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Do You Have 5 Minutes To Spare? –The Challenges Of Stakeholder Processes In Ecosystem Services Studies

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Abstract

Operationalization of the ecosystem services (ES) concept for improved natural resource management and decision support cannot, thus far, be rated as satisfactory. Participation of stakeholders is still a major methodical and conceptual challenge for implementing ES. Therefore, we conducted an online survey and a literature analysis to identify benefits and challenges of the application of ES in participatory processes. The results show that the purpose of stakeholder engagement is very diverse as a result of varying objectives, spatial scales and institutional levels of analysis. The complexity, terminology and (lacking) coherent classification of ES are pivotal aspects that should be accounted for in the design of studies to improve stakeholder participation. Although limitations of time and financial resources are bigger challenges than ES related ones, tailoring communication strategies and information for different stakeholder groups are of major importance for the success of ES studies. Results support the view that the potential benefits of applying ES, e.g., consensus finding, and development of integrated solutions, cannot be realized consistently across the different spatial scales and decision-making levels. Focusing on stakeholder processes represents a means to increase the relevance, reliability and impact of study results and to move participation in ES research from theory to reality.

Keywords:
decision-making, spatial planning, natural resource management, operationalization, participative processes, questionnaire

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1 Introduction

In the last decade the concept of ecosystem services (ES) (e.g., de Groot et al. 2010; Haines-Young and Potschin 2010; MEA 2005) has gained increasing attention and recognition in environmental sciences. In line with recent mainstreaming activities integrating the ES concept into policy making (in Europe, e.g., Convention on Biological Diversity, 2012 EU Commissions Blueprint to safeguard the future of European Waters by 2015, EU Common Agricultural Policy) (Maes et al. 2012), the concept has been increasingly tested as a framework for an integrated environmental impact assessment to be applied in natural resource management, landscape planning, land use policy, and biodiversity conservation (e.g., Cowling et al. 2008; Fürst et al. 2011, 2012, 2013b; Grêt-Regamey et al. 2008; Termorshuizen and Opdam 2009; von Haaren and Albert 2011). Thus, after a phase where much conceptual work has been carried out (e.g., de Groot et al. 2010; Haines-Young and Potschin 2010; Kandziora et al. 2013; MEA 2005; TEEB 2010) and several methodological approaches on quantifying, modeling and mapping ES have been published (e.g., Burkhard et al. 2012; Haines-Young et al. 2012; Hermann et al. 2014; Tallis and Polasky 2009; Villa et al. 2009), the next step is application of the ES concept in practice, i.e. implementation of procedures for ES assessment into regional and local processes in planning and management (van der Meulen et al. 2012).

As ES put into focus the needs of humans and the benefits they obtain from ecosystems, it is a stakeholder-driven concept. Thus, participation is an integral part of ES research (Menzel and Teng 2009; Müller et al. 2011). However, usually only scarce information on participatory processes is provided, which often renders the process itself nontransparent. There is a lack of practical experience described in scientific literature. Also difficulties, failures or mistakes are not mentioned or discussed. Besides, an overview and analysis of major challenges within participatory processes appear to be currently lacking in literature.

ES have been considered to be useful in communicating the benefits people obtain from ecosystems, to decide jointly on the best use and allocation of natural resources, and to facilitate deployment of a common discussion basis among different stakeholder groups (Grêt-Regamey et al. 2012; Wainger et al. 2010). However, there are drawbacks and obstacles that can impact its application and lead to discussions on the utility of the concept for decision-making in practice, for instance improvement of land management (e.g., Baker et al. 2013; Ghazoul 2007; Menzel and Teng 2009; Sagoff 2010; Wainger et al. 2010).

Participation in ES-based assessments – which is the focus of this paper – is also impacted by the ability to classify and quantify ES properly (Fisher et al. 2009). Other issues in group processes include stakeholder selection, the present personalities and the groups they represent, the questions asked and the form of communication. All have an impact on the resulting consensus (Malone et al. 2010; Mullen 1991).

Participation of (local) stakeholders is of major importance for the success in ES-based assessments, management and spatial planning (e.g., Chettri et al. 2007; Frank et al. 2012; Grêt-Regamey et al. 2012; König et al. 2010; Saxena et al. 2001; Sheppard and Meitner 2005; Turpie et al. 2008) and there are fundamental conceptual and operational issues still to be solved. Consequently, the proper inclusion of stakeholders has proven to be a challenge in many of the projects the authors of this contribution have been involved in. Therefore, stakeholders need much more attention in ES studies (Menzel and Teng, 2009).

The objective of this study is to investigate the challenges and the benefits of the application of ES in stakeholder participation processes in detail in order to derive general recommendations for improving participation in studies related to ES assessments in planning and management. In contrast to existing studies that investigated the challenges in integrating the ES concept in landscape or regional planning (e.g., Koschke et al., 2013; Albert et al. in press, we want to bridge the topic to stakeholder participation by revealing how scientists tackle the multiple demands related to stakeholder processes in the context of ES.

The **key questions** to be addressed are:

(1) Which are major challenges related to the ES concept in the practice of participatory processes?

(2) Does the ES concept indeed support better and more informed decision-making in stakeholder processes or are potential demerits and practical drawbacks actual hindrances to achieve this?

(3) Are there scale-dependent differences in terms of ES related challenges and benefits?

(4) Can general recommendations be derived on how to deal with challenges, potential demerits and practical drawbacks?

2 Methods

2.1 Development of an online-questionnaire

To get an overview on several important issues related to ES and participation, we first did a literature analysis and held discussions within the IALE-D working group "Ecosystem Services" (Figure 1). In order to collect data, we designed an online survey in which we questioned researchers about their practical experiences with stakeholder participation processes in their ES-based studies and projects. Since we aimed at investigating stakeholder processes from the perspective of scientists, we addressed only scientists who had conducted research related to ES including stakeholder participation. The survey was advertised in the newsletter of the Global Land Project (GLP, e-News No. 53; January 2013), the Ecosystem Services Partnership (ESP, Update No. 2013.1, January 2013), and the IALE-D/EU newsletter/mailing list. The questionnaire was also announced and linked to the two web-pages: http://www.eli-web.com/ and www.iale.de. 19 researchers were invited individually by email subsequent to a science-direct search.

In order to capture the diversity of study approaches and to analyze in a coherent manner the participatory processes thereof, the first part of the questionnaire dealt with general questions about the frame conditions (e.g., location, adopted scales, study aim) of the projects/studies. The second part was dedicated to the stakeholder participation, such as the reasons for their involvement, the task(s) stakeholders were asked to do, and the ES terminologies and communication techniques that have been applied. The third part belonged to evaluation of the stakeholder process and was aimed at uncovering benefits and challenges in general, and was related to the ES approach (the whole questionnaire can be found in the Appendix).

The survey was hosted by www.soscisurvey.de. Most of the questions in the survey were multiple choice questions in order to facilitate their completion by participants. For some of the questions multiple answers were allowed. Answer categories were formed in discussions among the authors of this

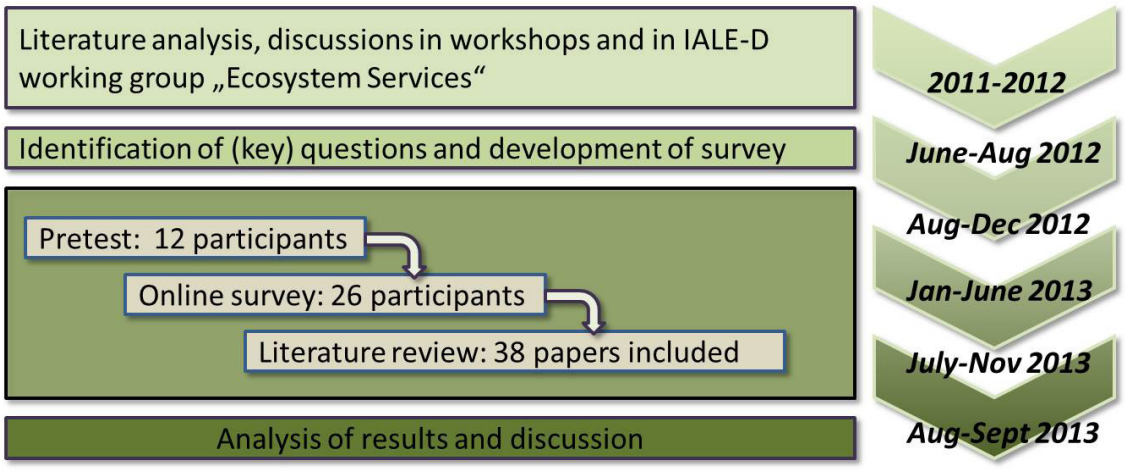

Figure 1: Overview of working steps

paper. There were also some open questions asking the interviewees to give free text answers. Subsequent to a pretest that was conducted with 12 participants, some flaws and some ambiguity were able to be eliminated before the survey was launched. The survey was online from January till June 2013. The survey results could be downloaded in *.csv format and were processed with Microsoft Excel to analyze the answers of the participants.

The results of the anonymous questionnaire are based on the answers of 38 interviewees mainly based in Europe (see results section). 26 participants answered all questions, while 12 datasets originate from the pre-test, which included fewer questions. Here, we provide only the most representative results with a focus on selected aspects.

2.2 Literature review

In addition to the questionnaire, a literature review was carried out. For the review of the studies a search on ISI Web of Knowledge was conducted to analyze peer-reviewed journal articles between the years 2000 to 2013 using the terms “ecosystem services”, “stakeholder” and “participation” in their title, abstract, or keywords. The search results were examined for information on participation in ES studies. 38 papers were relevant and could be used to discuss and reflect survey findings. We classified the information provided in papers according to answer categories of the survey if possible in order to be able to compare selected results.

3 Results

3.1 General information of the online survey

We found very diverse goals and approaches of the analyzed studies. This documents the broad range and fragmented character of ES research. The relatively low number (n=38) of filled surveys was another reason that made analysis, i.e. structuring studies according to the addressed scale/decision-making level and comparing results, difficult. While the field the respondents were working in was not assessed, we could derive information on the institution they were working for in 21 cases (17 respondents answered the questionnaire anonymously). 13 were employed at a university, five at an applied research institute, two in a consultancy firm, and one at a public authority/government institution.

25 different countries were mentioned as study regions in the questionnaire. 76% of the studies were located in Europe and especially in Germany (13 out of 37) as the country of origin of survey respondents. 8% were situated in South America, 5% in both North America and Asia, and 3% in Africa and Australia respectively. Studies referred to by survey participants focused at a regional/landscape (74 %) or a local scale (14 %). Only two studies operated in a national or Pan-European area (3 %).

The ES concept was applied in projects thematically ranging from climate change, policies/decision-making, conservation and biodiversity protection to ecosystem and landscape management, energy crops and spatial planning. The distribution between scientifically-focused (46%) and application-oriented (41%) studies was almost balanced. 39% of the studies were dedicated to spatial and conservation planning and 26% to the testing/development of assessment approaches. The most frequent reason for using the ES approach was the need for integrated solutions (35%).

The references for the theoretical background of the ecosystem services concept mostly mentioned for ES were MEA (2005), de Groot et al. (2002, 2010), Haines-Young and Potschin (2010) or TEEB (2010), Burkhard et al. (2012), and Boyd and Banzhaf (2007). Among the 16 respondents who applied other references with lists and definitions of ES or combined references, ten other references were mentioned: Staub et al. (2011), Bolund and Hunhammar (1999), Bryan et al. (2010), Beaumont et al. (2007), Bastian et al. (2012), Defra et al., (2011; the complete reference could not be identified), Link (2010), Rutgers et al. (2008), Ranganathan (2008), and Fagerholm et al. (2012). Ten respondents (26%) used two or three and one even used seven different ES references. Five of the respondents explicitly stated that they tailored their approach by combining various references to better account for the aim of the study and to be more pragmatic in the use of ES with stakeholders (e.g., in case stakeholders were not experienced with ES).

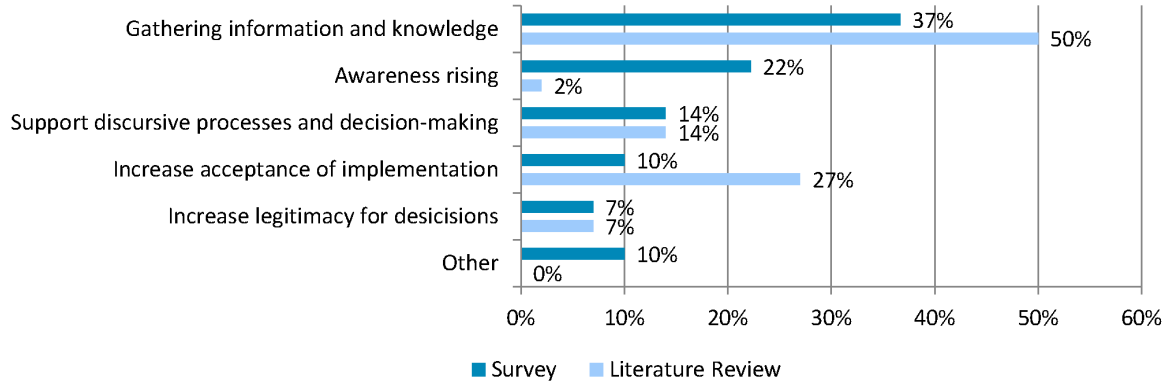

Figure 2: Reasons for stakeholder involvement (Survey: 90 answers, multiple answers allowed; Review: 44 mentions)

One respondent answered, *"ES were identified by stakeholders themselves [and] no a priori typology was used"*. One respondent stated that *"neither of these [references] were used directly, stakeholders modified them again to suit the purposes of the project and reflect the most up to date research on ES."*

3.2 Findings related to stakeholder processes

The main purposes of stakeholder involvement were gathering of information and knowledge with 37% and 50% of all mentions in the survey and literature review respectively (Figure 2).

Asking the respondents *"What type of information has been asked from stakeholders?"*, they stated that trade-off analyses (17 mentions), estimation of trends of supply (16), and the identification of relevant ES (14) were the most demanded information items from stakeholders. Less than every fifth study asked stakeholders for information on ecosystem service demands and only 13% of the studies asked for monetary valuation. Asked whether the information gathering was successful, 23% of respondents stated that it was not successful (i.e. unsatisfying or failed). For instance, reasons for unsuccessful trade-off analyses, which were mentioned in three of 17 cases, were problems *"to discriminate between similar or related ES"*. This caused stakeholders to be reluctant or unable to weight ES against each other in trade-off analyses (Figure 3). Further, the estimation of trends on demand and supply, quantification of impact on ES, and monetary valuation were not successful in some cases.

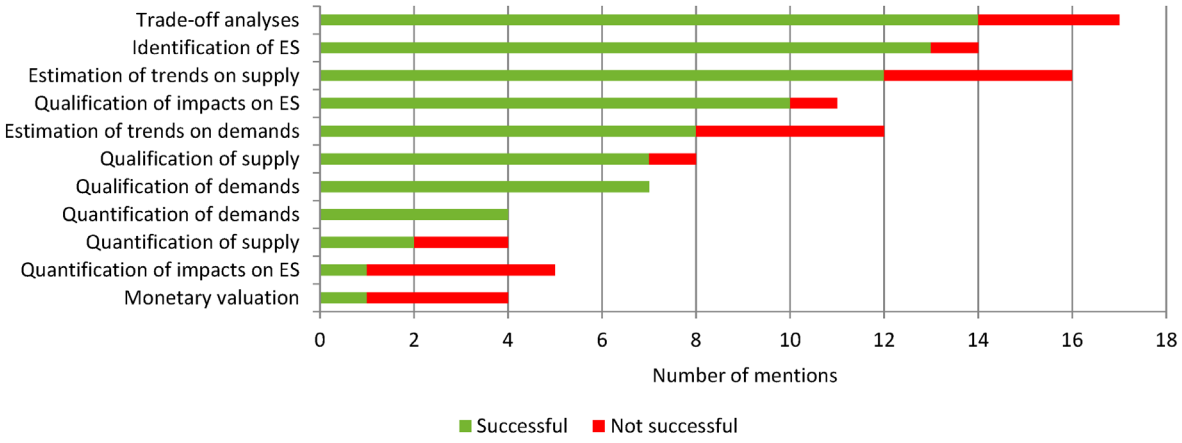

Figure 3: Type of information that has been asked from stakeholders (102 mentions, multiple answers allowed)

The techniques broadly applied to address stakeholders have been workshops (32% of overall 73 mentions), questionnaires (23%), interviews (22%) and round tables (18%). In 42% of studies only one technique was used, whereas the rest of the studies used one or more technique.

We further asked whether the respondents did explicitly use ES terminology and definitions during work with stakeholders. The ES approach was explicitly explained and the ES terms were applied in 53 % of the studies. 24 % of the respondents used the ES terms without any (extended) explanation of the ES concept (Figure 4, left). Among those who explained the ES concept and respective terms, almost all (90 %) were successful according to their own judgment. That is, the concept was mostly accepted and understood after explanation (see Table A1 for extended comments). This might be due to the fact that stakeholders were already familiar with the concept (as some of the respondents stated). However, understanding of the concept varied between stakeholder groups and educational level. To not additionally burden stakeholders with a new scientific concept, 24% did not provide an overview of the concept and used other terms. Either information was translated from stakeholders to ES, or ES terms were translated to fit stakeholders' perceptions/educational background (see Table A2).

65% of the respondents did include a social scientist or a mediator to facilitate communication. From the 17 survey participants who included a mediator, eight stated that he/she could significantly enhance the stakeholder process.

The distribution across spatial scales was rather unbalanced. Most of the studies addressed the landscape/regional scale. At local scales, ES was less often fully explained and more often 'translated' (Figure 4, right). The ad-hoc applicability of ES and the motivation to fully, i.e, holistically apply the concept seems to decline with decreasing scale level.

There have been quite contrasting opinions on ES communication. As the complexity of the concept can discourage stakeholders and the process can become an *"unsatisfactory experience"*, one respondent advocated ignoring the ES concept when dealing with (local) stakeholders. Another example provided evidence that the concept can be well understood and *"quite intuitively"* applied by stakeholders if a certain level of education and familiarity with concepts in general can be expected. One respondent mentioned that spatially available (statistical) data are not explicitly linked to ES and therefore it was challenging to apply the concept. Another respondent argued that the term 'landscape' (services) in comparison to 'ecosystem' (services) may be more attractive for stakeholders from non-ecological contexts or disciplines, and thus more suitable for being used in landscape planning projects (see also, e.g., Grunewald and Bastian 2010; Termorshuizen and Opdam 2009).

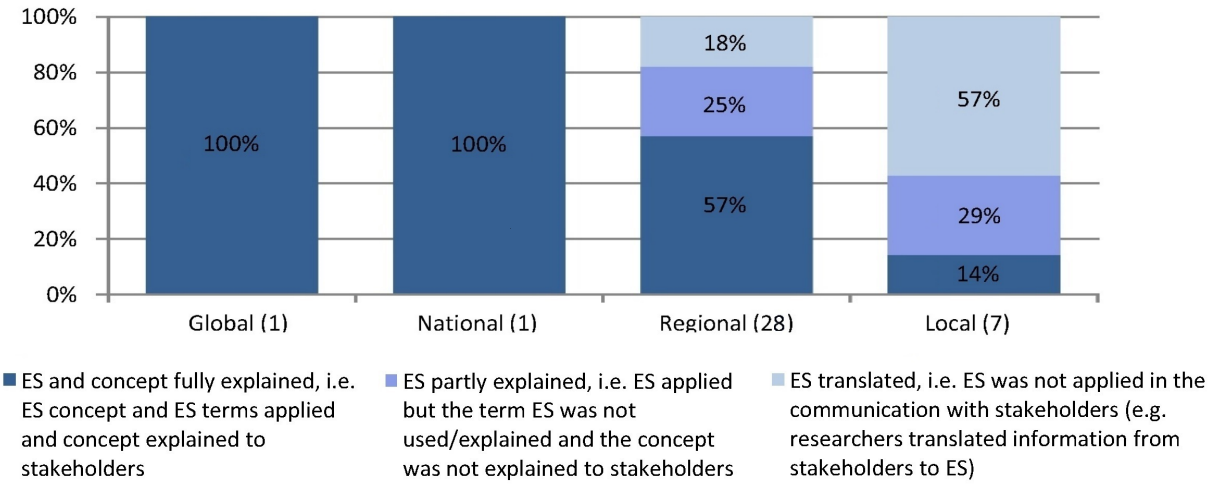

Figure 4: Overall comprehensiveness of communicating ES (left, 38 answers) and across the different scale levels (right, 37 answers). Number of considered answers in brackets

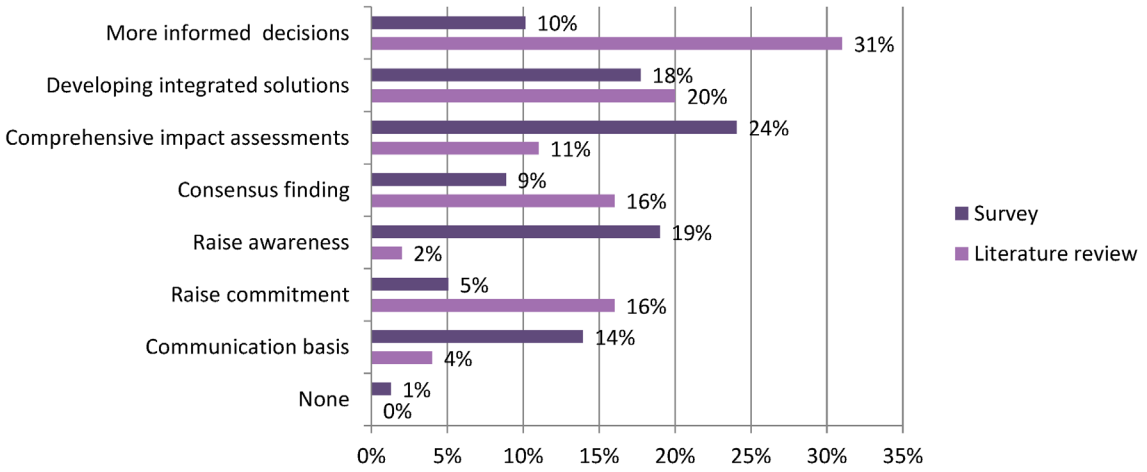

Figure 5: Benefits of using the ES approach in participatory processes as perceived by survey respondents (percentage of positive agreements, 79 answers) and based on mentions in literature (45 mentions)

3.3 Evaluation of the added value and applicability of the ES concept in stakeholder processes

Taking into account the survey results and the literature review, the greatest cumulative benefit of applying ES appeared to be related to achieving more informed decisions, developing integrated solutions and taking a comprehensive perspective for impact assessments. Further, ES were advantageous for awareness-raising, improved consensus finding and increased commitment (Figure 5). Only one respondent from the survey did not see a benefit.

In the survey, almost 70% of the respondents agreed that ES actually allow finding more informed decisions and 60% stated that benefits depend on the targeted decision-making level, (not displayed).

80% see clear potentials for improving stakeholder processes using ES. General improvements proposed by respondents (and efforts of the ES community) should aim at enhancing general publicity, acceptance, and familiarity of the concept by continuing to apply and spread it through various dissemination channels and through education. Specific improvements refer mainly to simplification of the ES terms. Many respondents would also opt to improve and simplify explanations for stakeholders, including a better preparation of the communication. Having more time available appears to be a major asset to deal with the challenges. Also methodical improvements concerning assessment, modeling, and visualization have been raised (see Table A3).

3.4 Challenges when using the ES concept in participatory processes

The most important ES related challenge for the survey respondents was dealing with the lack of data on ES (33% of all mentions). 12% of all answers stressed problems with the relevancy of assessed ES for stakeholders, which might result again from lacking suitable data on ES supply (e.g., different or opposed relevance of ES in a case study area for stakeholders). A failed analysis of stakeholders needs or an overall *"less tangible use"* of the ES concept for stakeholders might have been other reasons for this outcome. Further, the integration of the approach into existing concepts was demanding (30%). It was challenging for respondents to create a common understanding and *"communication basis between all participants"*, to deal with *"different notions of what belongs to a service"*, and to *"communicate the concept without creating confusion with respect to stakeholder's existing representations"*.

Challenges related to using ES identified in the survey were well supported by literature. Integration into existing concepts (30%), lack of data (20%), and lacking relevancy of the analyzed ES (10%) were found to be problems often mentioned in literature. The complexity of ES was found to be the most important challenge (40%) in the literature. In the respective multiple choice question in the survey, complexity was not offered as an answer (Figure 6).

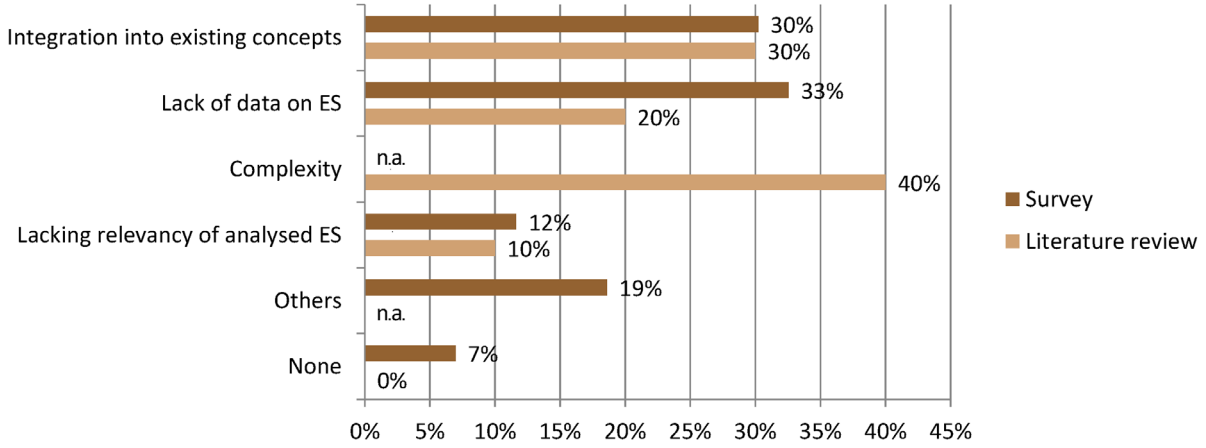

Figure 6: Challenges related to using the ES concept in participatory processes (survey: 67 mentions; literature review: 10 mentions)

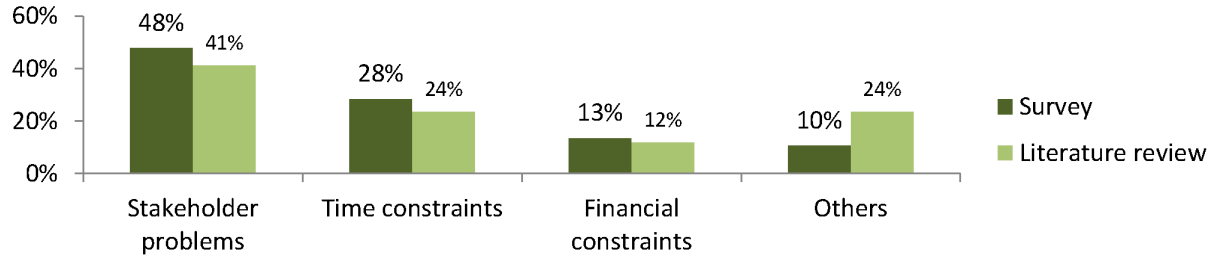

Figure 7: Overall challenges of stakeholder participation (survey: 67 mentions; literature review: 17 mentions)

Overall challenges were also quite similar in both the survey and in the review. Quite commonly, time constraints and financial restrictions were mentioned. Problems related to the actual inclusion of stakeholders however, were dominant in the survey as well as in the reviewed publications (Figure 7). Survey results allowed a more detailed differentiation in terms of stakeholder related issues. Hence, the identification of (motivated) stakeholders (26%), the (balanced) composition of stakeholder groups (12%) and gathering of all relevant stakeholders (9%) were challenging aspects related to stakeholder processes.

In comparison, 71% of the respondents agreed that stakeholder processes are hampered more by general challenges such as limitations of time and money than by ES related ones (e.g., complexity, integration of ES into existing concept etc.). Only around 19% perceived ES related challenges as a bigger obstacle.

In terms of the ES concept, major reasons for poor motivation of stakeholders, which was found in 17% of studies, were again the complexity (32%), the lack of tradition (and thus the competition with existing concepts and regulations; 18%) and a lack of understanding of the added value of ES (14%). In the comments, it was obvious that researchers were often not able to explain clearly the benefits of assessments for stakeholders and the importance of ES. Time restrictions of stakeholders (31%), communication problems (26%), and lacking identification with project aims (14%) were additional threats to stakeholders' motivation and commitments and thus for a successful participatory process.

4 Discussion

4.1 Challenges in participatory ES studies

Participation processes in ES studies are subjected to the main problems that have been identified in sociological literature on group processes (Jones and Stenseke 2011; Malone et al. 2010). Although the survey results suggest that general challenges, such as time constraints, lack of money and problems related to the (balanced) selection and involvement of stakeholders are more important, the use of the ES concept can pose additional threats to the success of stakeholder processes. This is due to its complexity, a lack of data, and terms unknown to stakeholders. For instance, Albert et al. (in press) reported that the ES concept was unknown by the majority of landscape and regional planners they questioned in their study. Further, the difficulty to integrate ES in accepted existing concepts and regulatory planning processes plays an important role (Albert et al. in press), as well as the inconsistent classification of ES. Merits and demerits of using ES might differ and depend on the specific decision-making context. Potential demerits of applying the ES concept in participation processes we found in our study were also often mentioned in ES literature (see Table 1). These demerits need to be considered since they can overcome merits.

Challenges related to the availability of data are not specific for ES studies of course, but the need to translate existing data to fit ES hampers the applicability of the concept. 60% of the survey participants believe that the benefits of the ES approach depend on the targeted decision-making level. At overarching, strategic decision-making levels where respective stakeholders are included, the need to translate ES terms is less pronounced in comparison to regional/ landscape and local scales where stakeholders ask for very precise and spatially explicit information. Employing the ES approach in natural resource management, Wainger et al. (2010: 1) said that *"the devil, truly, is in the details*" especially at local scales.

Table 1: Summary of potential merits and demerits of applying the ES concept in participatory processes in management and planning practice, based on ES literature.

Potential Merits (Benefits)	Potential Demerits (Drawbacks)
ES allow integration of disciplines, interests and sectors, bridge natural sciences and human well-being and can thus serve as a common communication basis between stakeholder groups in order to develop integrated solutions (Seppelt et al. 2011, de Groot et al. 2010; Barbier 2007; Carpenter et al. 2006, Tallis et al. 2009, Grêt-Regamey et al. 2012, Van der Meulen et al. 2013).	ES can hinder communication instead of facilitating it, which can aggravate conflicts (Menzel and Teng 2009).
	In the event there is no demand for ES, the concept might not serve as a useful management strategy (Grêt-Regamey et al. 2012).
ES explicitly involve beneficiaries, i.e. public demand for services (Grêt-Regamey et al. 2012).	Problems* come up when communicating the ES concept to the relevant actors (Meinke et al. 2006; Opdam et al. 2009, Koschke et al. 2012).
ES help to make more-informed management decisions and realize synergies between ES (Hauck et al. 2013).	There is a lack of clarity and definition standards (Broekx et al. 2013; Fisher et al. 2009).
ES provide a framework for a way of thinking that broadens the scope (Brauman et al. 2014)	There is a lack of methods for assessment and monetization (de Groot et al. 2010; Kroll et al. 2012).

* Problem might be: incomprehension of the purpose for applying ES, lack of clarity and definition standards or background for definitions

This might explain that within the survey two studies at the local/ farm level did not communicate ES. Respondents might not have been able to identify an added-value from the use of ES in their case studies. These respondents did not explicitly explain the term 'ecosystem services' but used either 'environmental services' or only single 'services' as a specific topic, i.e. soil erosion protection. In these cases it was more difficult to explain to practitioners (e.g., farmers) the added-value of ES and the different terminologies. Integrating ES into existing planning and decision-making approaches, especially at the local level, appears to be too demanding and not easily accepted. This, however, may also be related to the fact that the reported cases were research projects carried out mostly at universities and applied research institutes which hence dealt more with developing concepts and methods. Application of the ES concept might have been less demand-driven in these cases and there might be a weak point in connecting ES to ongoing processes in the case study areas.

Although common references such as MEA (2005) and de Groot et al. (2002, 2010) have been widely used, the range of other references clearly documents that there is no ecosystem services classification system that is totally consistent, can be commonly applied, and that there is a distinct need for refinements in practical applications. Some researchers working at the local scale tried to facilitate communication by not elaborating on ES. Experiences of survey participants have shown that, when discussing ES with expert stakeholders, one runs the risk of getting lost in definition and classification issues (e.g., which ones are final services, and which functions support which ES). These issues may make it more difficult for researchers to communicate with stakeholders.

4.2 Evaluating the impact of ES in stakeholder processes

Evaluating the applicability and the utility of ES, the concerned spatial scale and the related decision-making level are major drivers for the selection of stakeholders. Although based on a very low number of large scale cases, it seems that the ES concept is at the moment more easily understood or better suited to the stakeholders who work on a larger scale than at the local scale. This result is based on the decision of the researchers to not explain the ES concept or use alternative wording in the small scale cases. At higher levels, an adaption might be necessary in fewer cases, as the ES concept tends to be common to involved stakeholders (García-Llorente et al. 2011).

The survey and the literature review led to different results in terms of the role of ES to find more informed decisions. This benefit was mentioned in 10% of the answers from survey respondents while it was mentioned in 31% of the reviewed literature. In contrast, survey respondents put more focus on the ability to run comprehensive impact assessments (Figure 8, 24% of all mentions in comparison to 11% in the literature review). However, both answer categories are related, as they refer to the holistic, integrated character of ES. Asked if they agree or disagree with this statement, the majority of respondents stated that *"ES support finding better (more informed) solutions"* for landscape planning and management in practice. Yet, convincing examples could not be identified. It remains unclear whether the potential benefits of higher quality, better acceptance, and higher legitimacy in decision-making can be broadly realized in practice-oriented contexts.

Given the potential and perceived demerits, only 32% of the survey respondents evaluated the overall impact of ES on stakeholder processes as (rather) positive. Ambiguous findings were reported also from Albert et al. (in press) who asked regional and landscape planners about the usefulness of ES in planning processes. Interestingly, planners with no previous knowledge of ES believed it could be useful to integrate ES information in planning processes. Conversely, planners who already knew the ES concept had doubts and were rather pessimistic with respect to the benefits of integrating ES information.

4.3 How to handle challenges, potential demerits and practical drawbacks

Implementing participatory processes, the challenge starts with the selection of key stakeholders. A sound stakeholder analysis is the prerequisite for identifying values, interests, and needs of different and heterogeneous stakeholder groups (e.g.,

Grimble and Wellard 1997; Hein et al. 2006; Kasemir et al. 2003). The evaluation of the stakeholder process showed that a proper communication is of major importance. Although ES gained ground also in public discussion, many stakeholders might not quite understand what is meant by 'ecosystem' or relate it with natural processes and conservation instead of with human habitat and cultural patterns (Albert et al. 2012a). The advisable degree to which information on the conceptual background of ES needs to be conveyed to stakeholders varies.

The use (and extended communication) of the ES concept in the actual process might not always be necessary and advisable. Partly a certain reluctance of practitioners and (regional) planners to adopt the concept was reported by other scientists (e.g. Albert et al. in press). Some actors choose not to make the concept explicit when communicating with stakeholders, but merely mention specific services without labeling them ES, or by using other terms such as 'functions of the natural system' (Brauman et al. 2014; Everard 2009; van der Meulen and Brils 2011.) Thus, it is meaningful to adapt or translate the ES terminology and the amount of provided information to the needs of stakeholders in a way that the connections of the ES with stakeholders' well-being become more obvious and the information is useful and understandable for stakeholders with varying levels of expertise (cf. Granek et al. 2010; Nordström et al. 2010). Also technical support by interactive tools generally helps to trigger the interest of stakeholders for planning and can facilitate communication (Arciniegas et al. 2011; Berkers et al. 2006; Eikelboom et al. 2013; Frank et al. 2014).

Some of the caveats such as the problem of perceiving ES as a green concept, the unfamiliarity with terms and their connotations (Albert et al. 2012a) might diminish with time as the concept will be better known, acknowledged, and understood as an overarching paradigm. Other challenges however will persist (e.g., inconsistency of the concept, classification problems, and unit of data in official accountings) and might continue to impact stakeholder processes negatively.

Since ES studies do often include spatial data treatment and collection and application of participatory methods from social sciences, sound expertise from both fields should be present within the research team (Hauck et al. 2013). It can be recommended to include a social scientist or a mediator to increase the likeliness of a successful process.

5 Conclusions

In order to collect data on participation processes related to the application of the ES concept, we conducted an online questionnaire addressing researchers. In a subsequent step, a review of peer-reviewed journal articles was carried out to increase the information basis and to compare with findings of the questionnaire.

Referring to the **key question (1)** ("What are the major challenges related to the ES concept in the practice of participatory processes?"), results of the online survey support the view that the ES concept poses additional challenges to stakeholder processes (see also chapter 4.1). Most of the survey participants stated that the concept was understood to a great extent, if properly explained. However, often the survey participants did not, or did not completely, explain ES. Hence, there are particular requirements for a proper and well-prepared communication of the ES concept (terminology, definitions) and for keeping up the motivation of the stakeholders (relevance of the information provided). Although there are a number of potential drawbacks directly related to the ES concept, general challenges such as limitations of time and money and stakeholder choice appear to be more relevant.

Ambiguous results were found in terms of whether merits of applying ES outweighed demerits which has been addressed in **key question (2)**. Although several drawbacks were pinpointed, the overall impact of applying the ES approach in stakeholder processes within scientific studies was predominantly evaluated as being positive. The commonly conveyed benefits of the ES approach as a common basis for discussion, for consensus building, for the identification of integrated solutions or more informed decisions, for example, could mostly be

realized in practice according to researchers who conducted the studies.

However, merits and demerits of using ES is also related to scale which was addressed in **key question (3)** ("Are there scale-dependent differences in terms of ES related challenges and benefits?"). Survey participants generally agreed that benefits and challenges of applying the ES concept depend on the targeted scale/decision-making level. There were results (for example, the fact that researchers did not explain the concept in local cases) and comments from survey respondents (for example, in terms of acceptance/unfamiliarity of the concept, communicating the added-value) indicating that the application of the ES concept at local scales is more demanding with respect to stakeholder integration. However, sound confirmation could not be achieved due to the lack of data on the scale-dependent success of stakeholder processes. How exactly the study scale impacts the benefits of applying ES, is a question that should be further addressed by the research community.

As to **key question (4)** ("Can general recommendations be derived regarding how to deal with challenges, potential demerits and practical drawbacks?"): Participatory processes need to be closely related to demands by stakeholders concerning language, information types, and results that are produced. Thus, for a successful application in practice, it is definitely advisable to explicitly bring the ES concept to local context, to provide many examples and to focus on communicating the added-value of ES. It is safe advice to develop an individual communication strategy for each of the involved stakeholder groups with respect to the used terms and the amount of information provided on the ES concept (cf. UNEP-WCMC 2011). Communication of knowledge generated in assessments has to be adapted also to the decision-making level. Planning for larger scales allows more general information while the focus on smaller scale requires more detailed knowledge. If (cross-scale) stakeholder groups are involved, an important question is how to bridge knowledge gaps and different decision criteria between them. Still, stakeholders do not often talk the ES language and it is difficult to adapt research language to their needs. If it cannot be ensured that information is understood and perceived as relevant, it will be difficult to keep the process and results significant for stakeholders and ensure continued motivation and commitment. This problem may not always be coherently accounted for within studies.

One should be aware, that for changing awareness of ES, participatory processes (i.e. reasoning together, exchanging arguments) and actual study results are important. Thus, during assessments, the coherency and consistency of the ES framework might be of lesser significance, even more so if work is carried out at local scale. An important consensus of discussions within the group of authors was that ES might be well suited as a common conceptual/theoretical and analytical framework rather than as a blueprint to conduct practice oriented projects and investigations.

A major concern of ES research is still to be able to provide 'actionable' knowledge, which is needed to overcome the apparent problem that the ES framework is a scientific concept rather than a concept that supports decision makers (Fürst et al., 2013; RR21, 2013). Dealing with stakeholders, we cannot present the ES approach as a new management approach in just one case study, but we do have to assess how the concept can support ongoing processes. Information allowing an evaluation of stakeholder processes appears to be largely missing currently in most studies/projects. Thus, the structured collection of stakeholder feedback on participatory processes should be a focal aspect in the future to better assess the success of ES studies. At times it seems that we need to take participation and the role and (information) needs of stakeholders more seriously instead of just *"muddling through stakeholder processes"* (Jennifer Hauck, personal communication, 07.05.2013), as it seems frequently to be the case in current ES projects. Together with efforts to develop standardized methods for ES assessment, we advocate a stronger focus on stakeholder processes as a key element for implementing ES into planning and management practice. This would help to develop new ideas for how to deal with particular challenges in ES, and it represents a means to increase the relevance and impact of study results in real life decision-making.

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Appendix

Table A1: Extended optional answers to the question whether the concept was accepted and understood by stakeholders (question 15.1 in the questionnaire)

(Rather) Yes	Partly, […] it was difficult for them which ES might be more important over other ES!
	No noticeable obstacles
	No, the term and concept was already known by all involved stakeholders
	The scientists were familiar with it
	If explained properly, the concept can definitely be made understandable. Some terms (e.g. biodiversity) are used differently in different contexts.
	I did not have major obstacles, but I worked with people who are fairly familiar with these terms.
	[…] some concepts are difficult to understand for the community.
	Stakeholders basically understood the approach but due to lacking time not every single detail could be clarified
	Definition was mostly accepted.
	We had to clearly explain the concept, but afterwards it was in our experience quite intuitive for stakeholders. I have to state that all our stakeholders were quite well educated, e.g. forest engineers, city planners that have most probably been in contact with research and "concepts" in general.
	The concept has been completely understood.
(Rather) No	Broad unfamiliarity of ES concept to many non-academic audiences. Researcher's attempt to 'reclassify' relationships that were implicit in local discourse connotations of monetary fungibility in 'services' terminology was particularly problematic within the study area. The 'services' terminology can be counter-productive because it seems to be associated with commodification.
	ES is for most stakeholders quite difficult to understand. Farmers were the most easy, but only interested in production, government was more difficult at the time.
	At the beginning it was difficult to communicate the complex concept in an understandable, easy way. Additionally, the term "ecosystem services" is complicated in German.

Table A2: Reasons for not (fully) explaining the ES concept to stakeholders (question 15.2)

[…] it seemed to be too complicated
We communicated the concept but embedded it in broader discussions about uses and values of different land-cover and land-use options
To be sure that stakeholders understand the questions
Communication with stakeholders is more easy, if other terms are used
We did not want to ask too much of the stakeholders and did not want to discourage them
[…] to keep the process simple and to make it easier for the stakeholder to understand [the aim]
To help general understanding by not-technical stakeholders
[…] we know from other experiences that the concept is very hard to understand, even by environmental experts and that it raises discussion about the definition. The specific ES are generally well understood by interviewees, with a few exceptions.
Communication with stakeholders was easier when the term ES was not mentioned, since in most times it was directly linked to monetary values.
The method applied for eliciting preferences and evaluating alternative solutions was multi-criteria decision analysis (MCDA) and within this framework terms like "values, goals, criteria, objectives, attributes" are commonly used.

Farmers are mostly not familiar with the ES-concept. Thus a term was used that has a stronger connection to environmental measures on farms, pretending that by implementing these measures real ES are provided.
Use of existing data and preprocessed spatial data of administrative authorities which are not explicitly linked to ES concept!
It is not necessary to fully communicate the ES concept, to make it workable
'Landscapes' may be more attractive to non-ecological scientific disciplines in contrary to the term 'ecosystem' and may be associated with peoples local environment. The term landscape services might be more suitable for implementing the concept into landscape planning projects. In contrast, 'ecosystem' may be related with natural processes and conservation instead of with human habitat and cultural patterns.

Table A3: Selected statements on things that can be improved in stakeholder processes based on experiences of survey respondents (question 22)

[Better] preparation of the questionnaire
Provide more scientific background information to stakeholders and/or scientists, provide a specific challenge or problem to be tackled by the process
More previous networking
Adapt methodology better to situation and stakeholders
[Address] issues of representativeness [better]
Consider the difference in demand and tradition of participant
Increase stakeholder involvement upstream of research design
Explain in a better way the concept of ES
Better explanation of the ES concept. Facilitate methods for ES weighting. Keep stakeholder contact as simple as possible. Provide only essential information. Focus more on social-science related communication techniques and methods. Try to make assessment (ES and indicators) more relevant to stakeholders.
[More] time [is necessary]
Involve other stakeholder groups, other methods to promote discussion for consensus between different stakeholders and other topics of consults (e.g. identification of ESs)
Introduction through open-ended discussion of environmental/landscape benefits [to increase familiarity with the concept]
In this case: different groups of stakeholders need to be involved and more people needed for quantification
Identifying ES in a common language for all stakeholders OR produce a two step process 1. identify a common language for environmental quality aspects and 2. produce a framework for translating environmental quality into ES.
Financial incentives might enhance participation in conservation measures
Include experts on financial aspects and decision makers/managers of support programs
Better methods for WTP/ Choice Analysis
Starting earlier, trying to keep explanations as easy as possible, more direct contact (if time allows)
structure of workshops have to be well (and maybe strictly) organized, in order to be really productive
Better preparation concerning the choice of participants, reduce choice to local people with scientific background to ensure a better understanding of the concept (question of feasibility!?)
(1) Other ways to deal with supportive services, (2) learn how to deal with recognition, valuing and addressing beneficiaries for ES that are relevant at large scales, (3) use larger study area.
To facilitate the visualization of service provision (maps and diagrams are sometimes too abstract (too scientific) for stakeholders. It is very important to speak in 'their' language and to communicate them the benefits they will receive from the ES assessment

Table A4: Questionnaire

Variables Listing

Questionnaire - internal data

Apart from your questions, you will find in the data record additional variables, as far as you have not deactivated this option when downloading the data record.

CASE Serial number of the subject
REF Reference, if such has been provided in the link to the questionnaire
LASTPAGE Page number of the questionnaire that has been edited and sent last
QUESTNNR ID of the questionnaire that has been edited
MODE Information if the questionnaire has been started by pretest or by a project member
STARTED Time the interviewee opened the questionnaire
FINISHED Information if the questionnaire has been completed up to the last page
TIME_001... Time that an interviewee has spend on a questionnaire page

Please note that you can not read the internal variables of the questionnaire with the function value(). For interview number and reference there are the PHP functions PHP function caseNumber() and PHP function reference()

Details about additional variables can be find in the manual: Additional Variables in the Data Set

Section A1: General Information

[A101] Text Input
Q01 - Country
"Where is the study region located?"

A101_01 Country
Text input

[A102] Selection
Q02 - Scale level
"What is the analysis or decision making level addressed within your study?"

A102 Q02 - Scale level
1 = Global or Pan-European or similar
2 = National
3 = Regional/ Landscape
4 = Local
5 = Other:
-9 = Not answered

A102_05 Other
Text input

[A103] Selection
Q03 - Organizational scale
"What was the targeted organizational scale?"

A103 Q03 - Organizational scale
1 = Regional planning district
2 = Municipality
3 = Farm level/Company level/ Neighbourhood level (in urban cases)
4 = Field block level/ Stand level/Neighbourhood level
5 = Landscape
6 = Water management unit (catchment)
8 = Ecosystem
7 = Other:
-9 = Not answered

A103_07 Other
Text input

[A104] Text Input
Q04 - Project aim
"What was the aim of the research project?"

A104_01 [01]
Text input

[A107] Multiple Choice
Q05 - Case study aim?
"What was the aim of the case study/regional project?"

A107_01 Spatial or strategic planning support
A107_02 Conservation planning support
A107_03 Nature protection
A107_04 Adapted management practices
A107_05 Test/development of assessment approach
A107_06 Implementation of measures
A107_07 Other
1 = Not checked
2 = Checked

A107_07a Other (free text)
Text input

[A105] Text Input
Q06 - Why ES?
"Why was the ES approach applied?"

A105_01 [01]
Text input

[A106] Text Input
Q07 - Who asked for it?
"Who asked for the application of the ES approach (e.g. the project holder, stakeholders, research group, etc.)?"

A106_01 [01]
Text input

[A109] Multiple Choice
Q08 - Which ES ref.?
"Which reference for definition and classification of ES or which other concept did you apply?"

A109_01 MA (e.g. MA, 2005. Ecosystems and human well-being: Synthesis. A Report of the Millenium Ecosystem Assessement. Island Press, Washington)
A109_02 de Groot et al. (e.g. de Groot, R. S., Wilson, M. A., Boumans, R. M. J., 2002. A typology for the classification, description and valuation of ecosystem functions, goods and services. Ecological Economics. 41, 393-408// de Groot, R. S., Alkemade, R., Braat, L., Hein, L., Willemen, L., 2010. Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. Ecological Complexity. 7, 260-272)
A109_03 Burkhard et al. (Burkhard, B., Kroll, F., Müller, F., Windhorst, W., 2009. Landscapes' Capacities to Provide Ecosystem Services – a Concept for Land-Cover Based Assessments. Landscape Online. 15, 1-22)
A109_04 Haines-Young and Potschin (Haines-Young, R., Potschin, M., The links between biodiversity, ecosystem services and human well-being. In: D. Raffaelli, C. Frid, Eds.), Ecosystem ecology: a new synthesis. BES ecological reviews series, CUP, Cambridge, 2009) or TEEB (e.g. TEEB, The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB. 2010)
A109_05 Boyd and Banzhaf (Boyd, J., Banzhaf, S., 2007. What are ecosystem services? The need for standardized environmental accounting units. Ecological Economics. 63, 616-626)
A109_06 Other
A109_07 Other
A109_08 Other
A109_09 Other
1 = Not checked
2 = Checked

A109_06a Other (free text)
A109_07a Other (free text)
A109_08a Other (free text)
A109_09a Other (free text)
Text input

[A108] Selection
Q09 - Focus?
"Has your study been rather ... "

A108 Q09 - Focus?
1 = scientifically-focused, or
2 = application-/implementation-oriented ... ?

3 = Other/Comments:
-9 = Not answered
A108_03 Other/Comments
Text input

[A110] Free Mentions
Q10 - Which ES?
"Which specific ES did you consider (e.g. food and fodder provision, landscape aesthetics , soil erosion regu..."

A110 Number of mentions
A110x01 Mention 1
A110x02 Mention 2
A110x03 Mention 3
A110x04 Mention 4
A110x05 Mention 5
A110x06 Mention 6
A110x07 Mention 7
A110x08 Mention 8
A110x09 Mention 9
A110x10 Mention 10
A110x11 Mention 11
A110x12 Mention 12
A110x13 Mention 13
A110x14 Mention 14
A110x15 Mention 15
A110x16 Mention 16
A110x17 Mention 17
A110x18 Mention 18
A110x19 Mention 19
A110x20 Mention 20
A110x21 Mention 21
A110x22 Mention 22
A110x23 Mention 23
A110x24 Mention 24
A110x25 Mention 25
Text input

Section A2: Stakeholder Participation

[A201] Multiple Choice
Q11 - Why SH involved?
"Why did you involve stakeholders anyway? "

A201_01 Awareness rising/ Provision of information
A201_02 Support discursive processes and decision making (e.g. for a specific problem)
A201_03 Increase legitimacy for decisions
A201_08 Increase acceptance of implementation and compliance with measures
A201_04 Gathering information and knowledge (e.g. on relevant ES, preferences, quantification etc.)
A201_05 Other
A201_06 Other
A201_07 Other
1 = Not checked
2 = Checked
A201_05a Other (free text)
A201_06a Other (free text)
A201_07a Other (free text)
Text input

[A202] Scale (fully labeled)
Q12 - Infotype?
"What type of information has been asked from stakeholders? Was the information collection successful? "

A202_15 None
A202_02 Identification/definition/selection of ES
A202_03 ES prioritization/weighting/trade-off analyses
A202_04 Qualification of supply (stocks, flows)
A202_05 Qualification of demands (stocks, flows)
A202_06 Qualification of impact on ES as result of change
A202_07 Quantification of impact on ES as result of change
A202_08 Quantification of supply (stocks, flows)
A202_09 Quantification of demands (stocks, flows)
A202_10 Monetary valuation
A202_11 Estimation of past trends on ES supply
A202_12 Estimation of future trends on ES supply/ scenario building
A202_13 Estimation of past trends on ES demand
A202_14 Estimation of future trends on ES demand/scenario building
1 = Fully successful +++
2 = Rather successful ++
3 = Partly successful/ Don't know +/-
4 = Rather not successful --
5 = Not successful ---
-1 = Not assessed
-9 = Not answered

[A204] Text Input
Q12b - Infotype?
"Please enter the information you asked from stakeholders which have not been captured in Question 12 - or ch..."

A204_05 [05]
Text input
A204_05a [05]: No additional information/ comments
1 = Not checked
2 = Checked

[A205] Multiple Choice
Q13 - SH groups?
"Please indicate which stakeholder groups you involved."

A205_01 Representatives of municipalities or administrative authorities/
A205_02 Local politicians/
A205_03 Policymakers/
A205_04 Water managers/
A205_05 Investors/
A205_06 Stakeholders from recreation and tourism/
A205_07 Project managers of municipalities/
A205_08 Landscape and regional planners/managers/
A205_09 Managers of protected areas or nature conservationists/
A205_10 Land owners/ land users (farmers, foresters) or their representatives/
A205_11 Citizens, interested people/
A205_12 Stakeholders from education and research/ Scientists
A205_13 Other (Stakeholder group/number)
A205_14 Other (Stakeholder group/number)
A205_15 Other (Stakeholder group/number)
1 = Not checked
2 = Checked
A205_01a Representatives of municipalities or administrative authorities/ (free text)
A205_02a Local politicians/ (free text)
A205_03a Policymakers/ (free text)
A205_04a Water managers/ (free text)

A205_05a Investors/ (free text)
A205_06a Stakeholders from recreation and tourism/ (free text)
A205_07a Project managers of municipalities/ (free text)
A205_08a Landscape and regional planners/managers/ (free text)
A205_09a Managers of protected areas or nature conservationists/ (free text)
A205_10a Land owners/ land users (farmers, foresters) or their representatives/ (free text)
A205_11a Citizens, interested people/ (free text)
A205_12a Stakeholders from education and research/ Scientists (free text)
A205_13a Other (Stakeholder group/number) (free text)
A205_14a Other (Stakeholder group/number) (free text)
A205_15a Other (Stakeholder group/number) (free text)
Text input

[A206] Selection
Q14b - Work load for SH?
"Please estimate the work load dedicated to stakeholder participation with respect to other study work packages?"

A206 Q14b - Work load for SH?
1 = Most of the time was dedicated to intensive stakeholder participation (approx. >75% of total work load related to it)
2 = Stakeholder participation was the central component within our study (approx. 50 to75% of total work load related to it)
3 = Stakeholder participation was an important component within our study (approx. 25 to 49% of total work load related to it)
4 = Stakeholder participation was a necessary component within our study (approx. 10 to 24% of total work load related to it)
5 = Stakeholder participation was of secondary/marginal importance (approx. less than 10% of total work load related to it)
-9 = Not answered

[A207] Selection
Q15 - ES Terminology?
"Did you explicitly use ES terminology and definitions during work with stakeholders?"

A207 Q15 - ES Terminology?
1 = (a) ES applied AND the term ES used AND concept explained to stakeholders
2 = (b) ES applied BUT the term ES was NOT used and concept was NOT explained to stakeholders
3 = (c) ES was not applied in the communication with stakeholders but researchers translated information from the stakeholders to ES If you used another term instead of ES, what was the term that was communicated with stakeholders (e.g. landschape services): [Please use the text field to provide further information]
-9 = Not answered
A207_03 (c) ES was not applied in the communication with stakeholders but researchers translated information from the stakeholders to ES If you used another term instead of ES, what was the term that was communicated with stakeholders (e.g. landschape services): [Please use the text field to provide further information]
Text input

[A208] Selection
Q15.1
"If you answered with (a) under 17., was the concept accepted and understood? "

A208 Q15.1
1 = Yes; Please describe shortly if there have been any obstacles, challenges or drawbacks?
2 = No; Please describe shortly which obstacles, challenges or drawbacks you faced?
3 = Not applicable
-9 = Not answered
A208_01 Yes; Please describe shortly if there have been any obstacles, challenges or drawbacks?
A208_02 No; Please describe shortly which obstacles, challenges or drawbacks you faced?
Text input

[A209] Selection
Q15.2
"If you answered with (b) under 17., why did you not fully communicate the ES concept?"

A209 Q15.2
1 =
2 = Not applicable
-9 = Not answered
A209_01 [No Description] 01
Text input

[A210] Selection
Q15.3
" If you answered with (c) under 17., what was your motivation to not apply ES terminology or using a concept..."

A210 Q15.3
1 =
2 = Not applicable
-9 = Not answered
A210_01 [No Description] 01
Text input

[A211] Multiple Choice
Q16 - Techniques/Methods
"Which techniques/methods did you use to involve stakeholders?"

A211_01 Workshop
A211_02 Questionnaire
A211_03 Focus group discussion/ Round table
A211_04 Interview
A211_05 Other
A211_06 Other
1 = Not checked
2 = Checked
A211_05a Other (free text)
A211_06a Other (free text)
Text input

[A214] Selection
Q16.1 - Technical support
"Did you use technical support such as planning/ software tools, touch tables etc.?"

A214 Q16.1 - Technical support
1 = Yes. Please specify kind of tool and purpose of its application:
2 = No.
-9 = Not answered
A214_01 Yes. Please specify kind of tool and purpose of its application
Text input

[A213] Selection
Q16.2 - Technical support
"Did these techniques enhance the process?"

A213 Q16.2 - Technical support
1 = Yes.
2 = No.
3 = Don't know.
4 = None/ Not applicable
-9 = Not answered

[A215] Selection
Q16.3
"Did you involve a social scientist or a mediator/communication facilitator to accompany the process? "

A215 Q16.3
1 = Yes.
2 = No.
-9 = Not answered

[A216] Selection
Q16.4
"Could he/she contribute to enhance the process and communication?"

A216 Q16.4
1 = Yes.
2 = No.
3 = Don't know.
4 = None/ Not applicable
-9 = Not answered

[A217] Multiple Choice

Q17 - Presentation of results
"How did you present results of your study to stakeholders/ participants?"

A217_01 Maps
A217_02 Charts
A217_03 Diagrams
A217_04 Texts
A217_05 Other
A217_06 Other
A217_07 Other
1 = Not checked
2 = Checked
A217_05a Other (free text)
A217_06a Other (free text)
A217_07a Other (free text)
Text input

[A218] Scale-like Selection
Q14a - Importance of SH consultation?
"Please evaluate the importance of stakeholder consultation within your study."

A218 Q14a - Importance of SH consultation?
1 = Stakeholder consultation was of major importance
2 = Stakeholder consultation was important
3 = Stakeholder consultation was of medium/ average importance
4 = Stakeholder consultation was less important
5 = Stakeholder consultation was not very important
-9 = Not answered

Section A3: Evaluation of the process of stakeholder integration

[A301] Multiple Choice
Q18 - Benefits of ES?
"In the process of stakeholder participation, which benefits/opportunities related to the ES approach did you..."

A301_06 None
A301_01 ES useful as common communication basis
A301_05 ES useful for developing integrated/interdisciplinary solutions (e.g. linking the biophysical and socioeconomic)
A301_10 ES allow a comprehensive impact assessments (to identify synergies/trade-offs)
A301_08 ES helps consensus finding between conflicting interests
A301_02 ES useful to raise awareness of ecological principles/ to increase societal relevance of conservation efforts
A301_09 ES helps to raise commitment
A301_07 ES helps to make more informed decisions
A301_04 Other
A301_03 Other
1 = Not checked
2 = Checked
A301_04a Other (free text)
A301_03a Other (free text)
Text input

[A302] Multiple Choice
Q19 - Challenges of ES?
"In the process of stakeholder participation, which have been overall challenges/drawbacks you faced related ..."

A302_09 None
A302_01 Methodical difficulties to assess and value ES/ Lack of data on ES
A302_05 Lacking relevancy of analysed ES with study targets or problem level
A302_02 Integration into existing planning instruments and concepts
A302_07 Other
A302_08 Other
A302_10 Other
A302_11 Other
1 = Not checked
2 = Checked
A302_07a Other (free text)
A302_08a Other (free text)
Text input

[A314] Scale (fully labeled)
Q18.1 - Benefits of ES?
"Given your personal experiences, please indicate your (dis)agreement with the following statements!"

A314_01 ES useful as common communication basis
A314_02 ES useful for developing integrated/interdisciplinary solutions
A314_07 ES allow a comprehensive impact assessments (to identify synergies/trade-offs)
A314_03 ES useful to raise awareness of ecological principles/ to increase societal relevance of conservation efforts
A314_04 ES helps to make more informed decisions
A314_05 ES supports the implementation of conservation/ sustainable management measures
A314_06 Benefits of applying the ES concept in planning practice strongly depend on the targeted decision making level
1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree
-9 = Not answered

[A305] Multiple Choice
Q19.1 - Challenges/not ES?
"Are there other – not directly ES related – overall challenges that impacted stakeholder participation?"

A305_06 No
A305_01 Financial constraints
A305_05 Time constraints
A305_02 Identify motivated stakeholders
A305_09 Assemble all relevant stakeholders
A305_03 Achieve balanced composition of stakeholders
A305_04 Other
A305_07 Other
A305_08 Other
1 = Not checked
2 = Checked
A305_04a Other (free text)
A305_07a Other (free text)
A305_08a Other (free text)
Text input

[A318] Two-sided Slider
Q19.2 - Which issue more important?
"Please click on the scale and drag the emerging button to indicate which issue posed the bigger challenge on..."

A318_01 Stakeholder process was impacted more by ES related challenges/drawbacks/Stakeholder process was impacted more by other (not ES related) challenges/drawbacks
1 = Stakeholder process was impacted more by ES related challenges/drawbacks
11 = Stakeholder process was impacted more by other (not ES related) challenges/drawbacks
-9 = Not answered

[A304] Selection
Q21 - Motivation of SH?
"How did you perceive the willingness/motivation of stakeholders to participate?"

A304 Q21 - Motivation of SH?
1 = (a) Very good
5 = (b) Rather good
2 = (c) Rather poor
3 = (d) Poor
4 = (e) Depending on stakeholder group (if several were included)

6 = (f) Don't know
-9 = Not answered

[A309] Scale (fully labeled)
Q23 - SH Process vs. Results
"How would you evaluate RELEVANCY of participation process (e.g. discussion, consensus finding, dialogue betw..."

A309_01 Participation process
A309_02 Study results
1 = Low Relevancy
2 = Rather Low Relevancy
3 = Medium Relevancy
4 = Rather High Relevancy
5 = High Relevancy
-1 = Don’t know
-9 = Not answered

[A315] Multiple Choice
Q21.3 - Reasons?
"If you answered with (c), (d), or (e) under 29., what might have negatively impacted motivation or acceptanc..."

A315_01 Complexity
A315_02 Lacking tradition
A315_03 Lacking practical relevance, e.g. trough scale level of analysis
A315_04 Lacking practical relevance, e.g. trough level of detail/vagueness of analysed ES
A315_08 Lack of understanding what ES are
A315_09 Lack of understanding of the added value of addressing ES
A315_06 Other
A315_07 Other
1 = Not checked
2 = Checked
A315_06a Other (free text)
A315_07a Other (free text)
Text input

[A307] Free Mentions
Q21.2 - Reasons - not ES?

A307 Number of mentions
A307x01 Mention 1
A307x02 Mention 2
A307x03 Mention 3
A307x04 Mention 4
A307x05 Mention 5
A307x06 Mention 6
A307x07 Mention 7
A307x08 Mention 8
A307x09 Mention 9
A307x10 Mention 10
Text input

[A306] Free Mentions
Q21.1 - Reasons?
"If you answered with (a) or (b) under 29., what might have positively impacted motivation or acceptance of s..."

A306 Number of mentions
A306x01 Mention 1
A306x02 Mention 2
A306x03 Mention 3
A306x04 Mention 4
A306x05 Mention 5
A306x06 Mention 6
A306x07 Mention 7
A306x08 Mention 8
A306x09 Mention 9
A306x10 Mention 10
Text input

[A316] Multiple Choice
Q21.4 - Reasons - not ES?

A316_01 Communication techniques inappropriate
A316_02 Communication techniques too elaborate/detailed/complex questionnaire
A316_03 Communication techniques not elaborated enough
A316_05 External factors, e.g. time restrictions of stakeholders
A316_06 External factors, e.g. financial restrictions of stakeholders
A316_07 External factors, e.g. lacking identification with/appreciation of project/study objective
A316_08 External factors, e.g. lacking relevancy of project/study objective
A316_09 Other
A316_10 Other
1 = Not checked
2 = Checked
A316_09a Other (free text)
A316_10a Other (free text)
Text input

[A311] Scale (fully labeled)
Q25 - Neg. Impact of ES?
"Did the ES approach support the participation process or did it pose a negative impact on the process?"

A311_01 Impact of ES approach
1 = ++ Overall positive impact
2 = + Rather positive impact
3 = +/- Balanced (equal positive and negative impact)
4 = - Rather negative impact
5 = - - Overall negative impact
-1 = Don't know/ Not applicable
-9 = Not answered

[A308] Multiple Choice
Q22 - Improvements?
"Based on your experiences, can you name topics you would put (more) emphasis on to improve participation pro..."

A308_02 No, there is no potential for improvements.
A308_03 Yes, the following issues can be improved
1 = Not checked
2 = Checked
A308_03a Yes, the following issues can be improved (free text)
Text input

[A310] Scale (fully labeled)
Q24 - Process or resutls?
"From your point of view, what was more important for supporting decision making in the scope of your study:"

A310_01 (1) participation process, or (2) actual study results?
1 = (1) was much more important
2 = (1) was more important
3 = (1) and (2) were equally important
4 = (2) was more important
5 = (2) was much more important
-1 = don’t
know
-9 = Not answered

[A312] Text Input
Q26 - Reference?
"If you like - and if available - you can now provide a published reference study to which you referred."

A312_01 [01]

Text input

[A317] Text Input
Q27 - Name
"If you are available for additional inquiry from our side if need be, please enter your data. Otherwise clic..."

A317_01 First Name
A317_02 Last Name
A317_03 E-Mail
A317_04 Comments (e.g. on your general experiences with ES and stakeholder participation)
Text input