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Problem structuring in participatory forest planning

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ABSTRACT

Decision-making for multi-purpose forestry requires well-aligned public participation and stakeholder interaction. The operational research community has developed both the theory and practice of problem-structuring methods (PSMs) to help stakeholders determine a solvable joint problem perception. Problem structuring is typically conducted via facilitated modelling (group negotiation) in workshops. This review investigates problem-structuring activity within participatory forest planning over the period 2002–2011. A total of 32 research articles were studied and summarized. It was found that problem structuring is widely scattered in different continents, but most of the explicitly named PSMs arise from south-eastern Asia or Africa. Sophisticated problem structuring seems rather rare in forest planning, but some good examples bring evidence that encourages the use of facilitated modelling in participatory forest planning. Evoked activeness among stakeholders signals meaningful social learning, while improved knowledge exchange, anticipated 'sense of ownership' by stakeholders and commitment to the process were the main observed positive effects of problem structuring. However, problem structuring needs good facilitation as well as modelling and decision-analysis expertise. Attention must be paid to ensure participants' comprehension and to explicate the goals and rules of problem structuring with participants.

1. Introduction

When planning for the sustainable use of forest resources in a spatially explicit management unit, competing goals and interests call for multi-objective, participatory decision-making. To some extent, non-spatial forest policy-making shares similar challenges. In recent years, it has been acknowledged that problem definition and structuring are crucial parts of participatory decision processes (e.g. Antunes et al., 2006; Giordiano et al., 2007). In the messy situation of a 'wicked' problem with conflicting goals of various stakeholders, it is reasonable to put a strong emphasis on defining and modelling the problem (Shaw et al., 2006; Voinov and Bousquet, 2010) instead of adopting ad-hoc approaches to the problem-solving phase. Problem structuring refers to composing conceptual models (e.g. mind maps) and creating and negotiating views of the decision situation, its components, inputs and outputs in a systemic view and with the aid of an external group-learning expert. For this purpose, the operational research community has developed and debated problem-structuring methods (PSMs), which represent facilitated modelling within group decision-making (Morton et al., 2003; Rosenhead, 1989, 2006). PSMs are meant to be capable of handling problems that have not been pre-formulated and may have quite a diverse structure (e.g. Eden, 1995).

In this paper, PSMs refer to formally named methods appearing in Mingers and Rosenhead's (2004) study, although problem structuring may happen also without PSMs. The essential elements of problem structuring, as understood in this study, are presented in Fig. 1, which connect to the phases of a participatory planning process in forest management. The triangle of problem identification, problem modelling and problem solving originates from the study by Martins and Borges (2007), and the present authors have aligned the problem-structuring layer for the purposes of this study. In essence, problem structuring mainly falls within the problem-modelling component and partly in the problem identification component. In the problem identification phase decision-makers are supposed to compare the actual state of the planning object with the desired future conditions, which might lead to the realization of potential deviations. In the problem-modelling phase, decision-makers are aware of the problem situation and seek opportunities to overcome the limitations of the current state. To understand problem-structuring processes, it is thus necessary to know about the information inputs, experiences and expertise utilized in the group negotiation, the methods and modelling techniques applied, the facilitation conducted and the outputs generated, including the inherent learning achieved.

The scope of the PSM concept is wide, containing broad methodological entities such as soft systems methodology and drama theory (Mingers and Rosenhead, 2004). Individual methods and concepts,

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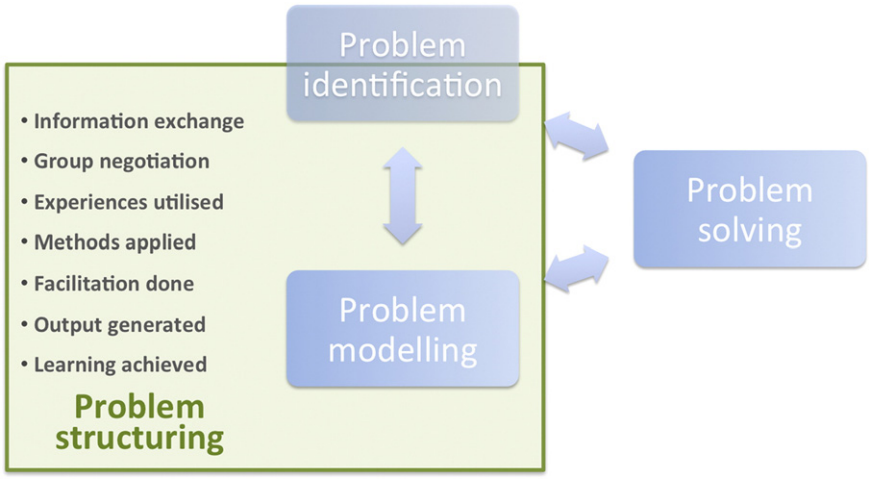

Fig. 1. Rationale and essential elements of problem structuring within a planning process.

such as cognitive mapping (Axelrod, 1976; see Kelly, 1955) or system dynamics (Forrester, 1961), were developed independently and later gathered under the umbrella concept of problem structuring as first reviewed by Woolley and Pidd (1981). According to Franco and Montibeller (2010), PSMs' main features are (i) the assumption of subjectivism (different views about the world); (ii) groups as the key organizational entity in making decisions; and (iii) the limited role of quantification in the analysis (mostly qualitative modelling). Further characterizing features of PSMs include, alongside collaborative modelling of the real-world system, the quest for an understanding of the phenomenon in its context and from the participants' perspective (Rouwette et al., 2009) as well as the centrality of pursuing consensus and commitment (Mingers and Rosenhead, 2004). In recent years, the focus of PSM research within operational research has thus shifted from developing and applying individual PSMs towards a broader facilitated modelling approach that focuses on group learning (Franco and Montibeller, 2010).

PSMs have been criticized for subjective idealism and the lack of evidence of effectiveness (Finlay, 1998). Such evidence is hard to acquire, because PSM studies are, due to the nature of PSMs, typically based on action research in specific case contexts (Eden, 1995). However, justification of PSMs has been made more evident by means of meta-analyses and conceptual reasoning (e.g. Rouwette et al., 2009; White, 2006). In particular, empirical evidence (Franco, 2007, 2009) shows mutual accommodation in participants' learning processes, and a high level of commitment to the joint agreements among participants. Awareness and shared understanding among stakeholders of issues around problem identification and wide acceptance of the ways and means of problem modelling are also among the expected positive effects of problem structuring. These outcomes are presumed to emerge due to looking at the situation systematically from different perspectives, combining professional and local knowledge, and compiling situation models out of participants' own conceptions. These effects are hardly directly measurable, thus, active involvement of stakeholders, reported comprehensibility and participants' commitment to the planning process may be used as indicators of such positive effects. Earlier research on the conditions and effects of social learning in natural resources management has demonstrated that social learning is challenging but possible (Mostert et al., 2007, 2008; Muro and Jeffrey, 2008, 2012).

The above findings and expectations from the literature neither mean that PSMs would guarantee such promising outcomes; nor do they claim that ordinary (non-PSM) methods of participatory planning (e.g. workshops including small-group discussions or world café exercises) could not reach similar results. Yet, it is reasonable to presume that PSMs are one way of improving participatory forest planning processes towards more effective, legitimate governance.

Franco (2009) points out that the success of PSMs is subject to a trusted facilitator, a neutral person who enables constructive group negotiation, equal participation, encouragement and a concrete outcome. The facilitator needs to safeguard a balanced combination of local knowledge and professional expertise. Further, he/she needs to be sensitive to the potential fears and anxieties of participants, to inequalities of communicative competence, and to the mood of the group (see Ackermann, 1996; Phillips and Phillips, 1993). Transferability of PSMs has been considered low because of the high requirements for a technically skillful and context-sensitive facilitator as a change agent of the case (Morton et al., 2003).

Potentially, PSMs may contribute to the power balance of the stakeholders by offering the participants a scene for active and transparent participation. On the other hand, availability of sufficient resources for facilitation has been seen as a critical issue in participatory forest planning, in which processes will ultimately change relationship patterns and affect power relationships (Buchy and Hoverman, 2000).

Mendoza et al. (2002) and Purnomo et al. (2003) proposed using and developing facilitated modelling methods in forest management (at that time the term collaborative modelling was typically used). Now, approximately a decade later, the forest-research community lacks summarized hitherto knowledge of how PSMs and facilitated modelling features have assimilated to participatory forest-planning research and how they have tackled the challenge of messy, ill-defined land use and policy planning problems.

This paper aims to fill the gap of knowledge by reviewing the past decade (2002–2011) of participatory forest-planning research cases incorporating direct stakeholder interaction in a group setting (in other words: problem structuring in a wide sense). The review focuses on the ways and means of making stakeholder groups address the problem and modify the understanding of it. The introduction above suggests that the main potential positive effects of problem structuring include the rising awareness of issues, achieving common understanding and commitment to the process. The aim of this paper is i) to figure out the general situation regarding problem structuring, including methods and facilitation efforts as well as the use of formal PSMs in participatory forest planning; ii) to identify the potential positive effects having emerged, and the challenges that have to be overcome to improve the effectiveness of problem structuring.

A glossary below provides definitions of the methods and terms that are important to follow the principles of problem structuring and the discussion throughout the article. Fig. 2 presents the distinction of the