Covaluation: exploring methods for expert and stakeholder valuation in integral earth system governance

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Abstract

Earth system governance can be characterized as multi-actor, multi-level and multi-domain. It is multi-actor because different stakeholders like governments, private actors, and societal actors are involved in the governance process; it is multi-level because different government levels play a role in the governance process through local, regional, national, European, and global governmental institutions. And it is multi-domain, because earth systems include the climate, water, infrastructure, regional and metropolitan development, ecology, and nature development.

Many scholars describe a trend towards stakeholder involvement in earth system governance, but also in other domains. Also in the Netherlands the stakeholder approach is gaining ground, as it is expected to improve decision-making in various ways. This is also the case in the context of water related spatial development. Water management in the Netherlands is increasingly becoming an issue of integral spatial decision-making on a regional level, instead of localized hydraulic engineering. Due to the limited available space and the complexity of water management in the Netherlands, it is expected that active involvement of stakeholders will generate more support and enriched information for complex decision-making processes on these issues.

In this paper we focus on methodological aspects of such integral stakeholder approach in relation to its expected contribution to decision-making. It has been recognized that an approach or methodology aiming at the combined involvement of stakeholder and expert inputs in assessment and decision-making is lacking (Rinaudo and Garin 2005; Petts and Brooks 2006; Leach 2006; Sabatier et al. 2005; Scholz and Stiftel 2005). We present an approach of covaluation: the 'collaborative valuation' of spatial issues relevant to the decision-making process, by multiple actors involved in the assessment and governance process. Covaluation is about making a joint assessment of the problem, the joint development of alternatives, the joint valuation of those alternatives, and the joint redevelopment (further specification) of the alternatives. We describe and analyze a specific project concerning a process of multi-actor and multi-level governance on water related spatial decision-making in The Netherlands. In this case study, called 'Around Arnemuiden', we aimed at developing, implementing and evaluating covaluation 'in action'. Our main goal in this paper is to describe and retrospectively analyze the practice-based method of covaluation in which values of local stakeholders and experts on spatial decision-making (water, housing, recreation, etc.) were integrated. We thus aim to provide insights in the way covaluation took place in practice, and we draw lessons from these experiences for multi-actor based and integral decision-making concerning system governance.

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1. Introduction

Earth system governance can be characterized as multi-actor, multi-level and multi-domain (Healey 2005, Edelenbos 2005). It is multi-actor because different stakeholders like governments, private actors, and societal actors are involved in the governance process; it is multi-level because different government levels play a role in the governance process through local, regional, national, European, and global governmental institutions. And it is multi-domain, because earth systems include the climate, water, infrastructure, regional and metropolitan development, ecology, and nature development.

To address this multi-actor, multi-level and multi-domain nature, many scholars describe a trend towards stakeholder involvement in earth system governance, but also in other domains (McLaverty 2002; Lowndes et al. 2001; Edelenbos 2005). Interactive policy making, involving stakeholders, is increasingly applied on a variety of issues and in an increasing number of countries. Also in the Netherlands the approach is gaining ground, as it is expected to improve decision-making. This is also the case in the context of water related spatial decision-making. Water management in the Netherlands is increasingly becoming an issue of integral spatial decision-making on a regional level, instead of localized hydraulic engineering (Wiering and Immink 2006; van Stokkum et al. 2005). This means that managing water has to be coordinated and integrated with other spatial functions in a region. Due to the limited available space and the complexity of water management in the Netherlands (Huisman et al 1998; Woltjer 2000; van Dijk 2008), it is expected that active involvement of stakeholders will generate more support and enriched information for complex decision-making processes on these issues. The policy domain of water related spatial decision-making takes an integral perspective: it takes the entire water system into account and reframes it by placing it in the broader context of spatial development, which requires the involvement of all relevant domains, levels and stakeholders. This is an alternative approach compared to the traditional dominance of experts and policy professionals in Dutch water management (Lintsen 2002; Wesselink et al. 2007).

In this approach, not only experts provide input for the decision-making, but also local stakeholders, including citizens, can contribute to the decision-making process. Internationally this has led to collaborative processes (cf. Healey 2005) aiming at the production of a shared body of knowledge and values, which has been called (amongst others) Joint Fact Finding (Ehrman and Stinson 1999), or negotiated knowledge (Jasanoff 1990). These developments have raised the question how the different inputs in the process are interrelated and how they should be managed. Whereas professionals generally provide scientific knowledge, based on education and professionalism (van Buuren and Edelenbos 2005; Rinaudo and Garin 2005), the input of stakeholders is usually coined as ‘non-scientific’, stemming from experiences and being strongly location- and context specific (Eshuis and Stuiver 2005; Rinaudo and Garin 2005). The interrelation of these different inputs has been observed as problematic (see e.g Petts and Brooks 2006; Edelenbos et al. 2008; Stilgoe 2007; Edelenbos 2005; Rinaudo and Garin 2005). It has been recognized that an approach or methodology aiming at the combined involvement of stakeholder and expert inputs in assessment and decision-making is lacking (Rinaudo and Garin 2005; Petts and Brooks 2006; Leach 2006; Sabatier et al. 2005; Scholz and Stiftel 2005; Fischer 2009). In order to acknowledge these different inputs in the assessment, new or adapted approaches are needed to effectively inform decision-makers on integral spatial decision-making. In this paper we focus on methodological aspects of such integral approach in relation to its expected contribution to decision-making.

Based on theoretical findings and previous experiences in interactive governance processes, we defined (initial) expectations concerning a process of interactive decision-

making in which the information of relevant professionals as well as citizens is actively identified and processed. Following arguments for interactive decision-making, we expected such process to enhance societal support for decision processes, to result in negotiated knowledge and in integral assessment and decision-making (see section 2). To focus on the equal involvement of different input provided and to put in perspective the relative 'truth' of diverging statements (cf. Ehrmann and Stinson 1999), we approached the input of various parties as 'values'. Values are often used to express social preferences (Foote 1992). Following a not-strict fact-value distinction (cf. Fischer 1998, 2009), we took the perspectives, or values, of various parties as input to the interactive decision-making process. The variety of values refers to the current state of affairs in the region (and its potential development) according to a broad group of actors. Hence, values – defined as 'things that are important to (collectives of) people' – could originate from various interests, either institutionalized or not. We aimed at the collaborative identification of relevant values by the actors involved. We coined such collaborative approach 'covaluation', which, as a point of departure, we broadly defined as the collaborative valuation of spatial issues by multiple actors involved in the governance process. Covaluation in water-land use issues is about making a joint assessment of the problem and the joint development of policy alternatives, based on the collaborative valuation, detailing and specification of spatial elements. It can thus be interpreted as a variation on interactive decision-making, in which values are used to steer the interactive process (see also van Schie and Bouma 2008). We focused on the identification and involvement of stakeholder values as we expected these to be overshadowed by expert values in the process, which still largely dominate Dutch water management (van Slobbe 2002; van Dijk 2008).

In order to develop, examine and evaluate a collaborative approach of valuation we conducted an experiment in a multi-actor and multi-level process of water related spatial decision-making in the Netherlands. In this case study, 'Around Arnemuiden', while facilitating the interactive decision-making process, we aimed to develop, implement and evaluate an approach of covaluation 'in action'. In this paper our main goal is to describe and retrospectively analyze this approach of covaluation. We thus aim to provide insights in the way the covaluation-approach took place in practice, as an outcome of interplay between science and practice. Our main research question is: *"In what way has a practice-based approach of covaluation contributed to integral, supported and enriched scenario development, assessment and (water-related) spatial decision-making?"*

In the remainder of this paper we first present our expectations based on which the process took shape (section 2). These expectations were based on theory and previous research on interactive decision-making. Also the research design is discussed. Section 3 presents the case study in which the approach of covaluation was developed. Section 4 analyses the results concerning our initial expectations. Section 5 concludes and draws lessons on the approach developed for multi-actor based and integral decision-making concerning system governance.

2. Theory, expectations and research design

This section presents our theoretical framework. We use literature on valuation and assessment methods, interactive governance and complex decision-making. From these we extract (theoretical) expectations, which we used as points of departure to design our research and develop our approach of covaluation. The idea of covaluation is deduced from the rationale for interactive decision-making; hence the expectations follow the motives for such approach.

Interactive policy- or decision-making is a way of self-regulation, or at least a way in which citizens and societal organizations get a more active role in developing and implementing public policy (Jessop 1998; Edelenbos and Klijn 2006). Interactive decision-making goes around under a number of labels, like citizen's juries, community planning, and citizen participation. In The Netherlands, for instance, extensive use of citizen involvement initiatives can be observed, particularly at the levels of local and provincial government (Edelenbos and Monnikhof 2001; van der Arend 2007). With interactive decision-making, public actors attempt to open up closed governmental decision-making through an alternative way of decision-making, in which decisions are legitimized through openness, accessibility and inclusion (Macpherson 1979; Young 2000). By involving more actors (and certainly citizens), decision-making acquires a less closed character, which is expected to result in more transparency and mutual understanding (Scharpf 1997; Young 2000; Berry et al. 1993). Interactive decision-making is different from more traditional decision-making procedures. As it explicitly tries to involve a wide variety of actors, interactive decision-making is an open decision procedure. It tries to incorporate values and perspectives of various actors in the solutions that are developed during the interactive process (Edelenbos 2000).

Several problems with such interactive processes have been observed. Decision-making takes a long time due to resistance of various involved actors, solutions are often not inventive enough, or a (too) large gap separates politicians civil servants and citizens. Practical discussions and literature on governance has extensively discussed these problems (e.g. Kingdon 1984; Schön and Rein 1994; Rhodes 1997; Kickert et al. 1997).

Motives for starting interactive decision-making can be various, like improving legitimacy of decision-making (Scharpf 1997), improving quality of the substance of the decisions (Webler 1995; Coenen et al. 1998), and restoring the relationship between the electorate and the elected (Renn et al. 1995). This paper follows three motives for the application of an interactive approach: enhancing societal support, enabling the development and use of negotiated knowledge, and stimulating the development of integral decisions.

2.1 Covaluation and support for decision-making

Interactive decision-making is mostly applied to prevent the use of veto power (Koppenjan and Klijn 2004). Complex decision making processes affect a multitude of different actors, who typically have the means to, at least partially, influence the outcome of decision-making. Interactive decision-making aims to involve these actors at an early stage in the process, which is expected to decrease their use of veto power and to increase the level of support for decisions (Edelenbos and Klijn 2006). When actors are involved in the process, they are expected to be more willing to accept both the process and the outcomes of this process, the decision taken (Edelenbos 2000). Such also is expected to accelerate decision-making processes, at any rate by averting lengthy legal procedures.

Based on these findings, we expect that the involvement of actors in the decision-making process through the active identification and involvement of their values will increase societal support for the process and its outcomes. This argumentation leads us to the following expectation that structures our approach of covaluation:

E1: An approach of covaluation that involves the values of local actors enhances societal support for a decision-making process and outcomes.

2.2 Covaluation and negotiated knowledge

The involvement of various actors in interactive processes brings along their different views and sources of knowledge and information (see e.g. Mayer 1997). Experts, or professionals, no longer are the only parties who provide information or knowledge to the decision-making process. It has been recognized that scientific knowledge should be developed in interaction

with its (intended) users and applicants (Lindblom and Cohen 1979). Von Hippel (2005), for example, elicits the importance of 'user knowledge' in many current innovation processes. 'Lead users' have taken over the production of 'applied' knowledge. Increasingly, democratization of knowledge is taking place. Experts fell from their pedestal as the production, distribution, application, and evaluation of knowledge has increasingly become a social, public issue in the Information Age (cf. Castells, 1996). Various studies have shown that the public is well able to deal with complex (scientific) issues, and that their inputs are beneficial to decision-making (Nowotny 2003; Yearley 2000; Petts and Brooks 2006), and often even have a better understanding of the local environment (Rinaudo and Garin 2005). Democratization of (scientific) knowledge seems to benefit from the continuously developing potential of media channels. In the current media-ridden societal environment scientific, expert knowledge appears to be insufficient to solve complex social problems (van de Riet 2003; Stilgoe 2007).

It is based on such premises that interactive processes often aim at the development and inclusion of negotiated knowledge (cf. Jasanoff 1990); knowledge that is accepted by various parties involved as relevant to the decision-making process (Healey 2005; Ehrmann and Stinson 1999; see e.g. Duijn & Rijnveld 2008). In general, two types of knowledge are distinguished in the context of decision-making processes (Rinaudo and Garin 2005; Eshuis and Stuiver 2005; Petts and Brooks 2006):

- Expert knowledge; which should meet the requirement of scientific validity (van de Riet 2003): it should withstand the test of scientific acceptability like transparency and potential replicability of the research.
- Stakeholder knowledge; which should meet the requirement of social robustness (Nowotny 2003); it should be repeatedly tested, expanded and modified outside the 'laboratory' of experts.

Expert knowledge is generally based on education and professionalism (Van Buuren and Edelenbos 2005), grounded in scientific models and methods. Stakeholder knowledge is grounded in contextual and local experiences (Wynne 1991; Eshuis and Stuiver 2005). Such knowledge is closely connected to individual perspectives and values held. The interconnection of these different types of knowledge has proved difficult (Petts and Brooks 2006; Stilgoe 2007; Edelenbos 2005; Rinaudo and Garin 2005). The interconnection of expert and stakeholder information is of particular concern in the domain of Dutch water management as the development of such negotiated knowledge opposes to the traditionally dominant position of experts in this field.

The establishment of an interconnection between expert and stakeholder inputs may be achieved in a consensus-seeking approach. In such approach, information and values relevant to the decision-making process are constructed during the process: decision-making is taken as a social construction in which the worlds of experts and citizens are combined and interconnected (Woolgar 2000; Latour 1999; Knorr-Cetina 1999; Bijker 2001). Such approach takes a less strict fact-value distinction and aims to find a relevant body of information that consists of both facts and values, each provided by both experts and stakeholders. The public role in such processes is not only to check scientific claims, but also to challenge the quality and plausibility of expert knowledge (Wynne 1992, 1996). Decision-making is not only fed by (instrumental) expert input, but also by (societal) values and insights (Apostolakis and Pickett 1998). Knowledge is repeatedly tested, expanded, and modified in dialogue and interaction between experts and stakeholders. In this dialogue, knowledge is produced that not only can withstand scientific standards (scientific validity) but also has societal relevance and is supported by stakeholders (social robustness; cf. Nowotny 2003). When knowledge is scientifically valid and socially robust it can be coined as 'negotiated knowledge'. Knowledge that lacks scientific validity turns out to become 'negotiated nonsense', knowledge that lacks

input from stakeholders becomes 'superfluous knowledge' (De Bruijn and Ten Heuvelhof 1999; van de Riet 2003; see also Edelenbos, van Buuren and van Schie 2009).

Based on these insights, we expect that the involvement of both stakeholder and expert information (facts, values, perspectives) in an interactive decision-making process will result in negotiated knowledge that is both scientifically valid and socially robust. This line of reasoning leads to our second expectation:

E2: An approach of covaluation that combines stakeholder and expert information (values, facts) delivers 'negotiated knowledge', which is both socially robust and scientifically valid to apply in decision-making processes.

2.3 Covaluation and integral decision-making and assessment

Interactive decision-making often results in coordination between different sectors or departments of governments (Edelenbos 2000). In other words: collaborative processes stress the need for integral processes (Healey 1997), which involve different sectors and domains. Collaboration seems to, inescapably, induce the integration of values, interests, knowledge and (policy) domains. Through such integral and collaborative decision-making a broader assessment can take place of the different perspectives on the problem at hand and of policy alternatives that may solve it. The involvement of more relevant information, that is in the possession of a broader group of actors (e.g. following a negotiated knowledge process; see 2.2), leads to more competent decision-making (Webler 1995; Renn et al. 1998). Such integral approach is the aim in Dutch spatial decision-making and water management (Wiering and Immink 2006; van Stokkum et al 2005; Edelenbos et al. 2009), as it is perceived as needed to solve the complex problems these policy domains are currently faced with.

The choice for a particular assessment method within such integral decision-making process, however, influences what *can* be assessed: what effects of the policy alternatives are taken into account and how these effects are measured (Schuijt 2003; Bouma et al. 2008). In addition, methods more or less determine which perceptions on the issue of concern can be involved in the decision-making process (Young 2000), thus influencing the level and range of 'integratedness' of the decision. Hence, the assessment method always, at least indirectly, influences the outcome of the process. Assessment methods applied in decision-making processes generally lean towards the involvement of expert information to support rational and efficient decision-making (Courtois 2004; House and Howe 1999; Sharkey and Shaples 2008). An example is (societal) cost-benefit analysis (SCBA) that aims to integrally assess the effects of different alternatives based on monetized, or at least quantitative, effects of measures. It takes a neoclassical economic perspective and is based on knowledge (on effects of measures) provided by established experts. Such is often applied in Dutch decision-making, particularly – and increasingly – concerning environmental and spatial issues[1] (de Bruyn 2007; RMNO 2008).

Various studies, however, have shown a growing unease with the way conventional economic approaches address environmental (valuation) issues (Bromley and Paavola 2002; Vatn 2004). Monetized effects of measures are not the only effects that actors perceive as relevant to the assessment, especially concerning environmental goods and services (e.g. Bowles 1998). This touches the well-researched issue of the value of (effects on) non-market goods and services, and the problematic measurement and involvement of such values in assessment and decision-making on policy alternatives. Many have argued that monetized values of effects on non-market goods and services, revealed through stated preference methods, do not adequately reflect the values of local actors (Sunstein 1993; Jacobs 1997;

[1] The Dutch OEI-guideline (Eijgenraam 2000) requires big infrastructural projects to ex ante evaluate the project's economic effects in an SCBA. Such is also recommended for other and smaller-scale projects, and the method is increasingly applied in water management and spatial issues.

Bromley and Paavola 2002; Sagoff 2004, 2008; Getzner et al 2005; O'Neill 2008). These actors not only reject the eventual assessment of such values; they also oppose the process of monetization of these often deeply held values. Surveys among participants in such processes revealed reactions like "I struggled with this money business", or "you can't quantify [the value of] a field full of orchids" (Clark et al. 2000). Apparently, monetization of non-market goods and services goes against the grain with their values, and the actual value is "lost in translation", as Ackerman and Heinzerling (2004) state it. This causes actors' discontent with the eventual assessment as well as the decision-making process (when such is based on monetized valuation), stressing the societal support that interactive (policy) processes aim for (see 2.1).

Nevertheless, the institutionalized methods for assessment focus on scientific and economic analyses, and generally do not (aim to) involve the full perspective of stakeholder values[2]. Integral and interactive processes, however, aim at the involvement of multiple actors (on multiple levels/domains) and their knowledge and perspectives on issues, which may (and – as research has shown – often does) include non-monetized values. The involvement in integral decision-making of a body of values and knowledge developed in a negotiated knowledge process (see 2.2), therefore, requires integral assessment methods and decision-making to go beyond expert inputs. Assessment methods need to be open to various sorts of values and effects and their description and measurement. It requires openness and flexibility, and a more collaborative approach of the valuation and assessment stages of decision-making. Such collaborative approach assumes values to be plural and incommensurable – an issue (a good or service) can have different values for different stakeholders that are not necessarily comparable or measurable in the same direction (cf. Vatn 2005; O'Neill 2008; see also van Schie and Bouma 2008). Moreover, such approach to values requires valuation to be not a single act of measurement but to be a process that is embedded in the interactive and integral decision-making, starting early in the process and continuing well into the assessment phase. This is fundamentally different from the assumptions of neoclassical economic valuation, based on value monism and commensurability.

Based on these findings, we expect that the involvement of a broad array of perspectives and values in the decision-making process will contribute to the development of integral spatial plans and their integral assessment. This leads us to our third expectation:

E3: An approach of covaluation that takes into account a broad array of values and perspectives contributes to integral decision-making and assessment of the issue under consideration.

Consequently, interactive decision-making aims to actively involve the multitude of actors, levels and domains that are involved in (earth) system governance processes. Not only do these actors have the means to influence decisions, they are also needed to make integral decisions on multiple domains and levels. We expect that an approach of covaluation that involves the values of different actors for spatial elements will generate the actors' support for both the process and its outcomes. Furthermore, co-valuation is expected to enhance the (negotiated) knowledge base for decision-making and to achieve an integral approach of spatial decision-making and assessment.

2.4 Research design

The expectations on covaluation address three aspects related to interactive decision-making processes: (1) societal support; (2) negotiated knowledge; and (3) an integral approach (in

[2] Such assessment methods aim at supporting rational and efficient decision-making; apart from enhancing transparency it is not their primary aim to generate societal support for the decision.

assessment and decision-making). To determine and evaluate these in the research, in this section we further operationalize these three variables.

1. *Societal support*: the level of participants' support to spatial plans that are developed in the process of covaluation. We identify the level of support by the degree participants in the process are satisfied with the process as well as the output generated. Process satisfaction is deduced from participants' level of involvement in the process and the stability of involvement in this process. A low or even absent loss of participants during the process indicates their satisfaction with the way the decision-making process and approach of covaluation evolve. Substance satisfaction is measured through stakeholders' agreement with (support for) the plan development and the eventual output of the process of covaluation. We measure both through observations during the process and in an ex post evaluation that questioned the respondents' feelings about the scenario development, the (valuation) process and the outcomes.
2. *Negotiated knowledge*: the extent to which knowledge/information is (repeatedly) tested, expanded, and modified in dialogue between experts and stakeholders in the process of covaluation. We measure this variable based on case study findings and observations during the knowledge development process. We speak of a high level of negotiated knowledge when there is balance between the two forms of knowledge, when both parties accept and respect each others' inputs, and when both knowledge domains have equal opportunities and possibilities in the knowledge production process. In a dialogue, knowledge is established that not only can withstand scientific standards (scientific validity), but also has societal relevance and is supported by stakeholders (social robustness, see also Edelenbos et al. 2009). We speak of a low level of negotiated knowledge when either of the two knowledge domains dominates in the establishment of a body of knowledge for decision-making at the expense of the other domain.
3. *Integral approach* in assessment and decision-making: the level of coordination and balancing of different spatial elements in the process of covaluation. We measure this variable based on case study findings and the outcomes (spatial scenarios), and observations during the decision-making process. We speak of a high integral level in assessment and decision-making when all spatial functions (water, infrastructure, housing, recreation, nature, environment, and agriculture) have a coordinated position in the scenarios and are taken into account when it comes to assessment. We speak of a low integral level when only one or a few spatial functions are taken into account in assessment and decision-making or only a selection of certain functions is considered at the expense of other spatial functions.

To test the expectations and develop an approach of covaluation, we executed an experiment. This experiment took shape in the interactive decision-making project 'Around Arnemuiden'. In this project, we conducted action research: we (as researchers) acted as participants in the process. This meant that we were partly subject of our own research, a common feature of participatory action research (Greenwood and Levin 1998, Elden and Levin 1991). We conducted research by various methods in the case study: document analysis, questionnaires, interviews, participant-observation, interactive workshops, and ex post evaluation.

In our view, action science/research approaches (Argyris et al. 2005) centre around two important components: (1) the active development of a community of inquiry in which researchers and representatives of governmental actors and stakeholders participate, and which designs, evaluates, and adjusts the collaborative research process while implementing

it; and (2) the search for a general theory of action, an idea about what works, why and how. We met the first component through the installation of what we call 'the process group', which may be considered as the case study's community of inquiry (cf. Argyris et al. 1985; Friedman 2001). This group consisted of researchers and representatives of key governmental actors and was responsible for the continuous evaluation and readjustment of the research process. The development of the approach of covaluation took shape in close interaction and reflection between this group and the group of participating local actors, like inhabitants and farmers. Argyris et al. (1985: 29) claim that the central activity of a community of inquiry is the creation of knowledge. Our case study was concerned with the creation of a body of information relevant to participants for a (formal) decision-making process on the spatial development of an area. For this purpose, we kept the interactive process, that evolved between local stakeholders and experts, in pace with the (formal) course of events that took place outside its immediate surroundings. The second component we addressed through the so-called 'reflection group' that guided from a distant and more scientific standpoint, and in which evaluative discussions took place with fellow-scholars and with the director of the co-financing organization[3]. Also in this paper we seek to answer the questions what worked, why and how, when it comes to executing an approach of covaluation for (water related) spatial decision-making.

As a result, there was constant interplay between us as researchers, representatives of policy actors, local actors and stakeholders, and experts on the course of events in the research process. This interplay resulted in an open and reflexive design of the research in which societal responses, scientific reflection, and the active and continuous redesign of the method itself caused a process of continuous readjustment. Hence, we did not identify detailed steps for covaluation prior to the project; only process appointments were made on deadlines, end results, rules of behaviour and process management, and a general framework for the interactive process was agreed upon. Stages in the process evolved as the process managers saw fit, in active reaction to contextual developments and reactions of participants. It was in such a process that the approach of covaluation presented in this paper took shape. The initial (theoretical) expectations described in the above sections steered the set-up of the process and the initial idea of covaluation. Based on intermediate findings, dynamics and interventions in the process, we analysed these expectations and adjusted the approach accordingly.

3. Case description Around Arnemuiden

The project Around Arnemuiden developed a policy advice for the spatial (re-) organization of a rural area. The project explicitly aimed to develop an integral spatial plan in an interactive process involving multiple actors. Subject of study was a polder area northeast of the town of Arnemuiden, located in the municipality of Middelburg (southwestern part of the Netherlands). The project started in February 2006, and ended in December 2007 with the presentation of the policy advice to the Mayor and members of the city-council of Middelburg. From that moment, the city-council had to decide on the future planning of the area but has postponed its decision ever since (dd. November 2009). In this section we provide a description of the case: after a short introduction to the project, we describe elements of the project concerning the three expectations on the approach of covaluation.

3.1 Case introduction

[3] The interactive decision-making project Around Arnemuiden was co-financed by Living with water.

The policy advice was developed in an interactive process, involving organized (governmental) parties and organizations as well as local actors, NGOs and other local parties bearing a stake in the issue. The governmental parties in the area had commissioned the project; we as researchers functioned as independent process organizers[4]. The policy advice was formulated in two spatial scenarios that were based on local actors' collaboratively identified values. During the development of this policy advice, we explicitly aimed to develop an approach for such (co-)valuation 'in action'. We expected the collaborative valuation by participants to improve the decision-making process as discussed in section 2: such was expected to result in societal support, negotiated knowledge among stakeholders and experts, and integral spatial plan and assessment. As the following sections will discuss, such effects would be beneficial as the current state of affairs in the region was characterized by a lack of societal support for spatial decision-making.

Figure 1 shows the process and steps of the interactive process conducted. First, we conducted a convening assessment (cf. Podziba 2002), in which we did interviews, conducted a questionnaire and policy analysis, and developed a project plan. Through 60 in-depth interviews with citizens, farmers, land owners, entrepreneurs, representatives of NGOs and expert organizations, and policy and decision makers, we explored what was at stake, and for whom, with regard to the future spatial development of the area. We verified our findings in a questionnaire among the participants of the first workshop. We identified different groups of participants, each accredited with their own role and function in the project to assure embedding at various levels. Most notable for this paper are the advisory group, consisting of people with local interests (inhabitants, farmers, land owners, entrepreneurs; from here called 'stakeholders') and accredited with the task to develop the policy advice. Next to this group, an expert group was formed, consisting of experts and specialists from consultancy firms, NGOs and governmental departments involved in the project. This group had the task to support the advisory group with their specialized knowledge on different (policy) domains. Representatives of governmental agencies were brought together in a steering group focusing on the political, executive and administrative embedding of the process and its outcomes (see Edelenbos et al. 2009). Together with the parties involved we developed a project plan, including the rules of the game for the interactive process – like restrictions and conditions as posed by laws, appointments on deadlines, end results, rules of behaviour and process management –, ideas on workshops, the development of scenarios, communication, and reporting of (intermediate) results. Important aim was the project plan's support by all organized parties involved.

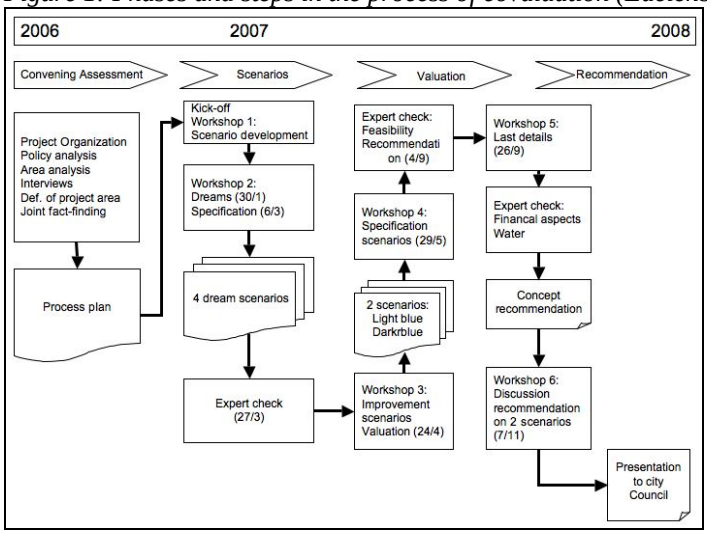
Based on the findings of this stage, we organized a series of workshops with both the advisory group and expert group separately. The advisory group developed spatial scenarios based on their values and perspectives, after which the experts reflected on these and provided suggestions for improvement. The advisory group then discussed these suggestions and adapted the scenarios, which returned to the expert group for discussion, and so forth. First, the advisory group developed 4 'dream' scenarios, based on their dreams and values expressed in the interviews and questionnaire, unrestricted by practical or technical limitations and including first suggestions from the expert group. Then they valuated the different spatial elements of these scenarios. Based on analysis of the results, we proposed 2 new integral scenarios, which were recognized and adopted by the advisory group. They detailed and specified these integral scenarios and the values these were based on, and again

[4] Governmental parties were gathered in a consortium, consisting of the municipality of Middelburg, the province of Zeeland, the regional Agency of the Ministry of Transport and Water management (Rijkswaterstaat), the Water Board, and the Agency for Rural Affairs (DLG). The process was managed by a research team of engineering consultancy Tauw, knowledge institute TNO Built Environment and Geo Sciences and Erasmus University Rotterdam, department of Public Administration.

added suggestions for improvement from the expert group. Finally, the advisory group presented these scenarios as the policy advice on the future spatial development of the area, including their reasons (values).

Hence, the entire process of interactive scenario development was steered by a focus on (stakeholder) values. We explicitly aimed at the identification, verification, representation and adaptation of the values of participants to spatial elements during the process, and the involvement of these values in spatial scenarios and assessment.

Figure 1: Phases and steps in the process of covaluation (Edelenbos and van Schie 2009)



3.2 Creating societal support

Spatial decision-making on the area had a turbulent history of plans proposed by governmental agencies. The plans at hand were generally aimed at a revival of recreational functions and the development of housing in the area. None of these plans has been implemented partly due to obstructions of local stakeholders, grounded in their preference to preserve the area's specific identity and rural state. The issue had become highly controversial and ended up in a situation of deadlock. Still, the governmental parties and, perhaps surprisingly, also most of the opposing stakeholders in the area were convinced of the need to redevelop the area. Together with the public authorities, we decided that an interactive process, based on co-valuation, would be an appropriate way of mediating between the opposing perspectives. In a process of co-valuation a spatial plan would be developed that could count on the support of the obstructing stakeholders, but that also fitted with existing policy documents and restrictions.

To generate societal support, we decided to give the stakeholders a central role in the process: they would develop the spatial plan based on their own values and perspectives on the area, gathered in the advisory group. Through the convening assessment and interviews we took stock of the values at stake for the stakeholders and investigated their willingness to participate. Their wishes and restrictions on future development of the area were involved in the project plan, and we used their values in scenario workshops to develop spatial plans. To safeguard the slowly developing trust among stakeholders in the evolving process, resulting in a willingness to discuss development of the area, we protected the advisory group from interventions of other parties during the series of workshops, and we took care of transparent communication on the project's aims and ambitions.

Many stakeholders appeared to be willing to participate in the process once they heard that they could provide their own perspectives and previous governmental plans would

be put aside. The workshops were well visited throughout the whole process. To check the participants' support for the contents of the spatial plans, we repeatedly checked for their approval during the workshops and through emails with the developed products and maps, and we collaboratively adapted intermediate findings if needed.

3.3 Developing negotiated knowledge

Stakeholders not only were involved to generate support for the spatial scenarios; they were also expected to contribute useful information to the issue. By involving the values and perspectives of both local stakeholders and governmental organizations in a joint fact finding process, the project aimed to achieve knowledge both socially accepted and technically and administratively relevant to the issue. Such body of negotiated knowledge was expected to enhance the integral nature and societal relevance of the outcomes.

To achieve such body of negotiated knowledge, both experts and stakeholders provided inputs to the scenario development. We collected the input during the interviews, in a questionnaire, and in the series of workshops with both groups. To protect the stakeholders, we kept meetings of the advisory group and expert group separate, with ourselves as intermediaries. The input of stakeholders was actively used in the scenario development: their values and perspectives steered the process as these would be directly affected by the intended spatial reorganization. The input of experts – even though they were provided with the possibility to make suggestions – was more restrictive in nature and focused on assessing the feasibility of the scenarios. The alternation of the use of stakeholder and expert information was applied to stimulate the development of spatial scenarios that would represent stakeholder values and, at the same time, would be feasible from a policy perspective. In this sense, our approach of alternating design and valuation workshops aimed to achieve a connection between local stakeholder values and policy-administrative (political) values.

The advisory group and expert group discussed each others' input in the scenario development process. The advisory group implemented in the scenarios most of the information and changes proposed by the expert group, and added their own insights to this in the scenario development. The expert group, however, could not approve most perspectives of the advisory group and mainly focused on technicalities and specialized issues[5].

3.4 Developing integral spatial plans and assessment

Through the active and alternated involvement of both stakeholders and experts, and both their bodies of knowledge, the project aimed to develop integral spatial scenarios that addressed the different spatial functions in the area and different perceptions and values attached. The advisory group addressed all spatial functions in the scenarios. With the help of illustrators, who drew geographical maps of the evolving scenarios during the workshops, the participants discussed the values of spatial functions in the area. The maps of the spatial scenarios supported the advisory group not to forget either of the spatial functions and keep an integral perspective on the future development of the area. Also the expert group focused on an integral approach to the scenarios in their suggestions to the advisory group. For this purpose, the group of experts was composed of experts who represented a broad range of expertises and domains (water, infrastructure, nature, housing, social structure, etc.).

To achieve integral assessment of the spatial plans, we paid due attention to the identification of values from all perspectives, provided by both the stakeholders and experts involved. During the interviews and questionnaire we had collected and analyzed the values of stakeholders. These values were used in the workshops on scenario development: in a way we (ex durante) evaluated the scenarios while designing them. At the third workshop,

[5] In the end a selection of experts on water issues took a more constructive role and developed a policy paper within their organizations.

stakeholders valuated the spatial elements of the dream scenarios, thereby identifying the key elements that best represented their values and preferences for the future development of the area. In the remainder of the scenario development the stakeholders further checked and adapted these values. The values consisted of various functions and aspects of the area, for example the presence of (more) surface water, less trees, recreational facilities, socio-cultural identity and ecological characteristics. The values were broad and qualitative in nature, they varied among stakeholders, and they overlapped. During the workshops with the expert group, it became clear that the municipality was used to decision-making based on (short-term) cost-benefit analysis, involving predominantly financial measures and index numbers. The experts perceived such measures (values) as needed for the assessment. We organized some extra meetings with (parts of) the expert group to discuss these issues. Together with the experts, and supported by an external specialist on SCBA, we identified the financial measures as far as this was possible at this stage of the process. We then combined both bodies of information (from both the advisory and the expert group) in a table, presenting all different perspectives and values involved in the scenarios. To connect to customs in the municipality we used the format of an SCBA; presenting costs and benefits of the spatial scenarios, with benefits and costs broadly defined as 'pros' and 'cons' of the proposed measures from different points of view. Contrary to a regular SCBA, however, our table reflected various kinds of (expected) values and effects of the scenarios, including qualitative improvements and reflecting conflicts and different points of view. Annex I provides an illustration on the combined table of both stakeholder values and financial measures.

This table, however, caused major discussions during the next expert workshop. The experts involved were not used to such broad interpretation of 'values', 'costs', and 'benefits'. They preferred a short-term financial assessment as they were used to make, more or less based on an overview of (direct) investment costs and benefits and operating costs, and excluding the inputs of local actors. It turned out that a shared understanding and appreciation of the method of SCBA was lacking. It appeared to be unclear what kind of (assessment-) information should be provided to decision makers. We then organized a more general discussion about assessment methodology and SCBA, facilitated by an external expert on the issue, but the expert group achieved no consensus on this subject. They refused to include the combined table in their final report and decided to provide decision-makers with only technical and specialized information on the scenarios. Also civil servants of the municipality were not satisfied, resulting in their continued requests for a 'financial paragraph' on the scenarios developed. The advisory group was not that satisfied either with the combined table as they feared political decision-making would focus on the financial information included only. However, they accepted the need of financial measures for formal assessment and decision-making and included the table in their policy advice.

To embed the policy advice in the existing formal procedures for spatial decision-making in the municipality, we had adapted the (form and style of the) advice to be integrated in the municipal policy document that was due in the same period[6] (see Edelenbos et al. 2009). However, in the end the municipal civil servants replicated only a fraction of the policy advice in this document, focusing on the housing aspects only, and ignoring the integral character of the policy advice. We confronted them with this strongly fragmented representation, and the resulting risk of loosing societal support for the interactively developed policy advice. Still, the civil servants argued they were not able to do otherwise, due to the formal, sector-based ways of doing in the municipality. Political discussion of this policy document, as discussed, is pending.

[6] Revised Quality Atlas Middelburg 2030.

4. Analysis: meeting expectations?

In this section we critically analyze our approach of covaluation developed and implemented in the action research. We had three expectations for this approach to improve the spatial decision-making process, based on the rationale for interactive decision-making (see section 2). We analyse whether our expectations were met, and, if not, what may have caused this. Table 2 summarizes the three initial theoretical expectations, the applied methods to identify values, and the main points of analysis. Note that the objective of the research was to make productive use of the values of local stakeholders as a basis for spatial scenario development for the designated area.

4.1 The approach of covaluation in retrospective

Our approach resulted from a 'chain' of participatory methods, which supported an iterative process in which both stakeholders and experts were continuously involved. Methods applied are: convening assessment on 'substantive issues' and stakeholder involvement, interactive workshops on scenario development with stakeholders and experts' review round(s) and process managers functioning as intermediaries (including map drawing, writing story lines, negotiation and active discussions in sub groups), a valuation workshop to identify highly valued elements, development of intermediate products (like maps, booklets), development of the policy advice, and formal presentation to Mayor and city-council. This chain of methods and activities was developed, executed, evaluated, and adjusted in action. In retrospective, the process of covaluation consisted of the steps summarized in table 1.

Table 1: Steps executed in the covaluation approach

Steps	**Objective**	**Activities**	**Role of values**
1.	Broad inventory of values (dreams and threats) among actors and stakeholding parties concerned, and reasons for these. Inventory of willingness to participate, possible conflicts (contrasting perspectives), interdependencies.	-Interviews -Policy analysis -Questionnaire	Inventory of formal and informal (sub) values and perspectives on the decision making issue.
2.	Development of shared project plan (shared problem formulation, goals, preconditions and restrictions, process). Embedding on political, executive, professional and policy level.	-Interviews -Policy analysis -Involvement of relevant parties	Establishment of formal and informal preconditions (based on values). Embedding of perceptions from different points of view in the process.
3	Discussion and specification of important values: Development of preliminary ideal scenarios. Searching for overlapping values and interests.	-Workshops advisory group on scenario development, and writing storylines -Active discussions, divergation of values	Expression of different values and spatial consequences. Divergation of values / perceptions
4.	Expression of (sub) values and visualisation.	-Workshops advisory group -Active discussions and feed-back -Map drawing -Scenario development -Expert group workshop; answer questions and suggesting improvements	Relating values to spatial elements Visualisation of values and discussion of consequences. Specification of values.
5.	Specification of values and scenarios. Reality check with experts.	-Workshop advisory group -Scenario development	Specification of different values and their (spatial)

		-Workshop expert group	consequences. Search for reframing and consensus.
6.	Identification of spatial elements Valuation of elements; selection of most highly and broadly valued spatial elements and their argumentation.	-Workshop advisory group -Valuation by use of stickers	Identification of most important values and most broadly valued elements of scenarios. Development of argumentation for spatial reorganisation based on values.
7.	Verification of identified values. Development of new scenarios; converging values. Reframing and reality check by preconditions.	-Workshop advisory group -Map drawing -Description of spatial elements with map and argumentation based on values.	Discussion of consequences of values. Confrontation with initial preconditions; reframing and consensus seeking. Convergation of values / perception.
8.	Experts' feasibility check.	-Workshop expert group - Identification of financial measures	Involvement of expert perspectives and values.
9.	Connection to formal procedures	-Measurement of index numbers with spatial planner/expert	Involvement of values required by formal procedures
10.	Establishment of values from all perspectives; expected financial and non-financial effects. (Explication of different perspectives on the decision making issue)	-Combining all values expressed in one table, (monetary, quant, qual.)	Valuation of alternatives from all perspectives/points of view involved.
11.	Perspectives in decision making issue as input for weighing and decision making.	-Extra meetings with experts on SCBA and (e)valuation methodology	Involvement of values in assessment.
12.	Ex post evaluation	- Questionnaire to all participants.	Evaluation on appreciation of values involved, representation in outcome and the process conducted.

4.2 Covaluation lead to societal support

Our first theoretical expectation was that an approach of covaluation would enhance societal support for the outcomes of a decision-making process. The core assumption – as section 2.1 discussed – was that support would evolve if all relevant local stakeholders are involved and get possibilities to generate, communicate and position their values in the scenario development process, in a collaborative approach of valuation. This expectation was met indeed: societal support for the spatial decision-making process and its outcomes turned out to be high, as both process and substance satisfaction appeared to be substantial. Interviews helped to inventory values and to motivate potential participants to take part and get committed to the process. Protection of the advisory group, careful communication and interactive designing workshops with illustrators helped to achieve and sustain the participants' support for both the process and the outcomes.

Concerning process satisfaction, involvement of the participants in the advisory group remained stable at approximately 35 participants during the whole process. Also, a large number of people (app. 70) visited plenary meetings like the opening and closing ceremony. No major discussions took place at these meetings and no new parties appeared that (had) wanted to be involved in the process. In our opinion, this indicated that the

participants were pleased with the way the process evolved and how their values were taken into account in the process. This was reconfirmed in the ex post evaluation.

Concerning substance satisfaction, during the workshops the advisory group had the opportunity to express and emphasize their viewpoints and values for different spatial elements and apply these values in the development of integral scenarios, through the process of covaluation. These values served as 'building blocks' in the development of the scenarios and eventually the policy advice for formal assessment and decision-making. By starting scenario development with the values and perspectives of the advisory group, the starting-situation of deadlock could be overcome and broad support was generated for collaboratively developed spatial scenarios. The ex post evaluation confirmed the advisory group's satisfaction with the outcome (the policy advice), the values that had been involved in this, and the process in which such was achieved.

4.3 Covaluation did not deliver negotiated knowledge

Our second theoretical expectation was that an approach of covaluation based on the interplay of expert and stakeholder information would contribute to the development of negotiated knowledge; knowledge that is both scientifically valid and socially desirable and relevant (see 2.2). This expectation was not entirely met in the case. Experts did not take the inputs of stakeholders (based on values) seriously, and expected their own ideas and inputs, based on other premises, to be superior in the assessment phase. Stakeholders accepted technical information provided by experts, but in some occasions counteracted this with their own, more local knowledge. For example, when the experts stated the low quality of certain farming lands, the farmers proved otherwise and pointed to fresh water supplies in the area unknown to the experts. Stakeholders and experts did come to agree on several spatial elements, such as returning water in the area, building new houses, and improving recreational facilities. However, they did not agree on the exact location and the functional intensity of these elements. Strangely enough, their motives for the new spatial elements seemed to match: revitalizing the area by strengthening its economic resilience and restoring its local historic identity were joint motives to reorganize the area.

Even though we paid considerable attention to the involvement of both stakeholder and expert information during the process, no consensus between stakeholders and experts was achieved on a body of valid and relevant information for the decision-making. Experts (in the expert group, but also in regular governmental agencies) were not receptive to the values, opinions and information provided by stakeholders. They did not perceive the stakeholders' knowledge as useful to the process. The municipality pressed the need for a financial assessment of the integral scenarios through the involvement of experts, to assure technical and financial feasibility.

We had decided to keep separate meetings for stakeholders and experts, with ourselves functioning as intermediates, in order to protect the stakeholders from domination by expert knowledge (e.g. through specialized and often difficult technocratic language). The ex post evaluation revealed that the stakeholders in the advisory group had appreciated this protection and felt at ease amongst their equals this group. The experts, however, did not approve their indirect communication with the advisory group as they stated in the ex post evaluation. They would have preferred direct communication with the stakeholders because they thought the stakeholders' ideas not to be realistic or feasible. How could they know the stakeholders would understand the experts' point of view otherwise? They clearly feared loosing control over the issue (c.f. Petts and Brooks, 2006). Even though our separation of the advisory and expert group prevented a clash between different knowledge bases, it enabled experts to step back and resort to questioning the scenarios of the advisory group only, instead of providing positive feed back.

4.4 Covaluation lead to integral scenarios, but no integral assessment

Our third theoretical expectation was that an approach of covaluation would contribute to the development of integral spatial scenarios and an integral assessment of the issue under consideration (see 2.3). We assumed that if different perspectives on all spatial elements were properly taken into account in the process, such would enhance an integral approach to spatial assessment and decision-making. This expectation was only partly met. Integral scenario development for the project area took place, addressing all spatial elements in coherent scenarios. However, the assessment of these plans did not take an integral perspective because of the lacking integration of stakeholder and expert knowledge.

The open and exploring approach led to a process in which different values of the region were involved: historical, natural, recreational, agricultural, residential, water, etc. Reorganization of the area was approached from the diversity of stakeholder perspectives and values they attributed to the region. Through the approach of covaluation, the values of the stakeholders were visible and open to discussion, and remained transparent for everyone during the scenario development. Through dialogue and interactive methods, the different spatial functions were kept in view, were all part of the development of scenarios and were translated into the policy advice. The expert group, consisting of experts from a wide variety of societal sectors and policy domains, also contributed to the integral nature of the spatial plans. The two final integral scenarios showed many similarities but emphasized different values. The first scenario emphasized the return of shallow water in combination with nature development, agriculture, a modest residential area and open space. The other scenario emphasized the return of deeper water, combined with recreational facilities and substantial residential areas. Still, both integral scenarios took into account all possible spatial functions into a balanced and coherent spatial plan.

However, this balanced and integral input in the interactive process was not part of the assessment. Experts dominated this phase of the process, with a focus on economic and technical scientific 'facts'. They pointed to the existing, institutionalized methodology for assessment of local spatial plans; i.e. the application of SCBA, which is not suitable for making productive use of non-monetized information. Experts and other representatives from the municipality had expected the project to result in an execution plan with a short-term financial assessment: they even felt that adequate information for decision-making was missing, as they noted in the ex post evaluation. The experts also expressed their inconvenience and unfamiliarity with the roles expected from them in the ex post evaluation. The experts thus had difficulties to adapt their traditionally dominant role in spatial decision-making to the more supportive role expected from them in this interactive process. Framing the issue in a more integral perspective, involving other participants' perspectives and assessments, was rejected. Instead, civil servants attempted to reframe the integral plan into the sectoral interest of housing, following bureaucratic and political routines. The municipality had expressed its desire to build houses in the project area from the very start of the process. This desire had been one of the causes for the previous municipal ambitions for the area to become controversial.

Table 2 summarizes our initial expectations and their analysis.

Table 2: Summary of initial expectations and analysis of methods and expectations in the case study

Theoretical expectations	**Methods applied (practice)**	**Analysis**
E1: Societal support for an alternative spatial plan	Interviews, supported project plan, interactive workshops, careful and transparent communication, protection of stakeholders	Both substance and process support are high at the advisory group. Expectation was met due to transparent and continuous involvement of local stakeholders'

		values in the process and method of covaluation.
E2: Negotiated knowledge based on balanced use of different knowledge sources	Interviews, questionnaire, interactive scenario and valuation workshops Expert meetings, process group as intermediary, development of story lines and products (booklets).	Low / absent level of negotiated knowledge; expectation was not met. Different knowledge sources were involved and combined in scenario development, but such was not accepted by municipality and experts.
E3: Integral scenario development and assessment	Interactive workshops for spatial scenario development and valuation of spatial elements, map drawing, description of spatial elements with argumentation based on values, development of combined table.	Expectation was partly met: high level of integral scenario development, including all relevant spatial elements and combined involvement of stakeholder values, expert knowledge and administrators' aspirations to develop the area. However, integral assessment is lacking due to traditional approach in municipality. focus on financial assessment by administrators, and lack of expert-support.

5. Discussion and conclusion

In interactive decision-making, different bodies of knowledge are involved: different types of knowing that individuals can deploy to inform their actions and practices. The interrelation of these different inputs has been observed as problematic (e.g Petts and Brooks 2006; Edelenbos et al 2008; Stilgoe 2007; Edelenbos 2005; Rinaudo and Garin 2005; Leach 2006; Sabatier et al. 2005; Scholz and Stiftel 2005; Fischer 2009). Existing and institutionalized assessment methods do not account for such broad inputs; when these different sources are to be acknowledged in the assessment, new approaches and methods are needed that recognize the relevance of both expert and stakeholder perspectives. We approached this issue from the perspective of values. To study and develop an interactive and collaborative approach of valuation we conducted an experiment, which took shape in an interactive process of water related spatial decision-making. In this case study, 'Around Arnemuiden', while facilitating the process we aimed to simultaneously develop an approach of covaluation 'in action'. Such approach was designed as a variation on interactive decision-making, focussing on the process of interactive, collaborative valuation, in which stakeholders and experts identify policy alternatives based on the joint valuation, adaptation and specification of spatial elements. This approach was initially steered by three (theory-driven) expectations that guided the interactive process. Analysis of these expectations and the case study as conducted in section 4, leads us to the following conclusions.

Concerning our first expectation, we can conclude that an approach of covaluation has the potential to result in broad(er) societal support for spatial decision-making. The project started from a situation in which citizens had very little trust in local government as a result of historical policy initiatives concerning the development of the region. With this background, the project very successfully resulted in a spatial advice for reorganization, with broad societal support for both the outcome and the process of scenario development. However, we cannot conclude that trust between citizens and local government was completely restored. The ex post evaluation revealed that the stakeholders' trust in the municipality was directly related to the eventual execution of the plan, still showing old sores. Still, in our view the

incorporation of local values in interactive processes provides a productive way of developing spatial scenarios in (politically) deadlocked situations.

Second, the approach of covaluation did not result in integrating stakeholder and expert knowledge, because experts were reluctant to actively take their supportive role in the interactive process. The case showed that experts were not willing to acknowledge that stakeholder information may improve the identification of problems and feasible solutions that meet the circumstances of the direct environment. Instead, they perceived stakeholder information as an attack on their professionalism and traditionally dominant position in water management and spatial issues. Their rejection of stakeholder information was reinforced by the fact that civil servants and decision-makers perceived expert knowledge as more legitimate for assessment and decision-making. Hence, expert knowledge proved to dominate the assessment in the case. A process of negotiated knowledge production that aims to combine the information of experts and stakeholders clearly challenges the traditional and familiar way of doing in (spatial) assessment and decision-making.

Third, the approach of covaluation stimulated the development of integral spatial scenarios in the project. Compared to the situation preceding the project, indeed broader and more diverse information was involved in the scenario development. Among the stakeholders consensus was achieved on the values that were considered as important to decision-making and these were adequately involved in the spatial scenarios. The eventual scenarios dealt with all different spatial functions in the area, and provided balanced and coherent integral plans. The approach opened up the 'black box' of societal perspectives and values, these values remained visible during the process and were involved in the policy advice. The sectoral organization of governments and experts involved in the process did not hinder the interactive and open process of scenario development.

However, when the scenarios were to be assessed by formal governmental and expert institutions, the integral scenarios were again separated in their sectoral elements, returning to traditional fragmented and sector-based ways of conduct. Concerning the governmental parties involved, we can conclude that the municipal experts and civil servants were used to a traditional and top-down way of decision-making, and to the roles of a representative democratic system in which experts and civil servants provide knowledge for decision-making, not citizens. Such practice traditionally dominates water management and spatial decision-making. They were not able to adapt to new roles within the interactive process but tried to utilize this process to fulfil their own professional interests. Experts preferred to keep their dominant position and, in a way, were legitimized to do so by decision-makers, reflecting path dependency and lock-in in the existing systems. We can conclude that the stakeholder values perhaps were not treated as we would have liked them to be. Decision-makers were primarily focused on expert judgments in preparing decision-making and they perceived judgments of stakeholders as not legitimate to involve in this. Institutionalized ways of doing were put forward for processes of assessment and decision-making; processes, or knowledge, that did not fit to these ways were ignored. The approach of covaluation deviated too much from this institutionalized method in the municipality and was therefore rejected as a ground for assessment and spatial decision-making. As a result, the decision-makers did not know how to process the interactively developed policy advice and separated this again in its sector specific components.

With respect to our research question posed in section 1, we can conclude that our practice based approach of covaluation contributed to only a certain extent to integral, supported and enriched spatial scenario development and assessment in the water-related spatial decision-making project. Indeed did the approach of covaluation result in more societal support for spatial decision-making in a situation of deadlock. Also, a broad range of values from

multiple actors were used to develop integral spatial plans. However, the collaborative valuation approach did not result in a body of negotiated knowledge that was shared by both experts and stakeholders, and no integral assessment of the spatial scenarios took place. This was mainly caused by experts and municipal civil servants who stressed a traditional approach of financial assessment for spatial issues, in which only experts provide relevant inputs to decision-making based on representative democratic structures. We may conclude that we over-focused on the values of stakeholders in the project, as we had expected these to be overshadowed by expert inputs (see section 1). As a result, we paid too little attention to the experts and their problems in the process, resulting in their reluctant attitude.

Nevertheless, we do believe that an adapted approach of covaluation has the potential to improve decision-making processes on spatial issues in which no consensus (on values) exist. Several improvements will be needed for the approach of covaluation to be effective and to result in societal support, negotiated knowledge and integral decision-making. From the experiences in the case study we derive some lessons concerning a multi-actor approach of collaborative valuation in interactive and integral spatial decision-making:

- Experts have difficulty with their expected roles in interactive and integral decision-making processes as such conflicts with their traditional roles. Therefore, experts should be mobilized early in the design and implementation of the approach. Due attention should be paid to educating them in interactive approaches, joint fact finding or negotiated knowledge, and an integral approach of spatial issues in order to achieve their understanding for the process. They should be clearly informed and educated on their expected role.
- Embedding of the interactive and integral scenario development process within the participating governmental institutions, is of due importance and may need further study. Governmental parties are difficult to involve in the process: as these parties traditionally fulfil roles based on a representative democratic system, interactively produced results may not automatically be processed in institutionalised ways of decision-making. In retrospect, we can conclude that although the governmental parties involved granted us as researchers and enabled us to execute and develop a – to them – innovative process involving a multitude of actors in the valuation process, they did not change their values and perspectives with regard to the question how the outcome should be treated. The rigidness of conventional ways of conduct in these organizations is not to be underestimated. Especially the role of the municipality in such processes is of concern as this organization generally fulfils a key role in spatial decision-making but may not be familiar with interactive and integral approaches.
- Assessment procedures for integral and interactively produced products (like the policy advice in Around Arnemuiden) should account for the involvement of multiple perspectives on values relevant to the issue of concern. Conventional procedures based on neoclassical assumptions, in such processes, should be combined with approaches that enable the involvement of values and perspectives of stakeholders that may be incompatible with a neoclassical approach. It should be recognized that conventional assessment methodology may have to be surpassed in case such would dominate and hinder the interactive process and involvement of negotiated knowledge. This, in turn, may reinforce problems with experts and governmental embedding.

We conclude that the increasing application of interactive governance in water management and spatial decision-making requires ample attention to the connection of experts and stakeholders in assessment methodology. As various studies have shown the existence of non-monetary, plural, and incommensurable stakeholder values, interactive processes should take note of these values. Existing methodology, however, does not provide for the involvement of such information and focuses on expert-based information. An interactive approach of

(e)valuation, like the approach of covaluation introduced in this paper, is one of the possibilities to involve multiple actors and their knowledge bases in the assessment of spatial issues. Such approaches will need further study to achieve adequate involvement of multiple actors, multiple levels and multiple domains in governance processes.

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Annex I: Illustration of the table with combined stakeholder and expert information as developed in the case Around Arnemuiden

This annex provides an excerpt of the table with combined information from the advisory group and expert group, concerning nature and landscape in one of the scenarios (lightblue). In the project we made such combined tables for all different spatial elements, and compared both final spatial scenarios on these elements (see van Schie et al. 2007).

Increase in value	**Measures needed (proposed)**
Improved spatial quality Increased landscape value Increased historical value (identity of area) Incorporation of existing and new facilities in scenery (visibility) More natural landscape, openness, panorama More diversity in types of landscape Effects on nr of tourists, property values	Screening of railway line and other (new) facilities (?E) Extension of hedges-landscape in Oranjepolder (app. 100,000 Euros) Landscape development in Suzanna polder (?E) Development old dikes with specific trees (app. 35,000 Euros) Develop shores of Lake Veere with open and varied landscape; cutting trees (?E) Develop compensation for cutting trees (app. 700,000 Euros)

The table illustrates that various measures needed in the proposed spatial scenarios could not be priced (yet) as the scenarios were not yet specified enough. Most values (increases) could not be priced either, as they cannot be bought and stakeholders did not think of them as monetary assets. The increase in value resulting from, for example, a more open landscape (hence resulting from cutting trees) was substantial to the advisory group. Still, this value was not expressed in Euros and as a result the experts and civil servants regarded it as not relevant for consideration of the scenarios.
The municipality argued the left column was not relevant to decision-making; the stakeholders feared decision-makers would focus on the right column only. We combined both bodies of information to show both the costs and what they would ‘gain’; both bodies of information seem relevant to decide on either of the scenarios.