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Analysis

A Context-based Procedure for Assessing Participatory Schemes in Environmental Planning

Guy-El-Karim Berthomé [a], Alban Thomas [b,*]

[a] UMR Metafort, AgroParisTech-Inra-Irstea-VetAgroSup, Aubière, France
[b] Toulouse School of Economics, INRA, University of Toulouse, France

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ABSTRACT

The efficiency of participatory schemes in environmental planning is an emerging research area, and many issues are not solved yet regarding the assessment of such procedures. It is essential for decision makers to identify improvement opportunities of participatory schemes. We propose an original procedure to address such issue, through a bargaining model from the signaling game literature, which accounts for participation design as well as for agents' preferences, beliefs and bargaining power. The model is calibrated using qualitative data from surveys in French local communities involved in municipal solid waste management. Model simulations are used to test for assumptions on the stakeholder dialogue and explore sensitivity of game outcomes to structural parameters. We propose a set of performance indicators to identify the most effective participatory schemes in achieving convergence in stakeholder positions regarding environmental and land-use planning.

1. Introduction

Consultation-based management initiatives have emerged over the past decades as a response to social and political factors impeding stakeholders to reach an agreement on local projects. The assessment of their performance is of growing importance for public decision makers and managers (Ansell and Gash, 2007), in particular because of the need to identify suitable resources associated with positive outcomes of such negotiations (Wolf-Powers, 2010). Providing decision makers with a scientifically sound and context-specific information adapted to their needs is therefore a critical issue. However, heterogeneity in stakeholder-dialogue cases does not facilitate the construction of a common benchmark for guiding decision makers who may not be familiar with public participatory procedures.

The efficiency issue in stakeholder dialogues has been addressed with various approaches and applications (Davoudi and Evans, 2005), with few seminal works focusing on the relative role of various factors on the outcome of stakeholder dialogues (Margerum, 2002; Beierle and Cayford, 2002). Participation procedures and stakeholders' satisfaction often stand out as the main drivers of success (Smith and Mc Donough, 2001). Nevertheless, the literature generally overlooked a large number of context variables from concertation schemes, while at the same time the scope of study of local negotiations became more complex (Menkel-Meadow, 2009), contributing to put forward the importance of context-based aspects of the debate (Braun and Schultz, 2010).

The role of such contingent, context-based components of stakeholder dialogue was addressed by some authors through approaches originating from governance studies (Koontz, 2005) or negotiation (Raymond, 2006). These studies contributed to shifting attention to political factors (Walker and Hurley, 2004) and the participation process design (Edelenbos and Klijn, 2006; Ansell and Gash, 2007), and most were taken from the literature on environmental management and planning. Recent empirical

* Corresponding author.
E-mail address: thomas@toulouse.inra.fr (A. Thomas).

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analyses include Ananda and Proctor (2013) on collaborative approaches to water management in Australia, van Rensburg et al. (2015) on wind farm planning decisions in Ireland, Skurray (2015) on institutional arrangements for common-pool resource management.

A standard approach in the economic literature consists of formal representations of complex relationships between players, even though relationships between the stakeholder dialogue and the outcome of the participatory scheme are often difficult to predict using simple mathematical representations, as acknowledged by Mathur and Skelcher (2007). In many settings, environmental planning with participatory schemes cannot be reduced to a two-player game with, e.g., environmentalists on one side and the industry on the other, but include the *principal* as a third agent (Wolf-Powers, 2010). Motivations for introducing a third agent (or player) include Chiu and Lai (2009), and Davoudi and Evans (2005) and Saarikoski (2006) for a three-player game with a principal facing two opposing coalitions. Moreover, the development of decentralized game models offered an extended perspective to economists willing to analyze collaborative bargaining. In this literature however, the relationship between agents does not always correspond to a participatory process.

In a majority of articles, the principal remains the first "active segment" facing agents with private information, contrasting with the timing of consultation-based procedures. In the latter, messages received by the principal may be distorted (Goltsman and Pavlov, 2008), and moreover, the principal does not control the way stakeholders behave, or how they will contribute (centralized or decentralized system). This justifies in particular the need to characterize the principal's attitude: neutral or not, but always in reaction to stakeholders. Moreover, standard negotiation models often allow for the possibility that negotiation completely fails, an option the regulator or principal tries in practice to avoid at all costs in local planning procedures. Indeed, stakeholder dialogue always allows for making (little) progress on some technical or managerial features of the sector or process design, such as valuing some new categories of municipal solid waste in our application (see below).

In participatory processes, information transmission is not really costly, there is partial cooperation and always partial results from the negotiation. These limitations justify in our view the use of a *cheap talk* model à la Crawford and Sobel (1982), where information is transmitted between agents through ordinary, informal signals, before the final decision is made. Cheap talk can be seen as a way to reach, in some circumstances, more proximity between parties in a negotiation (Messer et al., 2013). In order to model the interactions between agents involved in stakeholder dialogue, we consider an original approach based on a signaling game, formally close to an extension of Alonso et al. (2008). It is necessary however to augment this model by introducing negotiation power and familiarity among players, considering a greater variety of dialogue modes. Based on this, the cheap talk approach can be reinterpreted in such a way that it shares similar features with actual stakeholder dialogue situations. Although the modeling strategy introduced in this paper is far from sufficient for representing the complexity of agent interactions, we believe it is an original methodological step in an effort to explore stakeholder dialogue effectiveness.

The complex nature of stakeholder dialogues requires a detailed characterization of agents' preferences, beliefs, and other drivers of their behavior. An additional contribution of the paper is therefore to present an original method to calibrate a cheap talk model, including the major determinants behind negotiation objectives and outcomes, with qualitative data obtained from field surveys. However, for calibration purposes, we consider not only information on stated preferences collected from stakeholders, but also revealed evidence gathered during negotiation by means of a survey.[1] The cheap-talk model is calibrated by converting such qualitative survey data to numerical values, on each of three selected study areas. Predictions from the theoretical model are then obtained by a numerical root-finding algorithm. We consider as an empirical application the case of municipal solid waste management in France, as an illuminating example of environmental planning where stakeholder attachments are often clear cut, even incorporating a sophisticated amount of expertise during the stakeholder dialogue.

A final contribution of the paper is a method of performance assessment associated with stakeholder dialogue in environmental planning. Assessing the performance of participatory schemes is a challenging task, and this paper does not propose a comprehensive and generic method for evaluating such negotiation-based procedures. Rather, we consider only two indicators of performance that are relevant to facility siting process in environmental planning: the degree of convergence in the positions of opposing stakeholder groups, and the intensity of capital investment achieved through dialogue. We discuss in the paper the motivation for these indicators in relation with the literature on collaborative policy making.

The outline of the paper is as follows. Section 2 describes the way stakeholder dialogue is typically used in environmental and land-use planning, in particular in local solid waste management. We also present in this section the survey method and the study areas: three French sites concerned with municipal solid waste management. The cheap talk model is presented in Section 3 with its assumptions on preferences and dialogue modes, and the derivation of final outcomes. In Section 4, we present the calibration exercise, and we discuss the model simulation and validation checks. Section 5 concludes.

2. Stakeholder Dialog in Controversial Environmental Planning, with an Application to Waste Management

The upgrading of public services that rely on infrastructure subject to the NIMBY (Not In My Backyard) phenomenon often gives rise to difficult local negotiations (Feinerman et al., 2004). Because of comparable difficulties in policy making, the design of participatory procedures for achieving a collective agreement is not fundamentally different for a wide range of projects impacting the environment (industrial hub, landscape-modifying infrastructures, transportation, tourist facility, waste management, water dam, etc.)

2.1. The Usual features of Stakeholder Dialog in Environmental Planning

It is interesting for local planners, when they have the opportunity of designing their own procedure, to know which participatory scheme is preferable, regarding in particular the probability of success. Participatory approaches at the local level correspond broadly to a stakeholder dialogue, and in most developed countries a typical procedure for environmental planning can be described as follows. Stakeholders are involved in a series of participatory sessions (public hearing, working group, public event, open forum, etc.) during a process which can take several years. In practice, the process starts with a proposal from a company (public or under delegation) in charge of the facility design and/or upgrading investment. Such proposal is a combination of technical, financial and management options together with a size of operation, which can in principle all be opposed by (some) stakeholders. Stakeholders respond with counter-proposals consisting of required modifications on some components of the project design. If proposals and counter-proposals made by stakeholders for facility siting or upgrading investments do not converge to a satisfactory outcome for the majority of stakeholders, then this long and iterative process produces poor results. In the case of a more successful outcome, then the participatory process succeeds in achieving a final outcome in the form of a larger set of new management provisions, which have been subject to negotiation and approval by both sides. In case of real success, the fraction of strong disagreement remaining among groups is expected to be small.

Municipal solid waste is often considered an "environmental bad" (Davoudi, 2000; Feinerman et al., 2004) implying political, economic and cultural aspects (Bulkeley et al., 2005; Wagner, 2011). It is less the choice of the management mode in itself that matters in practice, than

[1] The advantages of in-depth interviews with stakeholders are also discussed by Avci et al. (2010).