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Supporting collaborative policy processes with a multi-criteria discussion of costs and benefits: The case of soil subsidence in Dutch peatlands

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ABSTRACT

Collaborative policy processes are increasingly advocated to resolve management problems of social-ecological systems. To elucidate which approaches work in diverse situations, this paper demonstrates the added value of Cost-Benefit Analysis in combination with a deliberative tool as a support system a collaborative policy process in Dutch peatlands. We used quantitative models to assess the spatial and temporal physical effects of three water management strategies steering soil subsidence and land use. The stakeholders involved in the case study provided empirical economic data to link the physical effects to the ensuing economic effects, which we distributed among the stakeholder groups affected. The case study aimed for an intersubjective assessment of strategies for water management and land use planning. We therefore enhanced the discursive features of Cost-Benefit Analysis, focusing on knowledge exchange and the evaluation of equitable tradeoffs. The stakeholders participating in our case study appreciated the approach´s comprehensive assessments, and the ensuing multi-criteria discussion of the costs and benefits. We believe this result can be attributed to (a) the clear, participatory design of the CBA process, (b) a comprehensive presentation of the constituent elements of the CBA result, and (c) the abundant opportunities to deliberate the results. We discuss how our approach can increase stakeholders' capacity to understand the complexities of social-ecological systems and their ability to explore the potentialities of these systems.

1. Introduction

The Millennium Ecosystem Assessment (2005) clearly demonstrated that most of the valuable services ecosystems provide to society are degrading or are being used unsustainably. There are no panaceas for achieving a more sustainable management of social—ecological systems, because interventions often cause nonlinear changes in a complex set of interrelated environmental, political, and economic variables across multiple spatial and temporal scales (Ostrom, 2007, 2009). In response to this complexity and unpredictability, adaptive management approaches have emerged that aim to increase the resilience of social—ecological systems through a structured and iterative learning-by-doing strategy (Den Uyl and Driessen, 2015). Early versions of adaptive management approaches tended to focus on enhancing the scientific knowledge of the ecosystem being managed. Because the knowledge generated was frequently not successfully linked to management, more iterative approaches that allowed stakeholders to collaborate were designed (Scarlett, 2013). The benefits of stakeholder collaboration are legion and can be derived from (a) normative ideas and principles, e.g., the enhancement of democratic capacity or deliberation among participants, (b) a substantive rationale to improve the quality of decisions, and (c) an instrumental underpinning to generate legitimacy or resolve conflict (Glucker et al., 2013).

Although collaborative adaptive management approaches are credited with great potential to improve the management of social—ecological systems, they prove difficult to put into practice. To improve this predicament, social learning processes are advocated, aimed at “learning together to manage together” (Pahl-Wostl et al., 2007; Monroe et al., 2013). To achieve mutual understanding, Van de Riet (2003) points out that the viewpoints of researchers and practitioners must be carefully balanced. Too much focus on researchers' views may produce only “superfluous knowledge”, i.e., knowledge that is scientifically valid, but irrelevant to the management problem. On the other hand, too much focus on practitioners' views may result in “negotiated nonsense”, i.e., knowledge that is supported by stakeholders but is scientifically invalid.

To reconcile the viewpoints of researchers and practitioners, the integration of analytical and deliberative tools seems to be a

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prerequisite. For instance, Goosen and Vellinga (2004) promote collaborative planning platforms that include support tools for negotiation and mediation, as well as tools for the assessment of the costs and benefits of the stakeholders involved. Holman et al. (2016) found that the integration of participatory scenario development and quantitative modeling can facilitate dialog among stakeholders and a better understanding of the impacts of management choices. Chaudhury et al. (2013) discuss how participatory scenario analysis can provide the legitimacy needed to bridge disciplinary boundaries and point out that quantification of the scenarios is needed to address the credibility and salience of the knowledge. Quantification of participatory scenarios is especially important if the goal of the process is to make concrete management decisions (Bohunovsky et al., 2011).

Given the context-dependency of most management problems of social—ecological systems, it has been suggested that instead of trying to conjure up a one-size-fits-all solution, more empirical insights from projects should be captured and disseminated, to illustrate which approaches work in diverse situations (McNie, 2007; Beratan, 2014). Therefore, this paper aims to contribute to this collective understanding by demonstrating how quantitative modeling, Cost—Benefit Analysis (CBA), and a web-based discussion tool were employed to support a collaborative policy process in Dutch peatlands. Some scholars believe that the combination of CBA and deliberative tools has high potential to support collaborative policy processes (De Jong and Geerlings, 2003; Turner, 2007; Browne and Ryan, 2011; Beria et al., 2012). Yet, case studies that demonstrate the added value of such combinations remain underexposed in the scientific literature. This paper aims to fill this knowledge gap.

2. Background

2.1. Cost-Benefit analysis as a heuristic aid

CBA has proven its worth for project planning and policy analysis for many decades, with methodological origins going as far back as the definition of benefits and costs by the French economist and engineer Jules Dupuit in the mid-19th century and the stipulation of the principle that the benefits of an investment should exceed the costs (Navrud and Pruckner, 1997). Although overall societal wellbeing is improved whenever this principle is applied, this nevertheless implies that those who bear the costs will be worse off. During the 1930 s and 1940 s the works of Kaldor and Hicks justified this benefit-costs principle by stating that societal wellbeing is improved whenever the gainers can compensate the losers, regardless of whether the compensation occurs (Pearce, 1998).

Changes in wellbeing are assessed by comparing the financial and non-financial effects of a measure with the effects of a "business as usual" scenario in which the current policy remains unchanged. Financial effects are fully captured in commercial markets and can be derived from the costs of consumed goods and services and their Net Value Added (NVA) of production, i.e., the sum of producers' income, interest, depreciation, and paid labor. Non-financial effects are not fully captured in commercial markets and require other valuation techniques. In recent decades, the valuation techniques used in CBA have gradually improved, resulting in CBAs that encompass the financial and non-financial economic values of a wide range of ecosystem services (Costanza et al., 1997; Turner et al., 2000; Robbins and Daniels, 2012).

The broad scope and the uniform monetary evaluation make CBA potentially a suitable tool to address the complexity of social—ecological systems. However, previous CBAs have encountered a variety of process-related issues that diminish its usefulness as a support tool for collaborative processes. Turner (2007) discusses how the use of CBA as a "decision rule", i.e., the a priori identification of the optimal cost–-benefit ratio of project alternatives, often conflicts with the iterative manner of consensus building in real-world policy processes. He suggests that a better match for these processes is the use of CBA as a "heuristic aid", i.e., a complementary component in a decision support system that aims for an intersubjective assessment of the preferred project alternative. Furthermore, both Beukers et al. (2012) and Mouter et al. (2013) found that CBA practitioners perceived misunderstandings and inadequate communication between planners and economist as a core problem in CBA processes. This predicament appears related to opposing views among the CBA practitioners on how CBA should be used. As a result, debates tend to focus on other issues than the management problem at hand, e.g., the limitations of CBA methodology, or the value assigned to CBA in the decision-making process. In addition, if some practitioners are insufficiently aware of CBA methodology, these communication deficits may even result in mistrust, if practitioners believe their values are deliberately disregarded, and the knowledge obtained by the CBA is used strategically.

Remarkably, the CBA practitioners that perceived the processes-related issues still believed CBA should be used in the appraisal process of a project, because it provides valuable information about the usefulness, necessity and design of a project (Mouter et al., 2013). However, to maximize the impact of these advantages, the process-related issues must be dealt with. The suggested solution by some scholars is that CBA should refrain from presenting final verdicts based on decision rules but should instead be used as a method for collecting, organizing, and discussing information relevant to interactive policy making, embedding the analytic analyses in deliberative processes aimed at revealing preferences and settling arguments (De Jong and Geerlings, 2003; Robinson and Hammitt, 2011). To achieve this, many authors propose a combination of CBA and Multi-Criteria Decision Analysis (MCDA), either by complementing CBA with a MCDA of non-financial values, or by using CBA as one component of a wider MCDA (Turner, 2007; Browne and Ryan, 2011; Beria et al., 2012).

2.2. Water management and land use planning in Dutch peatlands

In the research area (Fig. 1) the predominant land uses are dairy farming and built-up areas, and there are some small marshland nature reserves. The area lies in the delta of the river Rhine; its elevation ranges from 1 m above to 2.5 m below sea level. This low elevation requires manipulation of the drainage to prevent the soil from becoming waterlogged. To achieve this, during the Middle Ages artificial catchments called polders were created, with a dense network of several thousand km of watercourses. At present the drainage base levels of the watercourses are maintained at 30–70 cm below ground. Drainage

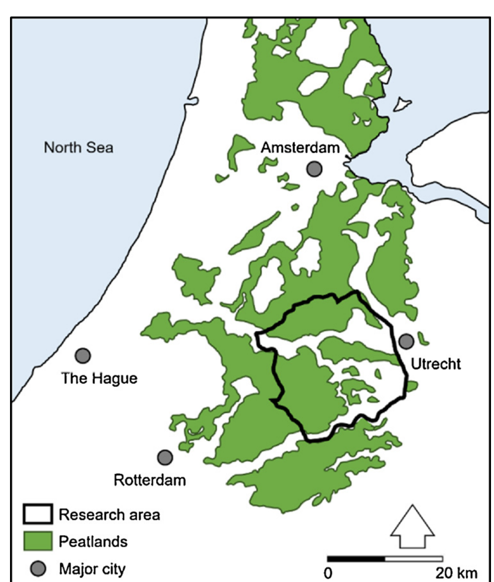

Fig. 1. Location of the research area in the western part of the Netherlands.