozessen stellen:

20. Ist der *[Name der Organisation]* in irgendwelche öffentlichen Entscheidungsprozesse zum Thema Waldnutzung eingebunden? Wenn ja, welche? (Verwaltungsverfahren, Mediationen, Anhörungen, Beteiligungsverfahren...)

21. Haben Sie ein Beispiel für ein Beteiligungsverfahren, an dem Sie in letzter Zeit für den *[Name der Organisation]* teilgenommen haben? Wie lief das ab?

22. Haben Sie den Eindruck, dass Vorschläge, die von Ihnen bei solchen Verfahren eingebracht wurden im weiteren politischen Prozess Berücksichtigung gefunden haben? Könnten Sie dafür ein Beispiel nennen?

23. Würden Sie sich eine größere Mitsprache in solchen politisch-administrativen Verfahren wünschen? Wenn ja, wie sähe dies für Sie idealerweise aus?

24. Welche Rolle spielen europäische und internationale forstpolitische Prozesse bei Ihrer Arbeit für den *[Name der Organisation]*?

25. Halten Sie es für sinnvoll forstpolitische Entscheidungen zukünftig stärker als bisher in die Europäische Politik zu integrieren?

26. Diskutieren Sie sich mit anderen Organisationen über die Themen Klimawandel und Energiewende und deren Auswirkungen auf Wälder in Deutschland? Wenn ja, mit wem?

27. In welcher Form findet der Austausch statt? Wie häufig?

28. Welche Verbände und Organisationen sind Ihrer Einschätzung nach in politischen Entscheidungsprozessen rund um die Waldnutzung in Deutschland besonders einflussreich?

Dann bin ich jetzt fast am Ende des Interviews:

29. In einer weiteren Interviewphase möchte ich mich speziell mit Niedersachsen und Rheinland-Pfalz beschäftigen. Haben Sie Kontakte zu Personen in Niedersachsen oder Rheinland-Pfalz, die in den eben angesprochenen Bereichen aktiv sind und die eventuell Interviewpartner sein könnten?

Wissen Sie von Städten oder Gemeinden in Niedersachsen oder Rheinland-Pfalz, die sich speziell mit dem Thema Windenergie im Wald beschäftigen?

30. Haben Sie noch ein besonderes Anliegen zu dem Themenfeld? Habe ich noch eine wichtige Frage vergessen?

DANK.

Appendix 4: Participants in expert interviews at the national level

Stakeholder Category	#	Interview participants
Forestry	4	Deutscher Forstverein (Face-to-face)
		Arbeitsgemeinschaft Deutscher Waldbesitzer (Face-to-face)
		Deutscher Forstwirtschaftsrat (Face-to-face)
		Forstausschuss des Deutschen Städte- und Gemeindetags (Phone interview)
Timber industries	2	Deutscher Holzwirtschaftsrat (Face-to-face)
		Verband Deutscher Papierfabriken (Face-to-face)
Employment in forests	1	Bund Deutscher Forstleute (Face-to-face)
Renewable Energies	3	Bundesverband BioEnergie (Phone interview)
		Plattform Nachhaltige Biomasse (Phone interview)
		Bundesverband Windenergie (Phone interview)
Recreational User	3	Deutscher Wanderverband (Phone interview)
		Deutscher Imkerbund (Face-to-face)
		Vereinigung der Freizeitreiter und –fahrer in Deutschland (Face-to-face)
Hunting	2	Deutscher Jagdschutzverband (Phone interview)
		Ökologischer Jagdverein (Phone interview)
Environmental and nature conservation	4	Greenpeace (Face-to-face)
		NABU (Face-to-face)
		PrimaKlima (Face-to-face)
		Schutzgemeinschaft Deutscher Wald (Phone interview)
Certification	2	FSC (Phone interview)
		PEFC (Phone interview)
Water	-	-
State-Actor	2	Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (Face-to-face)
		Bundesamt für Naturschutz (Face-to-face)
Total	**23**	

Appendix 5: Interview guide interviews in Lower Saxony

Haben Sie zunächst noch irgendwelche Fragen zu meinem Forschungsvorhaben?

Ich möchte das Interview gerne mit einem Diktiergerät aufnehmen wie in der Datenschutzvereinbarung vereinbart.

I. Einstiegsfragen

Zunächst einmal würde ich gerne zum Einstieg wissen:

1. Wie und wann sind Sie zum *[Name der Organisation]* gekommen?
2. Was sind zurzeit die wichtigsten Themen für Ihre Arbeit in Bezug auf das Thema Wald?

II. Konflikte um die Nutzung von Waldflächen in der Region

Zunächst möchte ich auf die gegenwärtige Situation der Waldnutzung in Niedersachsen eingehen.

3. Welche Nutzungskonflikte um Waldflächen sind hier in Niedersachsen nach Ihrer Einschätzung besonders hervorzuheben?
4. Seit wann gibt es diese Konflikte schon hier in der Region und wie sind diese eben geschilderten Konflikte entstanden?
5. Welche Funktionen des Waldes sind aus Ihrer Sicht besonders wichtig?
6. Welche Gruppen oder Organisationen sehen Sie als wichtige Gegner wenn es um die Umsetzung der eben genannten Ziele der Waldnutzung geht?

   Inwiefern stehen diese Organisationen/Personen/Unternehmen den von Ihnen eben genannten Zielen und Funktionen von Wäldern entgegen?

III. Energiewende und Wälder

Die Energiewende ist zurzeit ein wichtiges Thema in der aktuellen politischen Diskussion. Jetzt möchte ich gerne auf die Energiewende und ihre Auswirkungen auf die Waldnutzung in Niedersachsen eingehen.

8. Inwiefern wirkt sich Ihrer Beobachtung nach die Energiewende auf Wälder hier in der Region aus?
9. Haben Sie den Eindruck, dass durch die Energiewende neue Möglichkeiten der Wertschöpfung oder neue Einkommensmöglichkeiten durch Wälder in der Region entstehen?
10. Welche Rolle spielen Ihrer Einschätzung nach Kleine- und Mittlere Unternehmen im Hinblick diese neuen wirtschaftlichen Möglichkeiten?

IV. Fokuskonflikte

Wie in dem Anschreiben/unserem Telefongespräch angekündigt, würde ich gerne insbesondere über zwei Themen mit Ihnen sprechen: die energetische Nutzung von Holz und den Bau von Windenergie-anlagen auf Waldflächen.

Zunächst würde ich gerne mit dem Thema energetische Holznutzung beginnen. Ein wichtiges gesell-schaftliches Thema ist zurzeit die Nutzung von Biomasse für die Energieversorgung. Insbesondere wird diskutiert, in welchem Umfang fossile Energieträger durch Holz-Biomasse ersetzt werden kön-nen.

11. Inwieweit ist das Thema energetische Holznutzung ein Thema?
12. Wird Ihrer Einschätzung nach mehr über die energetische Nutzung von Holz gesprochen also vor einigen Jahren? Seit wann ungefähr haben Sie diese Veränderung beobachtet? Gabe es ein Ereignis mit dem die Diskussion anfing?
13. Was halten Sie von der verstärkten energetischen Nutzung von Holz?
14. Welchen Beitrag können Ihrer Einschätzung nach regionale Wälder für die Energieversorgung in der Region sinnvoll leisten?
15. Entstehen nach Ihrer Einschätzung stärkere Konkurrenzen zwischen stofflicher und energeti-scher Nutzung von Holz als bisher?
16. Inwieweit verändert sich für Forstwirte und forstliche Lohnunternehmer die Arbeit im Wald durch die verstärkte energetische Nutzung von Holz?
17. Was denken Sie über die Möglichkeit einer verstärkten energetischen Nutzung von Holz im Hinblick auf Umwelt- und Naturschutzziele in Wäldern?
18. Besteht politischer Handlungsbedarf beim Thema energetische Holznutzung?

Dann würde ich jetzt gerne zu dem zweiten Thema kommen, dem Bau von Windenergieanlagen auf Waldflächen.

19. Seit wann und inwiefern ist das Thema Windenergieanlagen in Wäldern ein Thema in Nieder-sachen?
20. Was halten Sie davon Wälder als Standorte für Windenergieanlagen zu nutzen?
21. Sehen Sie Probleme oder Schwierigkeiten für den Bau von Windenergieanlagen in Wäldern die anders sind als die auf landwirtschaftlichen Flächen?
22. In einigen Bundesländern werden schon seit längerem Windenergieanlagen in Wäldern auf-gebaut, in anderen Bundesländern wie zum Beispiel Niedersachsen ist dies rechtlich nicht möglich. Wie bewerten Sie dieses unterschiedliche Vorgehen der Bundesländer?
23. Wurden die Waldeigentümer vom Ausschluss der Waldflächen durch das LROP überrascht?
24. Wird dieser Weg Niedersachsens im Hinblick auf Windenergieanlagen in Wäldern Ihrer Ein-schätzung nach in der Zukunft beibehalten werden?
25. Hat Ihrer Einschätzung nach der im Winter stattgefundene Regierungswechsel in Niedersach-sen Auswirkungen auf die Waldpolitik im Land?

V. Konfliktregulierung, Vertrauen, Partizipation & politische Entscheidungen

Wir haben jetzt über verschiedene Konflikte um Waldnutzung gesprochen. Jetzt möchte ich gerne über mögliche Strategien für den Umgang mit diesen Konflikten reden.

26. Wessen Aufgabe ist Ihrer Meinung nach die Lösung der angesprochenen Konflikte?
27. Ist es für Sie wichtig, dass diese eben genannten Personen/Organisationen sich bei dem Umgang mit diesen Konflikten an Gemeinwohl orientieren?
28. Haben diese Personen Ihrer Einschätzung nach den Willen diese Konflikte zu lösen?
29. Haben diese Personen Ihrer Einschätzung nach zurzeit die Fähigkeiten und das Wissen um diese Konflikte zu lösen?
30. Fällt Ihnen ein Beispiel für einen Konflikt um Waldnutzung hier in der Region ein, dass erfolgreich gelöst werden konnte?
31. Wenn ja: wie lief das ab? Wenn nein: Woran liegt es Ihrer Einschätzung nach, dass Konflikte um Waldnutzung in der Region in der Vergangenheit nicht gelöst werden konnten?
32. Inwieweit hat sich Vertrauen (bzw. mangelndes Vertrauen) der Konfliktparteien zueinander auf die (nicht erfolgte) Lösung des Konflikts ausgewirkt?
33. Was genau bedeutet für Sie Vertrauen in diesem Zusammenhang?
34. Auf welcher Verwaltungsebene sollte der politische Umgang mit Konflikten um Waldnutzung Ihrer Einschätzung nach optimaler Weise stattfinden? (Also beispielsweise in der Gemeinde oder im Bundesland in Hannover?)
35. Hat Ihrer Einschätzung nach die lokale Verwaltung hier in der Region die Fähigkeiten sinnvolle Strategien für den Umgang mit Konflikten um Wälder zu entwickeln?
36. Inwieweit sollten Unternehmen und Verbände aus der Region in die Entwicklung von Strategien für den Umgang mit Konflikten um Wälder eingebunden werden?
37. Würden Sie sich für *[Name der Organisation]* eine größere Mitsprache in politisch-administrativen Verfahren im Zusammenhang mit der Waldnutzung wünschen? Wenn ja, wie sähe diese für Sie idealerweise aus?
38. Haben Sie ein Beispiel für ein regionales Beteiligungsverfahren, an dem Sie teilgenommen haben? Wie lief das ab?
39. Haben Sie den Eindruck, dass Vorschläge, die von Ihnen bei diesen Verfahren eingebracht wurden später berücksichtigt wurden?
40. Ziehen Sie persönlich Nutzen aus diesen Treffen?
41. Worüber haben Sie sich geärgert und gefreut, wenn Sie bei solchen Treffen waren?
42. Wer hatte in diesem Prozess über den wir eben gesprochen haben das sagen?
43. Könnten Sie sich vorstellen, an einem Beteiligungsverfahren hier in der Region teilzunehmen, zu den beiden Themen die wir besprochen haben, der energetischen Nutzung von Holz oder dem Bau von Windenergieanlagen in Wäldern?
44. Haben Sie bei Ihrer Arbeit manchmal mit Regelungen oder Themen von der EU zu tun?
45. Wie bewerten Sie die Entwicklung, dass manche waldrelevante Politikbereiche auf die europäische Ebene verlagert werden?

VI. Vernetzung

46. Mit welchen anderen Organisationen oder Unternehmen diskutieren Sie über das Thema Energiewende und deren Auswirkungen auf Wälder in Deutschland?
47. In welcher Form und wie häufig findet dieser Austausch statt?

48. Fallen Ihnen spontan noch weitere Personen oder Organisationen ein, die sich ebenfalls mit den besprochenen Themen beschäftigen und vielleicht zu einem Interview mit mir bereit wären?

VII. Abschluss

49. Wenn Sie sich die Zukunft vorstellen, das Jahr 2050, wie sieht Waldnutzung in der Region dann aus? Was wird Ihrer Einschätzung nach ähnlich sein wie heute, was wird sich verändern?
50. Dann bin ich jetzt am Ende meiner Fragen angekommen. Haben Sie noch ein besonderes Anliegen zu den Themen über die wir heute gesprochen haben oder möchten Sie noch etwas hinzufügen?

Vielen DANK.

Appendix 6: Interview guide interviews in Rhineland-Palatinate

Haben Sie zunächst noch irgendwelche Fragen zu meinem Forschungsvorhaben?

Ich würde das Interview gerne mit einem Diktiergerät aufnehmen um mir die Auswertung zu erleichtern und damit ich nicht die ganze Zeit alles mitschreiben muss. Die Aufnahmen werden dann wie in der Datenschutzvereinbarung festgelegt in Textform übertragen und die Aufnahme gelöscht.

I. Einstiegsfragen

Zunächst einmal würde ich gerne zum Einstieg wissen:

1. Wie und wann sind Sie zu Ihrer jetzigen Position gekommen?
2. Was sind zurzeit die wichtigsten Themen für Ihre tägliche Arbeit?

II. Konflikte um die Nutzung von Waldflächen in der Region

Dann möchte ich jetzt über die gegenwärtige Situation der Waldnutzung in Rheinland-Pfalz sprechen.

3. Welche Nutzungskonflikte um Wälder sind Rheinland-Pfalz zurzeit besonders hervorzuheben?
4. Seit wann gibt es diese Konflikte schon hier in der Region und wie sind diese eben geschilderten Konflikte entstanden?

III. Energiewende und Wälder

Die Energiewende ist zurzeit ein wichtiges Thema in der aktuellen politischen Diskussion. Im Folgenden möchte ich gerne auf die Energiewende und ihre Auswirkungen auf die Waldnutzung in Rheinland-Pfalz eingehen.

5. Inwieweit hat die Energiewende Ihrer Einschätzung nach Auswirkungen auf die Waldnutzung hier in der Region?
6. Haben Sie den Eindruck, dass durch die Energiewende neue Möglichkeiten der Wertschöpfung oder neue Einkommensmöglichkeiten durch Wälder in der Region entstehen?
7. Welche Rolle spielen Ihrer Einschätzung nach Kleine- und Mittlere Unternehmen im Hinblick diese neuen wirtschaftlichen Möglichkeiten?

IV. Fokuskonflikt

Wie in dem Anschreiben und unserem Telefongespräch angekündigt, würde ich gerne insbesondere über ein Thema mit Ihnen sprechen: den Bau von Windenergieanlagen auf Waldflächen.

8. Seit wann und inwiefern ist das Thema Windenergieanlagen in Wäldern ein Thema in Rheinland-Pfalz?
9. Was halten Sie von der Nutzung von Waldstandorten für den Bau von Windenergieanlagen?
10. Was raten Sie, wenn privaten oder kommunale Waldeigentümer fragen: Soll ich Windenergieanlagen in meinen Wald stellen? Was gibt es zu Bedenken?

11. Sehen Sie Probleme oder Schwierigkeiten für den Bau von Windenergieanlagen in Wäldern die anders sind als die auf landwirtschaftlichen Flächen?
12. In welchen Umfang sind Ihrer Erfahrung nach Rodungen für den Bau von WEAs notwendig?
13. Wie bewerten Sie die Gefahr von Eisschlag?
14. Wie bewerten Sie die Gefahr von Waldbränden durch WEAs?
15. Inwiefern gibt es Ihrer Beobachtung nach Konflikte um Windenergie im Wald in verschiedenen Gegenden in Rheinland-Pfalz?
16. Wer sind Ihrer Einschätzung nach die wichtigsten Konfliktparteien wenn es um den Bau von Windenergieanlagen in Wäldern geht und welche Positionen vertreten diese?
17. Für wie berechtigt halten Sie die Positionen dieser eben von Ihnen genannten verschiedenen Interessengruppen in diesem Konflikt?

Ich habe gehört, dass es in den Verbandsgemeinden Rheinböllen und Prüm ein freiwilliges Ausgleichssystem, den sogenannten „Solidarpakt" zwischen Gemeinden gibt die in ihrem Gemeindewald Windenergieanlagen bauen und zwischen denen die darauf verzichten.

18.   A. Ist Ihnen dieses Ausgleichssystem bekannt?
       B. Was halten Sie davon?
       C. Gibt es Probleme bei der Umsetzung dieses Ausgleichssystems?
       D. Warum ist das System erfolgreich/nicht erfolgreich?
       E. Welche Rolle spielt Vertrauen für die Entstehung und die Anwendung des Solidarpakts?
       F. Halten Sie das System für übertragbar auf andere Regionen in Deutschland?
       G. Was sollte man dabei im Vorfeld bedenken?

19. Wer hat Ihrer Einschätzung nach vor allem finanzielle Vorteile aus dem Bau von Windenergieanlagen in Wäldern gezogen?
20. Ist die Bevölkerung in Rheinland-Pfalz mit der Gewinnverteilung von WEA im Wald Projekten Ihrer Einschätzung nach zufrieden?
21. Inwiefern profitiert Ihrer Einschätzung nach die Region insgesamt von Windenergieanlagen in Wäldern?
22. Inwiefern hat die Region Nachteile durch Windenergieanlagen in Wäldern?
23. Von einigen lokalen Politikern und Politikerinnen wird argumentiert, dass die Kommunen in der Region die Einnahmen durch die Windparks in den Wäldern brauchen um überhaupt noch handlungsfähig zu sein. Wie bewerten Sie dieses Argument?
24. Wie bewerten Sie, dass die Zuständigkeit für die Genehmigung des Baus von Windenergieanlagen in Wäldern in Rheinland-Pfalz bei den einzelnen Gemeinden liegt?
25. Sollte es eine Planung bzw. eine Koordination der Planung auf einer höheren Verwaltungsebene geben? Wenn ja, auf welcher und warum?
26. Gibt es eine Koordination der Planung mit angrenzenden Bundesländern oder Staaten?
27. Inwiefern halten Sie Koordination mit angrenzenden Bundesländern oder Staaten für erforderlich?
28. In einigen Bundesländern werden schon seit längerem Windenergieanlagen in Wäldern aufgebaut, in anderen Bundesländern wie zum Beispiel Niedersachsen ist dies rechtlich nicht möglich. Wie bewerten Sie dieses unterschiedliche Vorgehen der Bundesländer?

V. Konfliktlösung, Partizipation und politische Entscheidungen

Wir haben jetzt über einen Konflikt um Waldnutzung gesprochen. Jetzt möchte ich über mögliche Strategien für den Umgang mit Konflikten um Waldnutzung reden.

29. Auf welcher Verwaltungsebene sollte der politische Umgang mit Konflikten um Waldnutzung Ihrer Einschätzung nach optimaler Weise stattfinden? (Also beispielsweise in der Gemeinde oder im Bundesland in Mainz?)
30. Haben Ihrer Einschätzung nach lokale Verwaltungen hier in der Region die Fähigkeiten und Kapazitäten sinnvolle Strategien für den Umgang mit Konflikten um Wälder zu entwickeln?
31. Welche Rolle spielen bundesweite und europäische Prozesse wenn es um die Waldnutzung in der Region geht?
32. Haben Sie bei Ihrer Arbeit manchmal mit Regelungen oder Themen von der EU zu tun? Welche sind das?
33. Wie bewerten Sie die Entwicklung, dass manche waldrelevante Politikbereiche auf die europäische Ebene verlagert werden?

34. Inwieweit sollten Unternehmen, Verbände oder Bürgerinitiativen aus der Region in die Entwicklung von Strategien für den Umgang mit Konflikten um Wälder eingebunden werden?
35. Haben Sie ein Beispiel für ein regionales Beteiligungsverfahren, an dem Sie teilgenommen haben? Wie lief das ab?
36. Haben Sie den Eindruck, dass Vorschläge, die von bei diesen Verfahren eingebracht wurden später berücksichtigt wurden?
37. Ziehen Sie Nutzen aus diesen Treffen?
38. Worüber haben Sie sich geärgert und worüber haben Sie sich gefreut, wenn Sie bei solchen Treffen waren?
39. Wer hatte in diesem Prozess das sagen?
40. Könnten Sie sich vorstellen, an einem Beteiligungsverfahren hier in der Region teilzunehmen bei dem es um den Bau von weiteren Windenergieanlagen in Wäldern geht?

41. Wessen Aufgabe ist Ihrer Meinung nach die Lösung der angesprochenen Konflikte?
42. Haben Ihrer Einschätzung nach diese vorhin genannten Akteure den Willen die angesprochenen Konflikte zu lösen?
43. Ist es für Sie wichtig, dass sich die eben genannten Akteure am Gemeinwohl orientieren?
44. Fällt Ihnen ein Beispiel für einen Konflikt um Waldnutzung hier in der Region ein, dass erfolgreich gelöst wurden?
45. Wenn ja: wie lief das ab? Wenn nein: Woran liegt es Ihrer Einschätzung nach, dass Konflikte um Waldnutzung in der Region in der Vergangenheit nicht gelöst werden konnten?
46. Inwieweit hat Sich Ihrer Einschätzung nach Vertrauen (bzw. mangelndes Vertrauen) der Konfliktparteien zueinander auf die (nicht erfolgte Lösung) des Konflikts ausgewirkt?
47. Was genau bedeutet Vertrauen für Sie in diesem Zusammenhang?

VI. Vernetzung

48. Mit welchen anderen Organisationen oder Unternehmen diskutieren Sie über das Thema Energiewende und deren Auswirkungen auf Wälder in Deutschland?
49. In welcher Form und wie häufig findet dieser Austausch statt?

50. Fallen Ihnen spontan noch weitere Personen oder Organisationen ein, die sich ebenfalls mit den besprochenen Themen beschäftigen und vielleicht zu einem Interview mit mir bereit wären?

VII. Abschluss

51. Wenn Sie sich die Zukunft vorstellen, das Jahr 2050, wie sieht Waldnutzung in der Region dann aus? Was wird Ihrer Einschätzung nach ähnlich sein wie heute, was wird sich verändern?
52. Dann bin ich jetzt am Ende meiner Fragen angekommen. Haben Sie noch ein besonderes Anliegen zu den Themen über die wir heute gesprochen haben oder möchten Sie noch etwas hinzufügen?

Vielen Dank!

Appendix 7: Interview guide interviews in Maine

Do you have any further questions about my research project?

Ask for permission to tape interview.

Explain and hand out consent form to interviewee.

I. Opening Questions

1. How and since when did you get your current position/become you involved in [org.]?

2. What are currently the issues which keep you the most busy in your daily work for the [org.]?

II. Conflicts about forest area use and management in Maine

Now, I would like talk about the current situation of forest area use and management in Maine.

3. From your impression, what are the main trends or the most important issues in forest policy in Maine in the last few years?

4. Are there conflicts about the use and managements of forests in Maine? Which?

5. When did the conflicts start and how did they develop?

6. How were you involved?

III. Transition towards renewable energies

The discussion about renewable energies is an important topic. In the following, I would like to talk about renewable energies and their effect on forest area use and management in Maine.

7. How does the trend towards renewable energies impact the use and management of forests in Maine?

8. How have you been involved in renewable energy issues in Maine forests? Have you been involved in any specific projects?

9. What are your impressions about the social or community impacts from renewable energies [positive or negative]?

Case study conflict

As I wrote you before, I would like to talk especially about the construction of wind turbines in Maine's forests.

10. From your perspective, what is the history of wind turbine construction in forests as an issue in Maine?

11. What are your impressions of wind turbines in Maine's forests?

12. What have been your direct experiences?

13. Do you see any problems related to the construction of wind turbines in Maine's forests?

14. Who financially benefits from the wind turbines in Maine?

15. Do local communities have some benefits from the construction of wind turbines?

16. Do local communities have disadvantages because of the construction of wind turbines?

17. Do you know of any conflicts related to the construction of wind turbines in Maine's forests? Could you describe them to me?

18. From your impression, who are the most important parties or stakeholders in these conflicts?

19. Can you tell me about these different groups and persons involved in these conflicts?

20. Do you know about a case where a conflict about the wind turbines was successfully regulated?

21. What do you think might help to reduce or to regulate conflicts about wind energy in Maine?

IV Conflict regulation, participation and decision-making

Previously, we talked about some conflicts related to the construction of wind turbines. I also would like to talk as well about options for the regulation of these conflicts.

22. I was told that the land planning related to the wind turbines relies on competence of the planning boards of the communities, on a very local level. What do you think about this local responsibility?

23. Do you think there should be some kind of planning related to wind turbines on a higher level, for example County, State, or multi-State level? Why?

24. Which administrative level, do you think, is most suitable for dealing with these conflicts about wind turbines? For example on state level for all over Maine or on a County level?

25. Do you think it would make sense to increase the participation of different stakeholders in decision-making about wind turbine construction?

26. How can local citizens, NGOs, citizen groups or companies become involved in decision-making about wind energy in Maine?

27. Do you have any personal experiences with participatory decision-making processes [we were talking about] about forest or land use in Maine? If yes, what were your experiences in these processes?

28. Can you imagine participating in a participatory process about the construction of wind turbines in Maine?

29. What would be important for you in such a participatory process?

V Network

30. With which other groups or persons do you exchange information about the topics we were talking about?

31. How often and in which ways do you communicate with these groups and individuals?

32. Do you have recommendations of other individuals or groups I could talk with in order to get a better understanding about the construction of wind turbines in Maine?

VI Final Questions

33. When you try to imagine the future, the year 2050, how will Maine's forest look like? What will be the same, what do you think might be different?

34. What role will renewable energies play in Maine's forests? In Maine's forest policy?

35. I do not have any further questions. Is there something you would like to add?

Thank you for taking time.

Appendix 8: Overview expert interviews (face-to-face vs. phone)

Interview acronym	Interview length	Interview type
E_1	58 min.	Face-to-face
E_2	1:40 h	Face-to-face
E_3	46 min.	Face-to-face
E_4	1:04 h	Face-to-face
E_5 and E_6	42 min.	Face-to-face
E_7	56 min.	Face-to-face
E_8	1:32 h	Face-to-face
E_9	1:06 h	Face-to-face
E_10	1:58 h	Face-to-face
E_11	1:38 h	Face-to-face
E_12	49 min.	Face-to-face
E_13	1:00 h	Phone
E_14	44 min.	Face-to-face
E_15	39 min.	Phone
E_16	1:24 h	Phone
E_17	43 min.	Phone
E_18	1:03 h	Phone
E_19	36 min.	Phone
E_20	30 min.	Phone
E_21	1:00 h	Phone
E_22	36 min.	Face-to-face
E_23	17 min.	Phone

Appendix 9: Interview participants Lower Saxony and Rhineland-Palatinate

		Niedersachsen	Rheinland-Pfalz	
I. Staatliche Akteure				
Politik	5	Mitglied Umweltausschuss CDU	Bürgermeister von Elling	5
		Mitglied Umwelt und Agraraus-schuss SPD	Bürgermeister der Verbandsgemeinde Rheinböllen	
		Mitglied Umweltausschuss Grüne	Landrat Birkenfeld	
		Mitglied Umweltausschuss LINKE	Forstpolitischer Sprecher der SPD	
		Mitglied Umweltausschuss FDP	Staatssekretär Umwelt, Landwirtschaft Forsten (Grüne)	
Verwaltung	8	Landwirtschaftskammer NDS	Wirtschaftsministerium (Landesplanung)	9
		Ministerium für Landwirtschaft und Forsten (2x)		
		Untere Naturschutzbehörde Uelzen	Untere Naturschutzbehörde Birkenfeld	
		Stadtforst Uelzen	Untere Naturschutzbehörde Rhein-Hunsrück Kreis	
		Niedersächsischer Landkreistag	Klimamanager Rhein-Hunsrück Kreis	
		Landesforsten NDS (2x)	Landesforsten RLP	
			Planungsgemeinschaft Rheinhessen-Nahe	
			Planungsgemeinschaft Mittelrhein-Westerwald	
			Vogelschutzwarte Hessen und Rhein-land-Pfalz	
II. Interessengruppen (Verbände & Bürgerinitiativen)				
Forst- und Holzwirt-schaft	1	Waldbesitzerverband Nieder-sachsen	Waldbesitzerverband Rheinland-Pfalz	1
Umwelt- und Natur-schutz	4	NABU Niedersachsen	BUND Rheinland-Pfalz	3
		NABU Uelzen	BUND Westerwald	
		SDW Niedersachsen	GNOR	
		Naturschutzverbund Nieder-sachsen		
Naherholung und Tourismus	2	Nordwestdeutscher Wander-verband	Bürgerinitiative Soonwald (2x)	3
		Naturfreunde Niedersachsen	Naturfreunde Rheinland-Pfalz	
III. Unternehmen				
Windenergie	1	Volkswind	Juwi	2
Forstwirtschaft	2	FVL Lüneburg	Forstbüro Matt	1
		Bernstorff'sche Betriebe		
Holzwirtschaft	1	Bockelmann Holz GmbH		
Tourismus			Tourismus Hunsrück	1
Gesamt	**24**			**24**

Appendix 10: Interview participants Rhineland-Palatinate and Maine

	# ME	Maine	# RLP	Rhineland-Palatinate
I. State				
Politics	1	Governer's Energy Office Maine Forest Service Clifton Planning Board	5	Landrat Birkenfeld Bürgermeister von Ellern Verbandsbürgermeister von Rhein-böllen Umweltstaatssekretär Forstpolitischer Sprecher SPD
Administration	6	Maine Departement of Environ-mental Protection (P1) Maine Departement of Environ-mental Protection (P1) Local Planning Authority Orono Lincoln Town Assessor	8	Regionalplanung Mittelrhein-Westerwald Regionalplanung Rheinhessen-Nahe Klimaschutzmanager Simmern UNB Simmern UNB Birkenfeld Landesforsten RP Staatliche Vogelschutzwarte Landesplanung
II. Civil Society				
Environment and Nature Conservati-on	1	Natural Resource Council of Maine	3	BUND RP BUND Westerwald GNOR
Livelihood and Recreation	5	Appalachian Mountain Club (AMC) Clifton Task Force on Wind (P1) Clifton Task Force on Wind (P2) Local Resident Lincoln (P1) Local Resident Lincoln (P2)	3	Naturfreunde BI Windkraftfreier Soonwald (P1) BI Windkraftfreier Soonwald (P2)
III. Companies and special interest groups				
Wind energy	4	First Wind Maine Renewable Energy Associ-ation Maine Ocean and Wind Industry Initiative Pisgah Mountain LLC	2	JUWI (P1) JUWI (P2)
Forestry and Timb-er Industry	4	H.C. Haynes Inc. Local forestry expert SWOAM Maine Forest Product Council	2	Waldbesitzerverband RP Forstbüro Matt
Tourism	1	Maine's Professional Guide Association	1	Hunsrück Touristik GmbH
Total	**22**		**24**	

Appendix 11: Interview invitation Rhineland-Palatinate

LEUPHANA
UNIVERSITÄT LÜNEBURG

Univ.-Prof. Dr. Jens Newig

Professur Governance, Partizipation und Nachhaltigkeit

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Ute X
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03. Juli 2013

Interviewanfrage für Forschungsprojekt

Sehr geehrte Frau X,

meine Doktorandin Frau Nataly Jürges möchte in den nächsten Wochen Interviews für ihr Dissertationsprojekt zum Thema „Auswirkungen der Energiewende auf Wälder" in Rheinland-Pfalz durchführen. Daher möchte ich Sie herzlich einladen, an einem ca. 45–60 minütigen Interview teilzunehmen.

Im Interview werden folgende Themenkomplexe angesprochen:

- Konflikte um Wälder in Zusammenhang mit der Energiewende in Rheinland-Pfalz
- Windenergieanlagen in Wäldern
- Energiewende und regionale Wertschöpfung in Wäldern
- Waldpolitische Entscheidungsprozesse

Zur Absprache eines Interviewtermins wird sich Frau Jürges in den nächsten Tagen telefonisch bei Ihnen melden.

Für Nachfragen und Anregungen können Sie sich gern an mich oder direkt an Frau Jürges (nataly.juerges@leuphana.de oder Tel. 04131-677 1392) wenden.

Mit freundlichen Grüßen

Prof. Dr. Jens Newig

Appendix 12: Additional interview information flyer Rhineland-Palatinate and Lower Saxony

Hintergrundinformationen zur Doktorarbeit von Nataly Jürges mit dem Arbeitstitel:

„Auswirkungen der Energiewende auf Wälder"

Zur Person Nataly Jürges

Frau Nataly Jürges ist Forstwissenschaftlerin. Sie hat an der Universität Göttingen und der Humboldt Universität Berlin studiert. Im Mai 2012 erhielt sie ein Stipendium des niedersächsischen Innovations-Inkubators. Seitdem arbeitet sie am Institut für Umweltkommunikation unter der Betreuung von Prof. Dr. Jens Newig an ihrer Doktorarbeit zu den Auswirkungen der Energiewende auf die Waldnutzung in Deutschland.

Fokus der Doktorarbeit an der Leuphana Universität Lüneburg

Durch den Bau von Windenergieanlagen in Wäldern entstehen neue Wertschöpfungsmöglichkeiten für Gemeinden, Waldeigentümer und regionale Unternehmen. Gleichzeitig können durch den Bau Konflikte mit Anwohnern, Erholungssuchenden oder dem Naturschutz entstehen.

Rheinland-Pfalz hat eine Vorreiter-Rolle beim Ausbau von Windenergie im Wald, daher konnten in der Region schon umfangreiche Erfahrungen mit dem Ausbau und damit verbundenen Problemen gesammelt werden. Deshalb wird Frau Jürges untersuchen, inwieweit andere Regionen in Deutschland aus den Erfahrungen in Rheinland-Pfalz profitieren können und welche Strategien zur Konfliktregulierung beim Bau von Windenergieanlagen in Wäldern in Rheinland-Pfalz angewendet werden könnten.

Selbstverständlich erhalten alle Interviewteilnehmer/-innen nach Abschluss der Untersuchung eine Zusammenfassung mit den wichtigsten Ergebnissen für die Praxis.

Bei Fragen oder Rückmeldungen, wenden Sie sich gerne an uns!

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Hintergrundinformationen zur Doktorarbeit von Nataly Jürges mit dem Arbeitstitel:

„Auswirkungen der Energiewende auf regionale Wälder"

Zur Person Nataly Jürges

Frau Nataly Jürges ist Forstwissenschaftlerin. Sie hat an der Universität Göttingen und der Humboldt Universität Berlin studiert. Im Mai 2012 erhielt sie ein Stipendium des Innovations-Inkubators Lüneburg. Seitdem arbeitet sie am Institut für Umwelt-Kommunikation unter der Betreuung von Prof. Dr. Jens Newig an ihrer Doktorarbeit zu den Auswirkungen der Energiewende auf regionale Forstwirtschaft, Waldnaturschutz und auf die Erholungs-funktion von Wäldern.

Fokus der Doktorarbeit an der Leuphana Universität Lüneburg

Der Fokus der Doktorarbeit ist es, das Thema Wald und Energiewende von Praxiserfahrungen regionaler Akteure ausgehend wissenschaftlich zu untersuchen und Hinweise für Praktiker in der Region abzuleiten. Im Mittelpunkt der Untersuchung stehen die Themen „Windenergie im Wald" und „Energetische Nutzung von Holz".

Selbstverständlich erhalten alle Interviewteilnehmer/-innen nach Abschluss der Untersuchung eine Zusammenfassung mit den wichtigsten Ergebnissen für die Praxis.

Der Innovations-Inkubator Lüneburg

Das Stipendium von Frau Nataly Jürges wird durch den „Innovations-Inkubator Lüneburg" finanziert. Das EU-Großprojekt wurde gemeinsam vom Land Niedersachsen und der Leuphana Universität Lüneburg initiiert. Ziel des Innovations-Inkubators ist es, für das Konvergenzgebiet Lüneburg einen nachhaltigen Modernisierungs- und Entwicklungsschub durch aktuelle, anwendungsorientierte Forschungsthemen auszulösen.

Bei Fragen oder Rückmeldungen, wenden Sie sich gerne an uns!

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Hintergrundinformationen zur Doktorarbeit von Nataly Jürges mit dem Arbeitstitel:

„Auswirkungen der Energiewende auf regionale Wälder"

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Fokus der Doktorarbeit an der Leuphana Universität Lüneburg

Der Fokus der Doktorarbeit ist es, das Thema Wald und Energiewende von den Praxiserfahrungen regionaler Unternehmen ausgehend wissenschaftlich zu untersuchen und Hinweise für Praktiker in der Region abzuleiten. Im Mittelpunkt der Untersuchung stehen die Themen „Windenergie im Wald" und „Energetische Nutzung von Holz".

Vorteile für teilnehmende Unternehmen

Durch die Energiewende können neue Wertschöpfungsmöglichkeiten für regionale Forstunternehmen und Waldeigentümer entstehen. Selbstverständlich erhalten alle Interviewteilnehmer/-innen nach Abschluss der Untersuchung eine Zusammenfassung mit den wichtigsten Ergebnissen für die Praxis.

Der Innovations-Inkubator Lüneburg

Das Stipendium von Frau Jürges wird durch den „Innovations-Inkubator Lüneburg" finanziert. Ziel des EU-Großprojekts „Innovations-Inkubator Lüneburg" ist es, für das Konvergenzgebiet Lüneburg einen nachhaltigen Modernisierungs- und Entwicklungsschub auszulösen und so die Wettbewerbsfähigkeit der regionalen Unternehmen zu stärken.

Bei Fragen oder Rückmeldungen, wenden Sie sich gerne an uns!

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Appendix 13: Interview invitation, follow-up call phone script, and interview confirmation Maine

Email Interview invitation

Subject: Interview invitation for a comparative study on wind energy in Maine and Germany

Dear Ms. /Mr. X,

I am a PhD candidate from Germany doing my dissertation on forested landscape wind energy conflicts in a comparative study between the USA and Germany. I am visiting the University of Maine at the School of Forest Resources under the supervision of Jessica Leahy from July through December on a Fulbright Fellowship.

During my stay in Maine I would like to conduct interviews with different organizations and individuals with relevant perspectives on conflicts about wind energy. I would like to learn more about your opinion, experience, and perspective on wind energy in Maine. The study focuses mainly on the Rollins Hill project near Lincoln and the Pisgah Mountain project in Clifton, both within Penobscot County.

Thus, I would like to meet you for a 45-60 minutes interview; the interview would cover the following issues:

- Forest-related decision-making and recent trends in forest policy in Maine
- Wind energy conflicts in Maine
- Options and challenges for the regulation of wind energy conflicts

The interviews will be recorded.

All participants in the interviews will receive an exclusive summary of the main interview findings at the end of 2014 and the final research results in 2015.

If you feel that you are not the right person to ask within your organization I would appreciate if you could refer to another person in your organization which might be better suited to answer questions about the listed issues.

I will call you in the next days for the arrangement of an interview appointment.

If you have any further questions about the research project please do not hesitate to contact me (via email or phone 207-299-6957).

Yours sincerely,

Nataly Juerges

Script for phone call to arrange interview appointment

Hello,

Is (participant name) available?

This is Nataly Jürges from the School of Forest Resources at the University of Maine. I wrote you an email that I would like to meet you for an interview you about wind energy in Maine.

Might you be willing to participate?

The interview will be held on the date of your choosing at a location convenient for you.

What time and date would be convenient for you?

Would you prefer if I come to your office/home or would you prefer to meet in the Community Library/in the General Store/in an office at the SWOAM?

This interview will last 45-60 minutes and will be recorded.

We will use the information gathered from these interviews to make recommendations to reduce conflicts about wind energy. Your participation will provide us with valuable information, and we thank you for efforts.

I will mail you a confirmation e-mail shortly. Let me also give you my phone number just in case you need to reach me before the interview – 207-299-6957 (Nataly Jürges).

Well, thank you very much (participant name), and I look forward to seeing you at the interview on X date at Y time at Z location.

Confirmation Email (to send ~24 hours before the interview appointment)

Subject: Reminder interview wind energy xx/09/14 at x am/pm

Dear [Participant Name],

Thank you for agreeing to participate in the wind energy in Maine interview. Your participation is important to the success of the project. Information gained at the interview will be used to compare conflicts about wind energy in Maine, USA and Rhineland-Palatinate, Germany and help to develop regulation strategies for wind energy conflicts.

Interview Information:

DATE:
TIME:
LOCATION:

There is nothing you need to do to prepare for this interview. Just show up. We simply want to generate some discussion with you about your experiences and perspectives about wind energy in Maine. We anticipate that the interview will last about 1 hour.

I look forward to seeing you at the interview. In the meantime, please do not hesitate to contact me at (207) 299-6957.

Sincerely,

Nataly Juerges
Visiting Graduate Student
School of Forest Resources
University of Maine
5755 Nutting Hall
Orono, ME 04469

Appendix 14: Consent form interviews Maine

Consent Form

You have been invited to participate in a research study sponsored by the German-American Fulbright Commission, the University of Maine, and the Innovation Incubator Lueneburg about wind energy conflicts in forested landscapes in Maine, USA and Rhineland-Palatinate, Germany. We are talking with different individual and collective stakeholders about their perspectives on wind energy conflicts in forested landscapes. We ask that you read this form and ask any questions you may have before agreeing to be in the study. You will be given a copy of this form to keep for your records. This study is being conducted by Nataly Juerges, visiting graduate student in the School of Forest Resources at the University of Maine, and Dr. Jessica Leahy, associate professor in the School of Forest Resources at the University of Maine.

Background Information:

The purpose of this study is to contribute to the understanding of conflicts about wind energy and options for their participatory regulation in different governance settings.

Procedures:

By agreeing to be in this study, we ask that you participate in a 45-60 minutes long interview. The interviews will be digitally recorded and later transcribed. The questions in the interview will address your perspectives and experiences about wind energy in Maine. Examples of questions from this session include:

> From your perspective, what is the history of wind turbine construction in forests as an issue in Maine?

> What do you think might help to reduce or to regulate conflicts about wind energy in Maine?

> Do you think it would make sense to increase the participation of different stakeholders in decision-making about wind turbine construction?

Risks and Benefits of Being in the Study:

There are no known risks of participation beyond that of everyday living. While there is no direct benefit to you from participating, we hope this study will improve the general understanding of conflicts about wind energy and options for their participatory regulation.

Confidentiality:

Your identity will be kept private. In any published report, we will not include any information that will make it possible to identify an individual person. All research records and transcripts will be kept on my office computer and backed up on CD kept in my office. Your name will not be connected to your audiofile and transcript. If you mention your own name or someone else's name during the

interview, it will not be transcribed, rather transcribed as [Name]. The records and transcripts will be kept for 12 years and then destroyed; only researchers will have access to the records.

Voluntary Nature of the Study:

Your decision whether or not to participate will not affect your current or future relations with the University of Maine. Participation is voluntary. If you decide to participate, you are free to withdraw at any time without affecting those relationships. You may skip any questions you choose not to answer.

Contacts and Questions:

The researchers conducting this study are Nataly Juerges and Dr. Jessica Leahy. You may ask any questions you have now. If you have questions later, you may contact Jessica Leahy at (207) 581-2834, or Nataly Juerges (207) 299-6957. You may also write Jessica, or Nataly at 241 Nutting Hall, University of Maine, Orono, ME 04469; or email at jessica.leahy@maine.edu, or nataly.juerges@maine.edu. If you have any questions or concerns regarding the study and would like to talk to someone other than the researchers, contact Gayle Jones, Assistant to the Protection of Human Services Review Board, 114 Alumni Hall, University of Maine, Orono, ME 04469; telephone (207) 581-1498; or email at gayle.jones@umit.maine.edu.

Appendix 15: Transcription guidelines

- Use Microsoft Word: letter type Calibri; letter size 11; line spacing 1,15; left-aligned
- Name the word file with the interview number (e.g. audio file Maine_1 becomes word file Maine_1)
- Use I: and P: for interviewer and participant (P1 and P2 in case of interviews with two participants)
- If interviewer or participants mention their own name, or the name of another interview participant, type [P]/[P1] [P2] instead of the name. There should no names of participants in the transcript.
- Transcribe verbatim all the words, including false starts and incomplete sentences, but not the "ums" or laughter.
- When you hit words you can't make out, use XXX instead of the word and record the time on the recording [1:47].
  (e.g. Yes, but we think this wind farms are XXX [20:31] everywhere, virtually, and we think…

Appendix 16: Example coding manual

Coding manual for the analysis of the interviews in Maine and Rhineland-Palatinate for research paper [4]
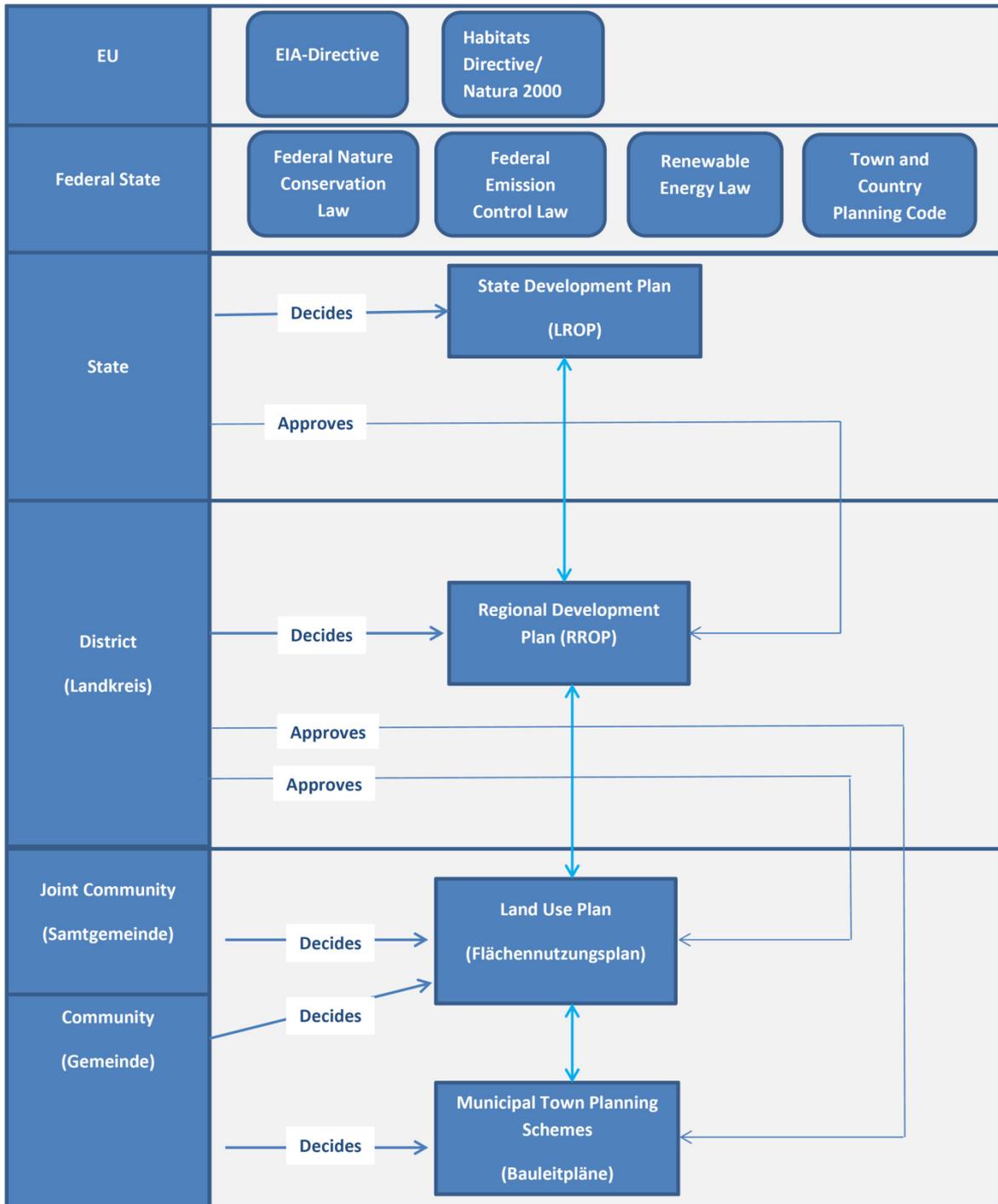
Category-Group	Category	Coding rule	Definitions
Opinion and perception of polycentric governance systems		All text segments are coded in which interview participant describes how s/he thinks about the polycentric governance system of wind energy decision-making	*Polycentric governance system:* "[…] a system where citizens are able to organize not just one but multiple governing authorities at different scales. Each unit exercises considerable independence to make and enforce rules within a circumscribed domain of authority for a specified geographical area. […] some units are general-purpose governments while others may be highly specialized. Self-organized resource governance systems in such a system may be special districts, private associations, or parts of a local government. These are nested in several levels of general purpose governments that also provide civil equity, as well as criminal courts." (Ostrom 2005: 283)
	Positive attitude towards polycentric governance system	All text segments are coded in which interview participant describes that s/he has a positive attitude towards the polycentric governance system of wind energy projects in forests	
	Negative attitude towards polycentric governance system	All text segments are coded in which interview participant describes that s/he has a negative attitude towards the polycentric governance system of wind energy projects in forests	
	Indifferent attitude towards polycentric governance system	All text segments are coded in which interview participant describes that s/he has an indifferent attitude towards the polycentric governance system of wind energy projects in forests	

	Non-perception of polycentric governance system	All text segments are coded in which illustrate that interview participant is not aware of the polycentric governance system of wind energy projects in forests	
Opinion about certain governance levels			
	Preference and justification for local decision-making	All text segments are coded in which interview participant describes that s/he has a preference for local decision-making about wind energy projects in forests	*"local":* community level (Gemeinde or Verbandsgemeinde in Rheinland-Pfalz)
	Preference and justification for regional decision-making	All text segments are coded in which interview participant describes that s/he has a preference for regional decision-making about wind energy projects in forests	*"regional":* Levels between the community and state, e.g. Planungsgemeinschaften, Counties
	Preference and justification for state-level decision-making	All text segments are coded in which interview participant describes that s/he has a preference for state-level decision-making about wind energy projects in forests	
	Preference and justification of national-level decision-making	All text segments are coded in which interview participant describes that s/he has a preference for national-level decision-making about wind energy projects in forests	
	Preference and justification for combined-level decision-making	All text segments are coded in which interview participant describes that s/he has a preference for a combination decision-making at different levels about wind energy projects in forests	*"combined-level":* shared decision-making of two of more different governing authorities.
Interest realization in polycentric governance system			

	Description of own behavior	All text segments are coded in which interview participant describes how s/he and/or his/her organization acts within the polycentric governance arrangement	
	Description of the behavior of other actors	All text segments are coded in which interview participant describes how other actor act within polycentric governance arrangement	
Legitimacy		All text segments are coded in which interview participant describe his/her opinion about the legitimacy of the current governing arrangement and/or descriptions how the legitimacy of decision-making could be improved	*"Legitimacy":* acceptance of governing authority *"involves the capacity of a political system to engender and maintain the belief that existing political institutions are the most appropriate and proper ones for the society."* (Lipset 1983)
Efficiency		All text segments are coded in which interview participant describe his/her opinion about the efficiency of the current governing arrangement and/or descriptions how the efficiency of decision-making could be improved	*"Efficiency":* the ability to do something or produce something without wasting materials, time, or energy (Merriam Webster Dictionary, online, accessed 1/8/15)

Appendix 17: Wind energy governance landscapes in focus regions

Governance-setting of wind energy planning in Lower Saxony (September 2014)

EU	EIA-Directive	Habitats Directive/ Natura 2000		
Federal State	Federal Nature Conservation Law	Federal Emission Control Law	Renewable Energy Law	Town and Country Planning Code
State	Decides → **State Development Plan (LROP)** / Approves			
District (Landkreis)	Decides → **Regional Development Plan (RROP)** / Approves / Approves			
Joint Community (Samtgemeinde)	Decides → **Land Use Plan (Flächennutzungsplan)**			
Community (Gemeinde)	Decides →			
	Decides → **Municipal Town Planning Schemes (Bauleitpläne)**			

Principle of countervailing influence (Gegenstromprinzip)

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Governance-setting of wind energy planning in Rhineland-Palatinate

International	UN World Heritage Convention
EU	EIA-Directive	Habitats Directive/ Natura 2000
Federal State	Federal Nature Conservation Law	Federal Emission Control Law	Renewable Energy Law	Town and Country Planning Code
State	Decides → State Development Plan (LEP IV)	Wind energy enactment
Structure and Approval Management (North and South)	Approves
Planning Communities (Four in RLP)	Decide → Regional Development Plan
District	Approves / Approves projects under federal emission control law
Association of municipalities	Decides → Land Use Plan
Community	Decides → Municipal Town Planning Scheme

Principle of countervailing influence

Governance-setting of wind energy planning in Maine

Appendix 18: Declaration (according to § 9)

Ich versichere, dass ich die eingereichte Dissertation „Forest conflicts in the face of energy transition and climate change: Actor-centered analysis from a multi-level governance perspective " selbstständig und ohne unerlaubte Hilfsmittel verfasst habe. Anderer als der von mir angegebenen Hilfsmittel und Schriften habe ich mich nicht bedient. Alle wörtlich oder sinngemäß anderen Schriften entnommenen Stellen habe ich kenntlich gemacht.

Nataly Jürges