Mobilization of knowledge in competing claims context. A research proposal for studying: "Space for change in complex societal negotiation processes over natural resources"

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Abstract: *Problem solving in land-use planning and Natural Resource Management has long been based on linear models of both policy and science application (Giller, Leeuwis et al., 2007). The role of science in such endeavours was to provide unequivocal, predictive knowledge about the functioning of social and agro-ecological systems that would allow for rational planning (ibid.). Since the 1980s, this notion has rapidly eroded and has been replaced by the idea that it is essential to deal with multiple realities in societal problem solving efforts. With the introduction of participatory research and methodologies, we sought for consensus among stakeholders about desired policy directions and innovative solutions by creating common sense of a situation and engaging in a joint learning process. While negative experiences with participatory approaches were often attributed to incompetence, unwillingness or 'bad practice' (Pijnenburg, 2004), constraints were often due to a lack of attention for dynamics of power, negotiation and conflict. Moreover intervention projects were still organized with a narrow focus on the local level, whereas local level developments are often constrained by what happens on higher levels (cf. Giller, Leeuwis et al., 2007). In the platforms where stakeholders from different levels meet and negotiate, knowledge has become a 'weapon' in the struggle to protect interests and purchase or impose certain problem definitions and solutions. This positions negotiation processes central to land-use planning, NRM and other decision-making processes (ibid.).*
This theoretical paper starts from the premise that sustainable solutions may emerge when negotiation processes in and between multi-level networks lead to a balancing of local, regional, national and global developmental interests. The theoretical perspective explores the role of knowledge in complex, societal negotiation processes over natural resources, as well as the methodology for studying how multi-level stakeholders mobilize scientific and other knowledge to protect their interests, purchase their goals and create space for change.

Keywords*: Natural Resource Management, land use, negotiation, knowledge, space for change*

Introduction

Growing populations and climate change increase the pressure on natural resources and their sustainable management (Gisladottir and Stocking, 2005). Land-use planning and Natural Resource Management (NRM) are often subject to negotiation and conflict. Firstly, no one solution fits all stakeholders, and secondly, land and other natural resources have characteristics which are distributive by nature (Cloke and Park, 1985; Carnevale, 2006). This gives rise to people having competing claims on land or natural resources, which often leads to distributive negotiations and conflict. This implies that we as scientists need to think carefully about, on the one hand, who our clients are, and, on the other how we can remain credible to other stakeholders (Giller, Andersson et al., 2005).

With the introduction of new modes of cooperation between science and society (cf. Gibbons, 1999; Nowotny, Scott et al., 2001), sustainable land-use planning and NRM became defined as: "The extent to which stakeholders are successful in mobilizing and integrating different types of knowledge" (Opdam, Berg et al., 2007). However, relatively little is known about how the strategic mobilization of knowledge influences the negotiation space for the different stakeholders, which often determines the outcome of decision-making processes on land use and NRM.

The objective of this research is to contribute better understanding about how stakeholders strategically mobilize knowledge in negotiations on land use and NRM. Studying the contribution of

knowledge for multi-level stakeholders will reveal insight in the factors and processes that influence the use of scientific and other knowledge in resource-use negotiation. Expected outcomes of the research are theoretical and methodological recommendations to enhance the contribution of science to high-quality societal negotiation processes and sustainable management of natural resources.

Structure of the paper

This paper contains three sections. The next section contains the theoretical foundation for this research. I have tried to create a framework that explains how 'the changing role of science in society' has implications for 'the role of knowledge in societal negotiations' on land-use and NRM and how knowledge is mobilized to create "space for change". I use several paragraphs to elaborate my point of view. The theoretical exploration is followed by a section on 'research questions and methodology' that clarifies my research design. In the last section I describe 'some final remarks' and reflections, followed by the 'references' used for writing this paper.

Theoretical exploration

The changing role of science in society

Concerns about whether science can meet the demands made on it by society date from the early 1970s (Jantsch, 1970; Lenhard, Lücking et al., 2006). These concerns about science losing its competence to solve practical problems resulted in various essays demanding that science has to become relevant to the needs of society. To deal with complex problems, especially of an ecological nature, the co-operation of disciplines in research is necessary (cf. Levin and Lind, 1985). Historically, disciplines emerged along with universities as the primary organizations for knowledge production, that – in a way – protects and controls its knowledge production by having a name, like sociology (Turner, 2000). In the world of disciplines, inter- and transdisciplinarity can be interpreted as practices that consciously transcend the disciplinary mode of knowledge production. Interdisciplinarity is a – often temporarily – practice in which scientists from different disciplines work together (Weingart, 2000). Transdisciplinarity goes beyond interdisciplinarity by including non-scientific actors and organizing knowledge production around societal and usually practical problem definitions. Transdisciplinary research is often seen as a new mode of governing science in society by integrating non-academic types of knowledge, interests and values into the procedures of scientific knowledge production (Maasen and Lieven, 2006). Gibbons (1994) and Nowotny et al. (2003) refer to this new production of knowledge as Mode 2 science, where knowledge is generated within a context of application through scientific and non-scientific perspectives and methodologies, by both scientific and non-scientific stakeholders. Different from Mode 1 science (traditional, disciplinary science), Mode 2 is seeking to produce knowledge which is social accountable or socially robust (Nowotny, Scott et al., 2003; Maasen and Lieven, 2006). More differences between Mode 1 and Mode 2 Science can be found in table 1. In his article the *'New social contract between science and society'*, Gibbons (1999) argues that new modes of cooperation requires new competencies for both scientists and societal stakeholders. "Science and scientists must leave the ivory tower and enter the agora*"* (Nowotny, Scott et al., 2003), and "societal stakeholders have to claim their right and responsibility in the new production of knowledge and act more reflexively" (ibid.).

Implications for knowledge and knowledge production

As explained above; the new contract between science and society asks for new competencies of the stakeholders and new organizational arrangements. Both scientific and non-scientific stakeholders have become 'experts', who enter the agora with their specific knowledge and interests perspectives for complex societal problem solving. Consequently, the new contract between science and society has implications for the knowledge and knowledge production. The old premise was that more knowledge would eventually lead to a save, just and sustainable way of life; but this has not come. It seems that more knowledge goes hand in hand with more ignorance and the uncertainty resulting from it (Leeuwis and van den Ban, 2004; Maasen and Lieven, 2006). People use knowledge to operate in the real world. They build theories that attribute causes to effects and apply these to control the environment for their purposes. If things do not turn out as predicted they adapt their knowledge or ignore the real world to avoid inconsistency.

Table 1: Comparison between Mode 1 and Mode 2 science (Adapted from: Weingart, 1997; Gibbons, 2000; Nowotny, Scott et al., 2003; Gelders, 2005; Lenhard, Lücking et al., 2006; Regeer and Bunders, 2007; Sherwood, 2008)

Issue:	Mode 1 Science;	Mode 2 Science:
Scientific disciplines:	Scientific disciplines work independently of each other	Scientific disciplines are interdependent and therefore work interdisciplinary in order to be successful
Knowledge	Knowledge is specialized, produced in the context of abstraction.	Knowledge is a social construct in which subjectivity plays an important role.
	Scientific knowledge is time-less, objectivity and Universal. Knowledge is cumulative and can be generalized	Scientific knowledge is contextual and negotiable, produced in the context of application.
Production of knowledge	Theoretical - production of knowledge is a neutral, objective and independent process. Expert-led knowledge production	Practical – Co-production of knowledge. Scientific and societal actors work together. Lay/ people-led innovation.
Role of science	Produce basic knowledge and spin-offs, set priorities – separation between science and technology	Facilitate innovation – little difference between science and technology.
Expected outcome	Solutions – answers to questions	Process management – management of interchanges, negotiation
Quality control	Self referential – 'Peer review' judgments; peers selected based on passed compliance with norms; emphasizes on individual creativity from within disciplinary bounds	Social accountability and reflexivity: 'Will the solution be socially acceptable?' Dependent on social composition of review system; emphasizes 'group think', socially extensive and accommodating
Institutional structure	Static and rigid, pre-determined research groups. With stable boundaries.	Self-organization; temporary teams and networks which dissolve when a problem is solved or redefined. With fluid, fuzzy and porous boundaries.
	Centralized, hierarchical & homogeneous	Decentralized, heterarchical &, heterogeneous

Knowledge utilization is a mechanism for survival, and consideration of the knowledge/ real world interface has heuristic effects (Röling and Engel, 1991). In their book *Beyond Farmer First*, Scoones and Thompson (1994) describe knowledge as a: "Social process", which emerges as a product of interaction and dialogue between different actors often with divergent perceptions, competing interests and conflicting allegiances. In their perception knowledge systems represent: "A multiplicity of actors and networks through which certain kinds of technical and social information are communicated and negotiated" (ibid.).

Through the years scientists have tried to typify knowledge into several classification frameworks; "Scientific and indigenous/ local knowledge" (Chambers, 1983; Nooteboom, 1995), "Explicit and Tacit knowledge" (Nonaka and Takeuchi, 1995), "Expert and Lay people's knowledge" (Gibbons, 1999; Foray, 2004), "Scientific and extra-scientific knowledge" (Maasen, Lengwiler et al., 2006), "Scientific and non- or other than scientific knowledge" (Regeer and Bunders, 2007) and "Reflective and Non-reflective knowledge" (Gourlay, 2006). Another way of classifying knowledge is by linking it to the processes through which it was created. Traditional scientific knowledge production was seen by Francis Bacon as a process and method that produces "truths about nature" (In: Goodstein, 2000). Post-modernists and social constructivists focus on social learning (Röling and Wagemakers, 1998), joint knowledge production (Van Buuren and Edelenbos, 2004) and knowledge co-production (Rist and Dahdouh-Guebas, 2006; Steyaert, Barzman et al., 2007) which centre around the integration of multiple perspectives to reach supported, sustainable solutions to problems. The first forms of joint knowledge production were described as participatory research. In practice, however, participatory research programs still had a strong disciplinary basis, only involving societal stakeholders in some

phases of the research. While negative experiences with participatory approaches first tended to be attributed to incompetence, unwillingness or 'bad practice' (Pijnenburg, 2004), later reflections (Leeuwis and van den Ban, 2004; Giller, Leeuwis et al., 2007) emphasized shortcoming in the fundamental assumptions underlying participatory approaches such as:

1. Participatory approaches have failed to anticipate on dynamics of power, conflict and politics

2. Intervention projects are seen as the main carrier of change, self-organization is underestimated

3. Focus on local level, while higher level constraints were not taken into account (figure 1)
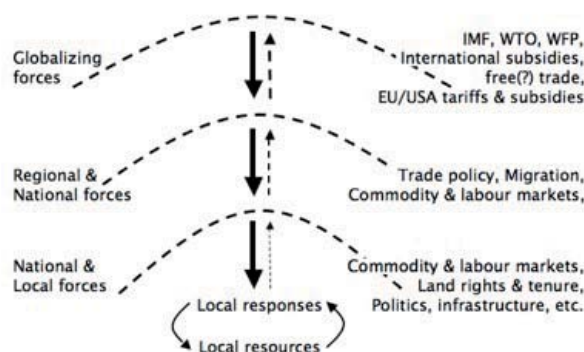

Figure 1: Global and national policies structure the space within which local responses can be generated (Giller, Leeuwis et al., 2007).

As visualized in figure 1: Local responses by local stakeholders or communities are often constrained or determined by policies and regulations at higher levels (Giller, Leeuwis et al., 2007). "This has tended to ignore that the space for change at local level (networks) tends to be constrained or facilitated by processes that occur in other " (ibid.). "Desirable change may emerge when societal negotiation processes in and between networks lead to a balancing of local entitlements, national developmental interests and global environmental concerns with sustainable utilization strategies" (ibid.). Subsequently this has implications for the role of science in these societal negotiation processes.

The role of science in societal negotiations

The critical success factor for sustainable land-use planning and NRM is: "The extent to which multi-stakeholders groups are successful in mobilizing and integrating different types of knowledge" (Opdam, Berg et al., 2007). Opdam et al. further explain that: "The present challenge is to formulate scientific research and policy that better corresponds with local realities and needs, and is focused on innovative ways towards sustainable design for multi-actor landscape planning" (ibid.). The previous paragraph showed that corresponding with local realities and needs can only be successful when societal negotiation processes take into account constrain caused by policies and regulations at higher levels.

In negotiations we distinguish two broad categories; distributive negotiation (win-loose) and integrative negotiation (win-win) (cf. Pruitt and Carnevale, 1993; Aarts, 1998; Upreti, 2001). Land-use planning and NRM are complex processes that tend to be distributive by its nature (Cloke and Park, 1985; Funtowicz, Martinez-Alier et al., 1999). Perceptions and opportunities offered by the landscape and its resources inevitable vary between individuals and groups. This creates a multiplicity of legitimate perspectives on any problem which makes that no single solution can be the unique correct one (Funtowicz, Martinez-Alier et al., 1999). Moreover the characteristics of natural resources (limited quantity, extractability, culturally defined meaning and unevenly distributed) are often drivers of conflict (cf. Cloke and Park, 1985; Leeuwis and van den Ban, 2004). "In many ways the planning system is charged with the resolution of conflicts between resource-using activities, although it is accepted that complete resolution is often impossible" (Cloke and Park, 1985). Many described the need to facilitate harmonious interaction between interest groups so they could develop new – at least partly shared – problem definitions and cognitions on the basis of creative learning processes (Habermas, 1881; Cloke and Park, 1985; Röling, 1994), but "in practice these participatory decision-making processes emerged as 'arenas of struggle', with stakeholders acting strategically, rather than communicatively"

(Leeuwis, 2000). If this is the case, "then why not base methodological approaches on these assumptions in order to be better able to deal with conflicting situations" (Leeuwis, 2000)? By adopting this view; negotiation becomes central to land-use planning and NRM. The contribution of science should therefore aim at the facilitation of high-quality societal negotiation processes which could lead to integrative outcomes (Aarts, 1998; Leeuwis and van den Ban, 2004; Giller, Leeuwis et al., 2007).

Role of knowledge in societal negotiations

As explained in the previous paragraph, the environment is a site of conflict between competing perspectives, values and interests, and the different actors, groups and institutions that represent them (Funtowicz, Martinez-Alier et al., 1999). Decentralization of decision-making, new modes of science and research and the involvement of multi-level experts have created complexities that border the irresolvable task of coordinating and facilitating the integration of heterogeneous types of knowledge (cf. Maasen and Lieven, 2006). The integration of different types of knowledge in land-use planning and NRM is interesting for a number of reasons. Firstly the involvement of scientists, policy makers and other stakeholders in negotiation is a condition for sustainable landscape development (Buchecker, Hunziker et al., 2003). Secondly local actors have a lot of practical knowledge on the biophysical and social constraints and opportunities to change a landscape within the boundaries of ecological sustainability, they know – for example – what local actors to go to (and not to go to) for specific support and advice. In order to be sustainable: "Landscape design and planning need a spatial concept that facilitates communication and negotiation among stakeholders about feasible aims and efforts, and at the same time allow emotional preferences to be integrated with scientific ecological reasoning" (ibid.).

In the 16th century Francis Bacon argued that "Knowledge is power". Bacon's perspective is still useful, because nowadays – more than ever – knowledge is used as a powerful instrument in societal negotiations (Nooteboom, 1995; Giller, Leeuwis et al., 2007). According to Latour (1999), knowledge is the outcome of social processes and institutional guided actions, which makes the process of understanding and interpreting knowledge neither ever purely subjective or arbitrary, nor ever wholly objective (Drinkwater, 1994). By strategically mobilizing knowledge, stakeholders try to influence negotiations or decisions in order to pursue goals or defend certain interests (cf. Van Buuren and Edelenbos, 2004).

How stakeholders mobilize knowledge in negotiations

In negotiations, knowledge can be mobilized and used in different ways and for multiple strategic reasons (cf. Granovetter, 1973; Hajer, 1995; Potter, 2004a; Giller, Leeuwis et al., 2007). Insights generated through research can easily be ignored, shielded off, misinterpreted, misrepresented, or be used selectively and opportunistically by stakeholders as 'weapons' in their struggle to pursue or impose certain problem definitions and solutions (Giller, Leeuwis et al., 2007). This research starts from the premise that any proposal that aims to enhance the contribution of science to resource-use negotiation must start from a proper understanding of how and why stakeholders mobilize scientific and other knowledge in societal negotiations on land-use and NRM.

Knowledge is a social construct (Arce and Long, 1992), that is produced and reproduced in interaction and dialogue between different actors (cf. Scoones and Thompson, 1994). In order to understand how stakeholders mobilize knowledge in negotiations it is necessary to study these interactions and dialogues, and analyze the discourses in which knowledge is 'packed' (Hajer, 1995; Potter, 2004a; Potter, 2004b). Finding appropriate discourses (use of specific argumentation, metaphors, narratives and performance) becomes an important form of agency for stakeholders to influence the outcome of societal negotiation (Hajer, 1995). By strategically deploying discourses, stakeholders seek for discourse-coalitions that create, design and alter cognitive maps, storylines or taboos, which could empower their position in the negotiation process (cf. Hajer, 1995; Carnevale, 2006; Hajer, 2006; Hajer and Uitermark, 2007). This makes the analysis discourse a vital facet for understanding how knowledge is mobilized to create space in negotiation (cf. Harvey, 1996).

Van Bueren, Klijn and Koppenjan (2003) analyze problems in decision making and negotiation from a (policy) network perspective. The network theory deals with situations in which "limited and contested knowledge and information will provoke strong reactions from stakeholders and will polarize decision making" (ibid.). The network approach contains three important concepts: networks, arenas and games. Stakeholders form 'networks' that use certain discourses and paradigms, which are the

product of institutional practices and individual activities that reflect particular types of knowledge (Hajer, 1995). They are actively produced through the agency of human actors, who by undertaking certain practices, and by describing the world in certain ways, create a discourse (Keeley and Scoones, 2000). These networks are the mechanisms through which knowledge becomes practice. Representatives of networks meet in 'arenas', where they negotiate over their competing claims. In these 'games' stakeholders strategically use knowledge in order to create 'room for manoeuvre' (Clay and Schaffer, 1984) or 'space for change' (Long, 1984; Long and Long, 1992). The network theory offers a useful framework for analyzing how critical moments (at different levels; see figure 1) influence the course and outcome of negotiation processes.

Space for change

Society is composed of actors, thinking agents, capable of strategizing and finding space for manoeuvre in the situations they face and manipulating resources and constraints (Villareal, 1992); what Long (1984; 1992) calls 'agency'. Creating space for change implies a degree of consent, a degree of negotiation and a degree of power. Not necessarily power stored in a given economic or political position, but the possibility of control, of privilege, of a degree of authority and ability, be it from- or backstage, for flickering moments or for long periods (Villareal, 1992). This change, is not realized in the arbitrary, isolated and formalized space of a project, but arises from multiple interactions in and between networks, whereby phenomena like coincidence and self-organization play an important role (Aarts, 2007; quoted in Giller et al., 2007).

The concept of space is used in very diverse ways and multi-disciplinary. Everyone knows what is meant by space in terms of a 'room' in an apartment, the 'corner' of the street, a 'marketplace', a 'shopping or cultural centre' (Lefebvre, 1991). But describing "Room for Manoeuvre" (Clay and Schaffer, 1984) or "Space for Change" (Long, 1984; Long and Long, 1992), turns out to be far more difficult. Space considered in isolation is an empty abstraction; likewise energy and time (Lefebvre, 1991). The understandability seems to be determined by the question if – or if not - space can be conceptualized as an objective attribute of things that can be measured and thus pinned down (cf. Verschoor, 1992). Lefebvre (1991) distinguishes the physical, the mental and the social space. As for physical space, it is observed, described and analyzed on a wide range of levels. The problematic of space is comprised of questions about mental and social space, about their interconnections, how they can change through time and their role in societal negotiation processes Mann (1986) adds that these spaces are constituted of multiple overlapping and intersecting types of space, which complies with Gibbons' notion (1994) that the boundaries of space can be stable and fixed, but also fluid, fuzzy and porous. Social space is the product of past actions, and permits fresh actions to occur. If space is a product, and if there is productive process, then we are dealing with history, which makes space – like knowledge – flexible and temporal in character. I therefore conceptualize space for change as the temporal situation in which specific physical, mental and social spaces provide the opportunity for change, innovation, breakthroughs or decision-making in negotiation processes (cf. Lefebvre, 1991). In this research I will analyze how strategic mobilization of knowledge can create this temporal situation which opens up space for change.

Research questions and design

Research questions

In the theoretical exploration I have explained and linked several theories and concepts that that explain why it there is a need to study the mobilization of knowledge in competing claims context. I have used this theoretical exploration to formulate the below research questions:

1. How do stakeholders mobilize knowledge to influence the outcome of negotiation processes?

    1.1. Through what discourses do local stakeholders mobilize knowledge?

    1.2. Through what networks do stakeholders access knowledge?

    1.3. Which coalitions do local stakeholders mobilize to influence the outcome of negotiation processes?

2. To what extent does this way of mobilizing knowledge opens up 'space for change' in terms of:

Research strategy

Knowledge and space are social constructs, produced and reproduced through social interactions, negotiation and discourse (e.g. Long and Long, 1992). In practice this means that it is important to understand and interpret: How problems are formulated? How stakeholders express their views and change social positions? And to identify: What resources (knowledge) stakeholders mobilize and why?

These are examples of 'pragmatic sociology' which is oriented to observations and interpretations of various forms of adjustment of people, between them, and with their environment in concrete actions, i.e., the way various entities, human and non-human, are assembled through social interactions (cf. Steyaert, Barzman et al., 2007). Pragmatic sociology displays important affinities with 'the social construction of reality' of for example Berger and Luckmann (1967; quoted in: Silber, 2003).

Research in the interpretative tradition is aimed at understanding the situation you are studying in its context (cf. Eshuis, 2006; Yanow and Schwartz-Shea, 2006). As explained in the theoretical framework, the increasing importance of context is also reflected in a relatively rapid shift within science from the search for 'truth' to the more pragmatic aim of providing understanding of the empirical world that 'works' (Gibbons, 1999). The complexities of the societal problems we face require a holistic and ethnographic approach to research that tries to understand actions in its historical context. Case study is a methodology that permits to gain a profound insight in complex social phenomena or social processes permitting the researcher to have holistic and meaningful characteristics of real life events (Yin, 1984; 2003).

Case studies and data collection

The "Competing Claims on Natural Resources" programme provides many interesting case studies for this research. The programme focuses on Competing Claims on land-based natural resources in southern Africa and Brazil where – as in a lot of other countries – competition on land-use is a major issue. In southern Africa the establishment of Transfrontier Nature Reserves (also known as *Peace Parks*), and recent developments on bio-fuels in Mozambique have increased pressure on arable land, and subsequently also on water and labor. Issues like resettlement and compensation of 'park'-inhabitants, changed land-use options and their underlying bio-physical and socio-economical research have opened a number of arenas in which stakeholders negotiate about policies, plans and their alternatives.

Although not formally part of the "Competing Claims on Natural Resources" programme, the Dutch "Room for the River" project shows great similarities with some land-use developments and policies in southern Africa. Through the decades the once so characteristic meandering Dutch rivers have been wedged between straight high dikes, while the level of the land behind the dikes dropped. In case of a flood this would cause huge emotional and economic damage (Ministry of Transport Public Works and Water Management, 2006). To give the rivers more space, the Dutch Cabinet has created a package of measures called the Spatial Planning Key Decision "Room for the River". Like in southern Africa the project requires resettlement of citizens, farmers and companies, which resulted in public uprising and self-mobilized study-groups which question proposed policies and their underlying research, and come up with alternative knowledge to influence negotiations.

In both cases the setting is highly dynamic, driven by emerging policies on land-use and NRM (cf. Giller, Andersson et al., 2005). Different stakeholders from different levels and rooted in different networks are involved, each with their own frame of reference, competencies, goals and responsibilities. The dynamics and processes behind what happens when these stakeholders meet

need better understanding to allow for more equitable and sustainable rural development. As explained in the theoretical exploration and research questions I am particularly interested in how different stakeholders mobilize knowledge to influence the outcome of these complex negotiations and create space for change.

Through analysis of documentation, records and interviews I will analyze the dynamics of the cases through time. Both cases have a rich history and are embedded in policy and research that go back more than a decade. These dynamics are essential to understand how decisions taken in the past influence stakeholders' behavior and perceptions in the current situation. At the same time I will use participatory observations and semi-structured interviews to get a better understanding about the stakeholders' problem- and solutions perceptions. I will observe these stakeholders both individually, and in the formal and informal arenas where they meet others and negotiations about issues at stake. By identifying coalitions, analyzing and interpreting discourses and behaviour I hope to explain how and why stakeholders mobilize knowledge in negotiations to create space for change. Subsequently I hope identify what knowledge and methodological gaps exist for different stakeholder groups so future research can be better tailored and targeted at specific needs of our clients.

Some final remarks

In this paper I have tried to show how the changing role of science and knowledge in society influences how stakeholders try to create space in negotiations to defend their interests and pursue their goals. I hope to have shown that knowledge should not merely be seen as a static rationality of actors. Experiences have shown us that scientific research can arrive in arenas in fundamentally different ways as intended (cf. Hoppe, 2005). In a clash between competing discourses, 'rational knowledge' is unlikely to play a significant role on its own (Nooteboom and Teisman, 2003). According to theories of complex decision making, decisions are taken in networks of interdependent actors (Kickert, Klijn et al., 1997). These indicate that there is no such thing as a decision maker that can take a truly rational decision. From a constructivist perspective, rationality of certain decisions is constructed through social interaction and learning (Nooteboom and Teisman, 2003). If science really aspires to enhance its contribution to solving complex resource-use problems, there is a need to better understand the processes of knowledge mobilization and construction that influence the outcome of negotiations on land-use and NRM.

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