Integrating stakeholder perspectives into environmental planning through social valuation of ecosystem services: Guidance and Prototype Applications

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Take-home messages

- Within the framework of an ecosystem service assessment, social valuation has the potential to make people´s opinions, beliefs and preferences visible in the decision-making processes.

- Set up a tailor-made social valuation procedure for your specific problem:
  - Be clear about the purpose and specific objectives for your specific problem.
  - Identify the stakeholders and addressees.
  - Consider the appropriate format.
  - Decide for coherent methods.

- Learn from experience:
  - We provide you with a **Catalogue of Prototype Applications**.
  - Connect with an established community of practices, for instance through .

- Be aware:
  - Perception and preferences of stakeholders might not be based on a comprehensive understanding of the ecosystem. They cannot replace biophysical assessments of ecosystem and ecosystem services.
  - Besides the concrete results of the social valuation, the process itself is likely to trigger changes in perception, knowledge and preferences of all partners.

Acknowledgements

We would like to thank all many practice partners that actively engaged in the social valuation studies described in the Catalogue of Prototype Applications. Further we would like to acknowledge the constructive feedback from members of the OPERAs userboard. This document is a product of the 7th framework programme of the European Commission in the project OPERAs (grant number 308393, www.operas-project.eu).

What is social valuation and why is it important?

Participatory and consultation processes have a great potential to find multi-functional, feasible and accepted solutions in regional environmental planning, natural resource management and nature conservation. They have the potential to foster synergetic solutions, reduce conflicts and increase acceptance and success of environmental planning, natural resource management and nature conservation (Reed 2008).

Over the past years, the Ecosystem Service concept (Box 1) has increasingly been used also in local and regional scale environmental planning. It encourages including not only ecologic and economic value of ecosystem services in such planning procedures, but also social values (Box 2).

Social – or often also referred to as socio-cultural – valuation of ecosystem services is the process of discovering what ecosystem services people value and how important they are to them. It is a way to bring in people's perspectives into the ecosystem service assessment which we strongly advocate (Box 3).

The social – or socio-cultural – value of an ecosystem or ecosystem services describes the importance it has to people. Such values can be utilitarian and experiential, namely how much people like to use or actively enjoy the ecosystem. Or they can be more intangible and related to transcendental or principle based values, for instance, how much people appreciate the existence of the ecosystem, that it can be used and enjoyed also by future generations. Social values can be individual or shared and they can often reflect the public good value of nature. Therefore, such values usually go beyond the domain of markets and exchange values. Instead they depend largely on the personal perception of individuals, and shared principles of a society (Chan et al. 2012).

Insights into peoples' perception and valuation of ecosystems play an increasingly important role in ecosystem management practices that are based on the ES concept as comprehensive Ecosystem Services Assessment requires capturing all three dimensions of value pertaining to ecosystem services: ecological/biophysical, social and economic value domains (Martín-Lopez et al. 2013).

BE AWARE: Social value is based on people´s perception and preferences. It might not be based on a comprehensive understanding of the ecosystem functioning and cannot replace biophysical assessments of ecosystems and ecosystem services.

Box 1: Brief introduction to the concept of ecosystem services and its application in regional environmental management.

Ecosystem services can be defined as the benefits people obtain from ecosystems (MEA 2005), or more specifically as the natural goods and benefits derived from functional ecosystems that sustain human life and wellbeing (Chan et al. 2012).

The concept of ecosystem services can help to address the conflict between human intervention and conservation needs. It gained a lot of political attention during the Millennium Ecosystem Assessment (MEA 2005) and is more and more streamlined for operational application.

There are many classification systems for ecosystem services. The Common International Classification of Ecosystem Services (CICES) is widely used within Europe, and differentiates between three main categories (Haines-Young and Potschin, 2012):

- provisioning services, such as food and water
- regulating and maintenance services, such as flood and disease control and natural cycles
- cultural services, such as recreation and cultural heritage

The concept of ecosystem services is designed to improve decision-making processes by identifying and quantifying shifts in ecosystem service supply, mainly through human intervention (De Groot et al. 2009). Studies have shown that in many cases of ecosystem conversion the natural state would provide greater economic benefits over time than the intended anthropogenic usage with its short-term benefit (Balmford et al. 2002). In Box 2, humans' dependency on

a functioning ecosystem and the provision of its services is further visualized and described.

For additional information about the ecosystem services concept and some illustrative examples of its operational application, watch this video: http://operas-project.eu/ESresearchtopractice.

Box 2: Linking human well-being to functioning ecosystems: the ecosystem service cascade

The relationship between human society and functioning ecosystems can be described in a cascade (Fig. 1). This cascade illustrates the dependency of human well-being on the biophysical structures, processes and functions of ecosystems to provide goods and services for human society. Humans benefit from goods and services that ecosystems supply them with, and they attribute values to them.

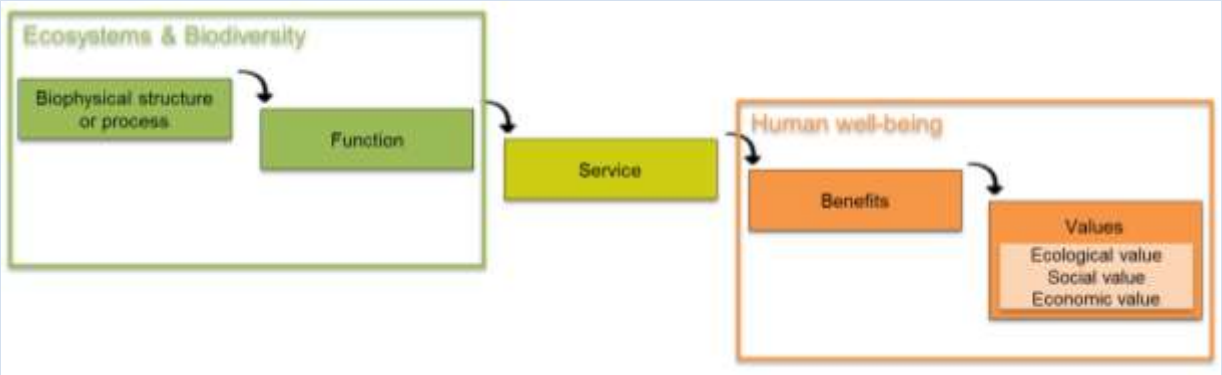

Figure 1: Framework for linking ecosystems and human well-being (adapted from Haines-Young & Potschin 2010)

These values are commonly divided into three complementary categories: ecological, social, and economic values (de Groot 2002, MEA 2005). Ecological values refer to biophysical units and thresholds that might be essential to maintain the functioning of the ecosystem in the long-term. The economic values refer to monetary units, which can be divided into market and non-market values. The social values reflect the perception and value people attach to an ecosystem service. They are usually measured in non-monetary terms, and can have a conceptual overlap to non-market economic valuation techniques (Koetse et al. 2015).

Provisioning, regulating, cultural and supporting services can all vary in their importance to people and therefore be subject of social valuation (Kenter et al. 2015, Scholte et al. 2015). In practice, however, economic market-based valuation has most often focused on provisioning services whereas social valuation has been used most often for intangible, mainly cultural ecosystem services.

Many large-scale assessments of ecosystem services have been criticized to ignore non-monetary social values (Chan et al. 2012). For regional and local scale assessments, we strongly recommend assessing and taking into account the social values of the ecosystem beneficiaries alongside that of experts and decision-makers.

In this document, we focus on the assessment of social values. We guide you to establish a tailor-made study to reveal social values for your specific purposes and provide a **Catalogue of Prototype Applications** that provides illustrative examples.

Box 3: The potential of social valuation.

The social value of ecosystems and ecosystem services – especially on local scale – are far from being self-evident. One of the big potentials of social valuation lies in the opportunity to identify and measure the importance, especially of non-material ecosystem services for the affected people and stakeholder groups. Such knowledge can be key in the elaboration of acceptable solutions in environmental planning.

But social valuation assessments are not only beneficial for the direct findings. By using techniques of social valuation, participants deepen their understanding of locally supplied ecosystem services and get the opportunity to close individual knowledge gaps. These important co-benefits on the individual level help to foster ecosystem appreciation and awareness. In addition to that, participatory approaches present a platform for collective discussions and mutual learning processes. Participatory formats therefore have the potential to capture existing collective transcendental meanings and values and overcome the designation of merely individual values.

Overall, social valuation can be of great significance for decision-making processes. The identification of social preferences and beliefs that are connected to a specific ecosystem combine the more abstract economic and ecological aspects with the personal reality of directly affected people – which has been one of the principle goals of the ecosystem service concept. Social valuation therefore represents a necessary element in the overall assessment of ecosystem services. At the same time, however, these social values, preferences, and opinions represent only one part of the entire puzzle and cannot replace for example the bio-physical aspects of an ecosystem service assessment.

This document builds on practical experience from case studies of the FP7 project OPERAs. This research project investigated the operational potential of the ecosystem services concept for practical environmental planning and natural resource management in 12 exemplary case studies. Experience and insights gained in social valuation from these case studies are manifold. They supported to elaborate guidance for the setting up further studies and build the basis for an illustrative **Catalogue of Prototype Applications** to learn from. More information on OPERAs is available under www.operas-project.eu.

Main steps towards a tailor-made social valuation procedure

Four main steps lead to a tailor-made social valuation procedure:

(1) Define purpose and specific objectives.

You need to be clear about the purpose and the specific objectives that you want to achieve with the social valuation. In the following section, we will present typical, but not exclusive purposes and objectives.

(2) Identify stakeholders and addressees.

Identifying the main stakeholders and addressees is crucial. The range of potential addressees extends from a small number of experts to the wider public. Make sure your targeted addressees cover a wide range of perspectives and add new or deeper insights in the decision-making process.

(3) Decide for an appropriate format for data collection.

The purpose of your study, the number of addressees, and their state of knowledge will be important constraints in selecting an appropriate format. You need to further consider whether your study focuses on revealing individual social values or on encouraging dialogue across stakeholder groups.

(4) Choose appropriate methods.

Finally, you will have to choose specific methods. We suggest a variety of methods for each of the formats which are explained in more detail in an Appendix: Inventory of Methods in the Appendix.

Step 1: Define purpose and specific objectives.

Social valuation serves mainly three purposes in environmental planning and management. Either it focuses on the assessment of the current social value of an ecosystem, on preferred future ecosystem states and acceptable trade-offs between ecosystem services, or it focuses on the identification of ill-defined stakeholder groups and their behaviour (Table 1). In most cases, the social valuation procedure will provide an overall social value, while revealing the variety of social preferences at the same time.

For any of these more general purposes, more specific objectives need to be detailed to set up your study. Table 1 gives some common examples within the multitude of specific objectives that can be followed by individual social valuation studies.

Table 1: Typical purposes for social valuation with examples for more specific objectives

Purpose of social valuation	Specific objectives
Assess current social value of an ecosystem and its services	1. Identify current social values 2. Measure current social values 3. Understanding the underlying reasoning for social values
Determine preferred future ecosystem states and acceptable trade-offs	4. Identify visions for future land management 5. Identify preferences and acceptable trade-offs between distinct management options 6. Develop and test feasibility of alternative land management
Identify involved stakeholders and potential beneficiaries, and their interactions.	7. Identify (diversity of) beneficiaries and stakeholders 8. Understand actor behavior

Each purpose and objective can be followed individually in a study. In many cases, you would want to start with a simple and clear objective. For instance, you would want to know what the ecosystem services are that visitors to the ecosystem of interest appreciate most. This question relates to Objective 1, which aims to identify the current social value of the ecosystem and the services it provides. Similarly you could identify, for instance, preferences for future management (Objective 5) or follow any other objective individually.

More complex social valuation assessments might have multiple purposes and objectives.. For example, studies may include stakeholder identification (Objective 7), the value they assign to the current state of ecosystem services (Objective 2) and their preferences for the future (Objective 5).

Step 2: Identify stakeholders and addressees.

People to be addressed include either individuals or representatives of groups

- who need to make the decisions in ecosystem management,
- who are affected by these decisions, i.e. beneficiaries of the ecosystem and its services, or
- who are particularly knowledgeable about the ecosystem and their management.

Social valuation processes can be tailored for one of these groups exclusively, or it can be designed to involve multiple stakeholders as to facilitate dialogue and social learning between these groups about the various values of ecosystems and ecosystem services in the study site.

Typical addressees include land owners, environmental managers, NGOs, organized interest groups, decision-makers (e.g. policy-makers, municipalities, park management), experts (e.g. consultants, planners, scientists) or the affected public (e.g. visitors, consumers, residents).

In many cases you will be aware of the main stakeholders. In some cases, you might be even able to contact them through formal institutions, such as cross-sectoral consultative platforms. In most cases, organic snowball-like networking has proven useful to establish contact between stakeholder groups outside and across formal institutions. A range of formal methods allow the systematic analysis and identification of stakeholders (described for instance in Reed et al. 2009).

BE AWARE: If stakeholder groups are diffuse or not organized, the identification of stakeholders can also be a main purpose of your social valuation study (see Table 1, Objective 7).

Step 3: Decide for an appropriate format for data collection.

For assessing social value, a wide range of formats is commonly used, including:

- Workshops
- Interviews
- Surveys
- Observation
- Document and media analysis

Which format is most appropriate for your assessment depends strongly on the purposes and objectives you follow (Table 2). The choice of formats is further constrained by the number of people addressed and how well-informed these addressees are. Each of these formats can be used to address (parts of) the public, selected stakeholders and/or experts.

Table 2: Typical data collection format for specific purposes and objectives, based on experience from the OPERAs exemplar cases

Purpose	Objectives	Workshops	Interviews	Surveys	Observations	Document and media analyses
Appreciation of current social values	(1) Identify social values	✓	✓			
	(2) Measure social values	✓		✓	✓	
	(3) Understand underlying reasoning	✓	✓			✓
Future preferences / acceptable trade-offs	(4) Identify visions for future LM	✓	✓	✓		✓
	(5) Identify preferences / acceptable trade-offs	✓		✓		
	(6) Develop and test feasibility of LM	✓	✓			
Identify stake-holders	(7) Identify stakeholders	✓		✓		✓
	(8) Understand actor behavior	✓	✓		✓	✓

These formats differ fundamentally in their degree of interaction between you (as a person who conducts social valuation assessment) and the addressees, as well as the interaction between addressees. Social learning may occur during interactions within workshops and therefore t the value that individuals would assign to an ecosystem services can be modified by such interaction (Liu and Opdam 2014). If the objective is to not only reveal social value, but encourage a dialogue across stakeholder groups, this can be accomplished by using a highly interactive format, such as a workshop setting.

Another decisive factor for the choice of format is whether your assessment aims for qualitative or quantitative data. If your objective is to measure social values (objective 2) or to identify preferences for future development (objective 5), survey techniques is preferable. If you are aiming for identifying social values (objective 1), understanding the underlying reasoning (objective 3) or identifying joint visions for future ecosystem management (objective 4), more open and in-depth formats, such as interviews or workshops,

could be more appropriate. Workshop formats are widely used in social valuation studies. They can cover quantitative as well as qualitative aspects. Another advantage of workshop formats is that it is possible to obtain data and knowledge about social values through deliberations during workshops and participants can also have the opportunity to connect and co-learn about the value of ecosystems as they share their own experience and debate the relative importance of nature to them within the workshop setting.

Step 4: Choose appropriate methods.

Each of the five formats allows for a variety of well-established methods to reveal social values and preferences (Table 3). The selection of the methods should allow capturing the desired outcome and stakeholder participation in the best possible way.

Further information on the listed methods can be found in an **Appendix: Inventory of Methods** (Appendix), and illustrative examples how to use and combine these methods in specific social valuation studies are provided in the **Catalogue of Prototype Applications**.

Table 3: Common methods for data collection for each data collection format (adapted from Scholte et al. 2016)

Workshops	Interviews	Surveys	Observation	Document and media analysis
• Expert workshops • Participatory workshop • Focus groups • Participatory mapping • Citizen juries	• Semi-structured interview • Unstructured interview	• Structured questionnaires (face-to-face interview, online, email) • Choice Experiment • Q method • Delphi techniques	• Participant observation • Unstructured observations • Structured observations	• Analyses of written texts • Analyses of social media channels • Analyses of other media (e.g. films, photos)

Catalogue of Prototype Applications

Ten prototype applications have been selected as illustrative examples to demonstrate the diversity of applications and to guide you on how to set up your own assessment. This selection covers the full range of purposes and objectives introduced in Step 1, a wide variety of the presented formats and methods and addresses different stakeholder groups.

Table 4 provides an overview. Select the preferred valuation and go to the Catalogue of Prototype Applications, where a one-page description of each of Prototype Application is presented. Each Prototype provides illustrative results and suggested use of the knowledge within decision-making. All Prototype Applications are drawn from the FP7 project OPERAs.

Table 4: Overview of prototypes on social valuation for different purposes and objectives

Main Purpose	Specific Objective	Prototype Application	Format					Methods/tools	Addressees		
			Workshop	Survey	Interview	Document	Observation		Public	Selected stakeholders	Experts
Appreciation of current social values	(1) Identify social values	Spatial planning and coastline management on the North County Dublin Coastline, Fingal	✓		✓			• Focus groups • Participatory mapping • Rating values • Scenario analysis		✓	
	(2) Measure social values	Visitor appreciation at the Pentland Hills Regional Park		✓				Structured questionnaire via face-to-face interviews, available also online	✓		
	(3) Understand underlying reasoning for social values	Estuary restoration and conservation planning at the Inner Forth Estuary, Scotland			✓			In depth face-to-face interviews using the interactive visual tool ("streamline")	✓		
Preferences and acceptable trade-offs in future ecosystem management	(4) Identify visions for future land management directions	A. Future visions based on visitor survey for the Pentland Hills Regional Park		✓				Structured interviews • On-site (tablet-based) • Online	✓		
		B. Conservation of traditional cultural landscape Montado	✓	✓				• Participatory workshops (regional and local) • Structured questionnaires via interviews and online + choice experiment	✓	✓	
	(5) Identify preferences and accepted trade-offs between distinct management options	A. Off-setting measures for housing development at East Lothian		✓				• Structured questionnaire via face-to-face interviews with choice experiment	✓		
		B. Wetland management strategies in the Kaikusha Marsh, Persina Natural Park, Lower Danube	✓	✓				• Expert workshops with multi-criteria analysis and supporting tool: mDSS • Structured questionnaire via face-to-face interviews		✓	✓
	(6) Develop and test feasibility of alternative land management	Future land use planning and implications for nature conservation and natural resource for Grenoble	✓					• Expert workshops with multi-criteria decision analysis (MCDA) • Structured preferences in combination with biophysical modelling		✓	✓
Beneficiaries/ actors/ stakeholders	(7) Identify stakeholders	Coastal dune restoration and management for Barcelona		✓		✓		• Social media analytics • Visual classification of images & videos • Text analytics on blogs, on online newspaper	✓	✓	
	(8) Understand actor behavior	Enforcing the protection of seagrass meadows at the Balearic Islands			✓			Semi-structured face-to-face Interviews (on perception and governance)		✓	✓

(1) IDENTIFY SOCIAL VALUE

Exemplary case	Spatial planning and coastline management on the North County Dublin Coastline, Fingal
Aim	Better understanding of the social value of Fingal coastline for improved spatial planning by Fingal Local Authority
People Addressed	Users and stakeholders including the public (residents), NGOs, fishing, coastal recreational businesses, community groups
Methods	Focus groups, participatory mapping, rating values, scenario assessment and individual interviews
Formats	3 workshops between October 2014 and February 2016, Feedback & Dissemination seminar in August 2016

Source: Deidre Joyce

Exemplary results

The study identified the benefits of the Fingal coastline to a large range of stakeholders, and how these benefits were valued by different stakeholders. The process allowed the participants the opportunity to acknowledge the benefits flowing from coastal ecosystem and make their tangible as well as intangible value explicit (Fig. 1.1 A+B). It informed the planners and decision-makers where these benefits are located and identified spatial hotspots of social value (Fig. 1.2). Further, it revealed expected changes in value against development scenarios which anticipated land use change along the coastline with Fig. 1.1 A+B showing the results of ratings for tangible and intangible social values before and after taking the anticipated change into account.

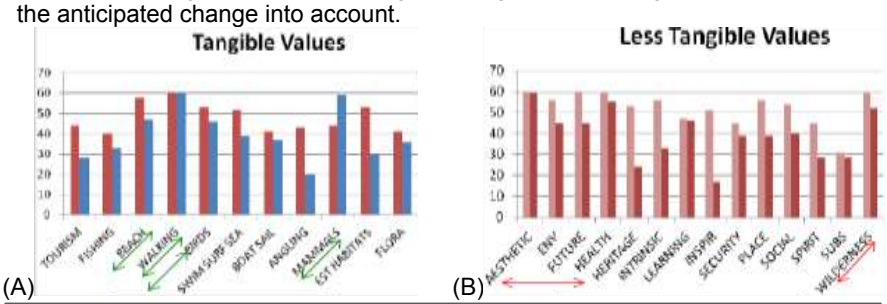

Fig 1.1: Rating of tangible and intangible values of the Fingal Coastline, without and with anticipated change (first and second column)

Fig 1.2: Map of social value for the Fingal Coastline.

Use of the results	The results of the study were presented to a cross-section of executives from Fingal Local Authority as part of a feedback and dissemination seminar. Representatives from various departments including spatial planning, natural heritage, water, parks and engineering and of the County Council attended. After the event, the councilor decided to propose amendments to the County Development Plan to take an ecosystem services approach, incorporating social valuation at the policy level. Guidelines on the process of social-cultural valuation are being devised for the local authority.
Contact	Deirdre Joyce (deirdre.joyce@ucdconnect.ie) and Craig Bullock (craig.bullock@ucd.ie), UCD, Dublin.
References and further sources	• Fingal study on OPPLA: http://www.oppla.eu/casestudy/139 • Fingal study on the OPERAs website: http://www.operas-project.eu/node/317 • Joyce, D., Bullock, C. 2016. Making Cultural Services Count in Policy and Decision Making. EU Ecosystem Services Partnership (ESP) Conference. Antwerp. Sept. 19-23, 2016. http://www.esconference2016.eu/86157/wiki/211589/book%20of%20abstracts#.WK2HrW-LTIU • Bullock, C., Joyce, D., Collier, M.J., Scholte, S., Zanten, B., Verburg. P., van Teeffelen, A., Schmidt, K., Walz, A. 2015. Strategies and methods for social valuation of ecosystem services. OPERAs Project Report. Deliverable 3.5. http://www.operas-project.eu/resources • Joyce, D., Bullock C., Collier, M.J. 2016. Social Valuation and its relevance for Land Use Planning. Dissemination and feedback session to Fingal Local Authority, Aug 2016. Dublin: http://operas-project.eu/node/317

(2) MEASURING SOCIAL VALUE

Exemplary case	Visitors appreciation at the Pentland Hills Regional Park, Scotland
Aim	Learning about user profiles and perceptions of ecosystems and ecosystem services
People Addressed	Visitors and users, interested public
Methods	Structured questionnaires via face-to-face interviews and online
Formats	Interviews (July-Aug 2014: 454) Online survey (Aug-Oct 2014: 109)

Source: Katja Schmidt

Exemplary results

The survey highlights the role of the Pentland Hills as a recreational asset for visitors mostly from Edinburgh and adjacent councils. Since 2006, the portfolio of activities has changed towards a broader range of activities, that include, e.g., mountain biking and running.

The socio-cultural valuation of ecosystem services was performed using a rating (importance on scale from 1-5) and ranking approach (allocate a total of 100 points across 9 ecosystem services). The rating exercise revealed fairly high values for all ecosystem services in general, and also showed that the values for the ecosystem services rated higher for societal needs in general ("others-oriented") than for the individual ("self-oriented") (Fig. 2.1A). The ranking exercise indicates particularly high values for physically using nature and the landscape (by walking, running, fishing, etc.), experiencing nature and habitat/biodiversity (Fig. 2.1B).

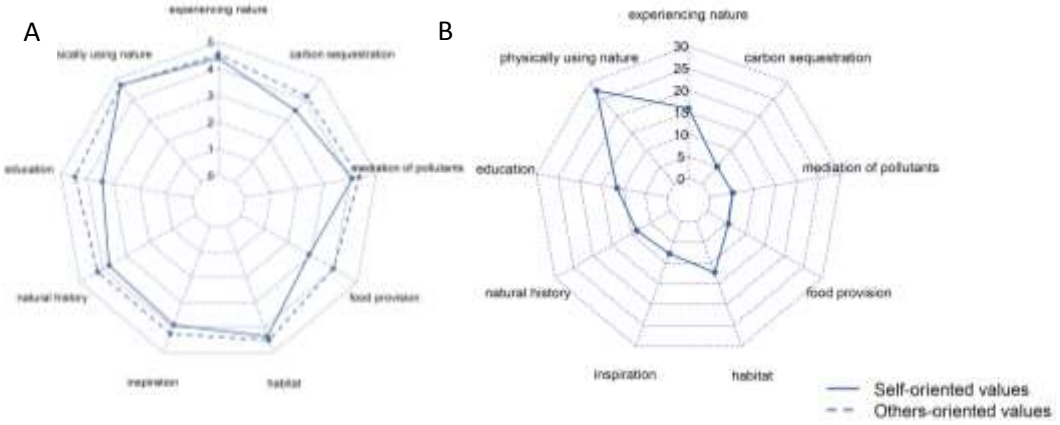

Fig. 2.1: Results of the socio-cultural valuation of ecosystem services in the Pentland Hills Regional Park, (A) Mean results of rating (scale 1-5) and (B) mean results of weighting (allocation of 100 points)

Use of the results

The survey results were shared between the multiple organs of the park management, including responsible decision-makers, land owners, and further stakeholder representatives.

They could demonstrate (1) the high overall appreciation of the park by users, (2) their appreciation of the park not only for recreational purposes, but also its regulating effects, and (3) the dynamics in park users, which underpins the need for appropriate infrastructure adaptation to avoid an increase in negative ecosystem impacts and user conflicts.

Contact

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(3) UNDERSTAND UNDERLYING REASONING FOR SOCIAL VALUES

Source: www.weadapt.org

Exemplary case	Estuary restoration and conservation planning at the Inner Forth Estuary, Scotland
Aim	Understanding how people that live and work in the area value their landscape and the ecosystem services it provides.
People Addressed	Interested public and stakeholders
Methods	In-depth one-on-one interviews using the graphically supported STREAMLINE format, to engage in a two-way, interactive and thought provoking consultation.
Format	Interviews (Feb to June 2016: 22)
Exemplary results	Early results showed a great appreciation of the local landscape, in particular among participants from socially disadvantaged backgrounds. Especially cultural ecosystem services, such as the potential for recreation, are highly valued, alongside the natural environment's contribution to quality of living. The area's unlocked potential for (eco)tourism was highlighted by multiple stakeholders as an avenue for sustainable jobs creation to rejuvenate the waning industrial towns dotted throughout the region. Sustaining habitat and wildlife was cited as a key priority, along with jobs provision and flood protection.

Fig 3.1: Canvas examples, Source: Aster de Vries Lentsch

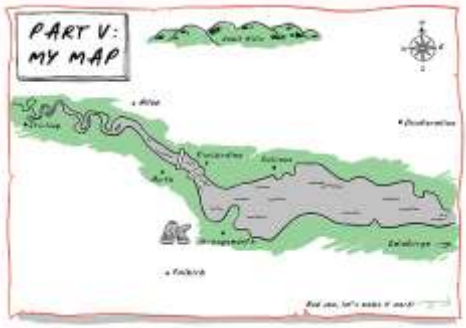

Fig 3.2: Canvas for the Inner Forth, Source: Aster de Vries Lentsch

Use of the results	Based on the gathered data a set of visions will be collated for the future of the area, which will be analyzed for common grounds, tensions, opportunities and threats. These in turn will feed into recommendations for a lottery funded regional development project, the Inner Forth Landscape Initiative, and will be presented to stakeholders at the Forth Estuary Forum annual conference. The results will also be published in report and an open access academic paper. Moreover, the project was able to show that the interactive STREAMLINE format served as a convenient methodology and was well received by the participants.
Contact	Aster de Vries Lentsch (aster.devrieslentsch@ed.ac.uk), Univ. of Edinburgh, Scotland
References and further sources	• Inner Forth Estuary study on Oppla: http://oppla.eu/casestudy/130 • More information about the format and methods: www.streamline-research.com • Inner Forth Landscape Initiative: http://www.innerforthlandscape.co.uk/ • Forth Estuary Forum: http://www.forthestuaryforum.co.uk/

(4A) IDENTIFY VISIONS FOR FUTURE LAND MANAGEMENT

Exemplary case	Future visions based on visitor survey for the Pentland Hills Regional Park
Aim	Assessment and visualization of landscape preferences
People Addressed	Visitors and users, interested public
Methods	Structured interviews, on-site (tablet-based) and online
Format	Interviews (July-Aug 2014: 454) Online survey (Aug-Oct 2014: 109)

Source: Katja Schmidt

Exemplary results

The visitors´ preferences for future management reveal that many visitors wish only for limited changes over the next 10 to 15 years. When looking more closely into preferences for future landscape management, we can identify five preference clusters. Almost 50 % of the respondents classify as “nature enthusiasts” supporting enhanced biodiversity and nature conservation while maintaining the great inspirational value of the park. Smaller clusters include the “forest enthusiasts” favouring an increase in native forest in parts of the Pentland Hills, the “recreation seekers” wishing for an enhanced recreational infrastructure, the “multi-functionalists” for whom the generation of wind energy would be acceptable to some degree, and the “traditionalists” who favour the current park management.

Fig. 4A.1: Identified preference clusters, Source: Schmidt et al. 2016

Use of the results

The topic of future landscape management directions was taken up amongst the park management and a superior authority. Additionally, a formal dialogue was initiated with land owners, and further stakeholder representatives. With the expected changes in the environmental and agricultural policy, social and climate change as well as financial constraints of the public sector, the future directions of park management are becoming a more and more relevant topic. After this impression of visitor perception, also the core management organs of the PHRP (i.e. the joint committee and the consultative forum) took up the discussion. A pilot study aiming towards developing a collaborative approach to land use and management was a first and promising opportunity to address this topic in the park.

Contact

Katja Schmidt (schmikat@uni-potsdam.de) and Ariane Walz (awalz@uni-potsdam.de), Univ. of Potsdam, Germany.

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(4B) IDENTIFY VISIONS FOR FUTURE LAND MANAGEMENT

Source: www.operas-project.eu

Exemplary case	Cultural Landscapes in the Montado, Portugal
Aim	(1) Identifying perceptions of benefits by different stakeholders at different scales (2) Understanding perceptions of present and future trends of the system, and (3) Identifying preferences in future Montado management
People Addressed	Land managers and owners, environmental NGO's representatives, municipalities, interested public
Methods	Participatory workshops (regional and local scales), Structured questionnaires for interviews including contingent valuation for scenario management preferences (local scale), Structured online questionnaire, with choice experiment on management preferences (national scale)
Formats	Workshops (April 2014, Dec 2015, April 2016, May 2016, June 2016) Interviews (Nov 2015-April 2016) Online survey (pilot in Aug 2016; full survey in Nov 2016)
Exemplary results	The results of the workshops and the surveys show that, both at the regional and the local scales, regulating and supporting ES are more valued by the stakeholders, followed by provisioning ES, while cultural ES were seldom selected as important. "Tree mortality" and "Severe drought" were the most plausible future scenarios for the Montado, according to stakeholders at the regional scale, emphasizing a decrease in of ES delivery in both scenarios.

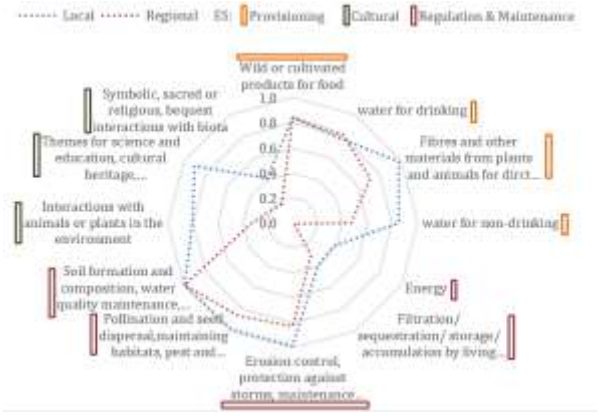


Fig 4B.1 Workshop results for ecosystem services (ES) valuation by the montado stakeholders at local and regional scales.

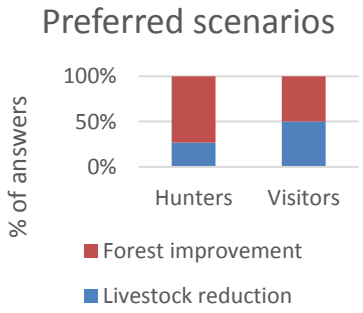


Fig 4B.2 Results for willingness to pay for different management scenarios at the local scale.

	The survey also indicated that hunters and visitors do not show a high willingness to pay for different management scenarios. However, for those willing to pay, hunters showed preference for an improved forestry solution, while visitors didn't demonstrate a clear preference. At the national scale results are not yet available as data collection is still on-going.
Use of the results	With the current threats and drivers of change, the future of the Montado is at stake and it is a relevant issue for several sectors of the Portuguese society. Although the results of workshops have been shared between the participants, a final workshop is being prepared to disseminate and discuss the results across workshops. Other formats of results dissemination are being considered since stakeholders stated the importance of transferring this knowledge both to citizens and decision makers. The creation of a stakeholder platform for the montado (Montado Community of Practice) is a promising avenue to discuss and promote a sustainable management of the system.
Contact	Inês Rosário (itrosario@fc.ul.pt) and Margarida Santos-Reis (mmreis@fc.ul.pt) University of Lisbon, Portugal.
References and further sources	• Montado study on the OPPLA: http://www.oppla.eu/casestudy/136 • Video of Montado study on OPERAs website: http://www.operas-project.eu/node/319 • LTsER Montado platform: http://ltsermontado.pt • Video of one of the workshops https://www.youtube.com/watch?v=8BQwTro7lV • Vasconcelos, L., Rosário, I., Caser, U., Ferro, F., Rebelo, R., Máguas, C, Santos-Reis, M. 2016. Building a Community of Practice for the Portuguese "Montado" – Capacitating Collaborative Management. World Congress Silvo-Pastoral Systems, Évora. 27-30 September 2016 • Rosário, I.T., von Essen, M., Nicholas, K., Koetse, M., Máguas, C., Rebelo, R., Santos-Reis, M 2015. Valuing Ecosystem Services in the Montado Landscape: the OPERA's Project Approach. 4º Encontro Ibérico de Ecologia. Coimbra, 16-19 June 2015. •

(5A) IDENTIFY PREFERENCES AND ACCEPTED TRADE-OFFS BETWEEN DISTINCT MANAGEMENT OPTIONS

Exemplary case	Off-setting the impact of housing development in East Lothian, Scotland
Aim	Assessing to what extent people are willing to 'offset' the environmental impacts from urban development through woodland restoration in a rural to peri-urban environment.
People Addressed	Local rural and peri-urban residents
Methods	Choice experiment using housing as a cost attribute (i.e. without a monetary payment vehicle) based on structured face-to-face interviews

Source: www.iha.com

Format	Interviews (Oct 2014: 285)
Exemplary results	Results from the choice experiment show that respondents who felt most affected by additional housing (predominantly rural residents with long residence times) were least willing to accept woodland restoration as a way to compensate for the losses incurred by additional residential development. This is most likely because these residents do not only perceive additional housing as a threat to the landscape, but also as a threat to their own identity. The people who were most willing to make the trade-off between higher levels of housing with high levels of compensation and low levels of housing with no compensation, were respondents who thought that additional housing may have environmental impacts, but is also necessary to fulfil the increasing demand for housing. By also giving different options on possible woodland restoration, the restoration of broadleaved and softwood forests was seen as most valuable for preserving biodiversity and wildlife. Generally, the findings indicate that there is over- all support for the general idea of biodiversity offsets.

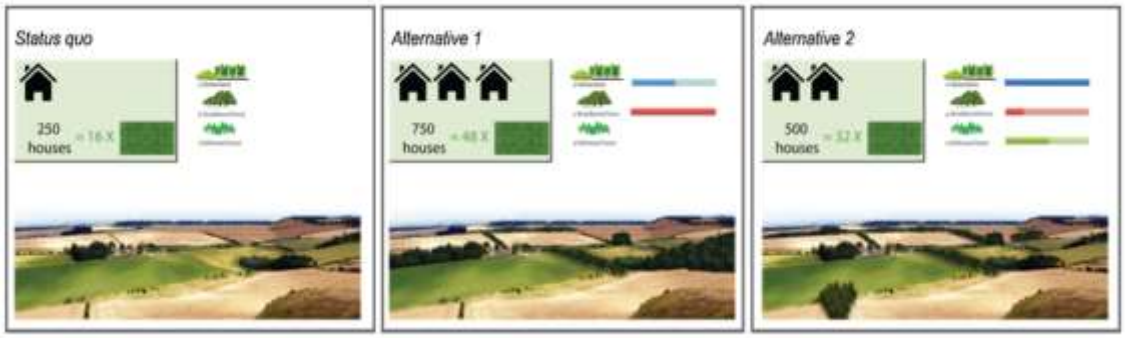


Fig. 5A.1: Choice card example, Source: Scholt, S.S.K. et al. 2016

Use of the results	The results show that any effort to achieve a 'no-net-loss' of ecosystem services (which is an explicit aim in the EU biodiversity strategy) should firstly begin by identifying: a.) who is affected by the proposed change, b.) how people are affected by the proposed change (e.g. in East Lothian recreation was not perceived to be threatened by additional housing, lowering the need to compensate for urban development by creating more space for nature-based recreation) c.)how those affected can and should be compensated.
Contact	Samatha Scholte (samantha.scholte@vu.nl) and Astrid van Teefelen (astrid.van.teeffelen@vu.nl), Vrije Universiteit Amsterdam, The Netherlands.
References ar further source	• East Lothian study on OPERAs website: http://www.operas-project.eu/sites/default/files/resources/astrid-ecosystem-services-offset-urban-development-east-lothian.pdf • Scholte, S.S.K., van Zanten, B.T., Verburg, P.H., van Teeffelen, A.J.A. 2016. Willingness to offset? Residents' perspectives on compensating impacts from urban development through woodland restoration. Land Use Policy, 58, 403-414. doi:10.1016/j.landusepol.2016.08.008.

(5B) IDENTIFY PREFERENCES AND ACCEPTED TRADE-OFFS BETWEEN DISTINCT MANAGEMENT OPTIONS

Source: OPERAs-project.eu

Exemplary case	Wetland management of Kaikusha Marsh, Persina Natural Park, Lower Danube, Bulgaria
Aim	Testing preferences of real-life management options for the Kaikusha marsh, including for instance, opportunistic reed removal coupled with economic use of the biomass, a three-year mosaic mowing cycle and business-as-usual
People Addressed	Stakeholders, such as fishermen, nature park management, farmers, and also non-expert local stakeholders
Methods	• Expert workshop to (1) elaborate management scenarios, (2) define a set of criteria for multiple impacts, and (3) quantify impacts of management scenarios based on earlier studies. • Face-to-face interviews with public based on a structured questionnaire to identify preferences in the criteria. • Formal analysis of the preferences in the multi-criteria analysis (using the mDSS tool)
Format	Workshop (May 2016: experts only) Face-to-face interviews (April-May 2016: 10 interviews)
Exemplary results	The results showed that the current management is unsatisfactory for all participants in the survey. The business-as-usual scenario with no reed removal which leads to desiccation of the marsh and consequent loss of economic value was consistently rated very low. Instead, stakeholder preferred some reed removal for better economic use of the marsh. The highest preferences were attributed to both management options including periodic mowing of selected sections of the marsh, either by opportunistic reed removal or as part of a regular mowing cycle.
Use of the results	The pilot study highlighted the consensus to change the management of the Kaikusha marsh and revealed explicitly the conflicting perspectives of different stakeholder groups. This provides the decision-makers the opportunity to deal with these conflicts more openly during the planning process. Multi-criteria analysis, here supported by the mDSS tool, was generally found very helpful to reveal and deal with conflicts in such planning processes.
Contact	Apostol Dyankov (adyankov@wwfdcp.bg), WWF Bulgaria, and George Cojocaru (gco@tiamasg.com), TIAMASG Foundation, Romania.
References and further sources	• Danube Study on OPPLA: http://oppla.eu/casestudy/133 • Danube Study on OPERAs website: http://www.operas-project.eu/node/322 • mDSS on OPPLA: http://oppla.eu/marketplace • Instructions and download of the mDSS: http://www.netsymod.eu/mdss/

OPTIONS:	Score:	%(relative to first position)
Mosaic Mowing	0.7878	100%
Cleaning channels	0.7783	99%
Partial mowing	0.6961	88%
Opportunistic mowing	0.575	73%
In situ	0.4882	62%
BAU	0.3393	43%
Fire prevention	0.1661	21%

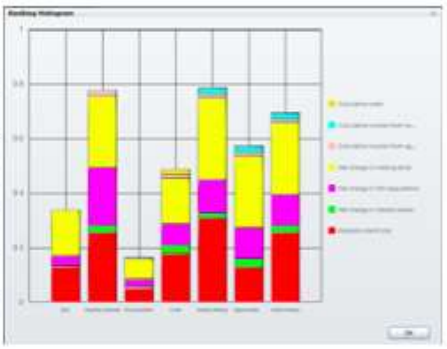


Fig 5B.1: Exemplary results of the mDSS software comparing management options.

(6) DEVELOP AND TEST FEASIBILITY OF ALTERNATIVE LAND MANAGEMENT

Exemplary case	French Alps: Land use and ecosystem services in the Grenoble Urban Area
Aim	(1) Co-constructing alternative future options for land planning and management (2) Co-evaluating their implications for nature conservation and ecosystem services depending on structured preferences
People Addressed	Local government, urban planners, nature conservation managers and NGOs, agriculture, forest and nature managers, tourism stakeholders
Methods	• Scenario development using a four-step participatory approach with scientists and stakeholders, and following translation to land use maps using modeling. • Selection of focus ecosystem services to by stakeholders with respect key management and land planning issues • Assessment of current and modeled future bundles of ecosystem services using multi-criteria analysis (MCA), with to by stakeholders criteria and assessment rules developed by stakeholders according to management priorities.
Survey period	Workshops (4 workshops between September 2013 and June 2016)
Exemplary results	The MCA demonstrated that multifunctionality cannot necessarily be achieved by ecological trade-offs, nor does it actually meet stakeholder goals and values, e.g. for nature conservation.
Use of the results	Land planners and managers will use the results to support debates on specific issues such as the multiple values of biodiversity corridors, rural development planning, or the design of biodiversity offsetting plans.
Contact	Sandra Lavorel (sandra.lavorel@univ-grenoble-alpes.fr), CNRS, Grenoble, France
References and further sources	• Grenoble Study on OPPLA: http://www.oppla.eu/casestudy/135 • Grenoble Study on OPERAs website: http://operas-project.eu/node/323 • Communication site of the Grenoble study in French: http://www.projet-esnet.org/ • One of the Workshops in the OPERAs News blog: http://www.operas-project.eu/news-article/2014-03-27-000000 • Bierry, A., Lavorel, S., 2016. Implication des parties prenantes d'un projet de territoire dans l'élaboration d'une recherche à visée opérationnelle. Sciences, Eaux & Territoires in press. • Lavorel, S., Bierry, A., Vannier, C., Crouzat, E., Lasseur, R., Byczek, C., Nettier, B., Cordonnier, T., Longaretti, P.-Y., Rolland, A., 2016. Scenarios and models of biodiversity and ecosystem services for land use planning, ScenNet: Scenarios and models of biodiversity and ecosystem services in support of policy, Montpellier, France. • Vannier, C., Bierry, A., Longaretti, P.-Y., Nettier, B., Cordonnier, T., Chauvin, C., Bertrand, N., Lasseur, R., Lavorel, S. In preparation. Co-constructing future land-use scenarios for the Grenoble region, France.

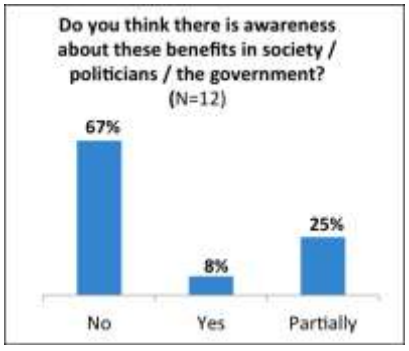
(7) IDENTIFY STAKEHOLDERS

Source: J Lascurain SGM

Exemplary case	Urban coastal dune and sand management for resilient beaches at Barcelona.
Aim	(1) Identification and clustering of the different stakeholder groups (2) Identification of underlying narratives and moral orders (3) Early identification of potential polarization risks by competing moral orders on trade-offs (4) Quantification of capacity of generating opinion trends (5) Identification of information gaps
People Addressed	Identification of affected members of the public, including not formally organized groups and relevant stakeholders
Methods	Mapping / counting visitors for beach stretches, social network analysis, social media listening & analytics, visual classification of images & videos, text analytics on blogs, comments on online news (tag clustering, word clouds, phrase nets, word trees)
Format	Observation Interviews Document and Media Analysis (2015-2017)
Exemplary results	 Fig 7.1: Key words could from social media Fig 7.2: Revealed CES preferences for different beaches The social network analysis showed that the importance of various cultural ecosystem services (CES) differ between the beaches of Barcelona (see Fig 7.2). An analysis of the stakeholder interaction also revealed that there are big information gaps and strong differences in social media visibility among actors. Additionally, strong differences in the perception of environmental impacts and acceptable trade-offs can be identified. Social media listening is useful to identify CES preferences and its spatial variation as well as for early warning systems to avoid polarization and eco-chamber processes.
Use of the results	Building on the findings of the social network analysis, an alternative governance scheme is being discussed on the coastal defense scheme. It will probably be approved in 2017. Information gaps in the social networks were identified and led to new opportunities of use for social media to promote knowledge and solve trade-offs.
Contact	Josep Lascurain (lascurain@sgm.es), Consultora de Servicios Globales Medioambientales, Barcelona, Spain.
References and further sources	• Barcelona study on OPPLA: http://www.oppla.eu/node/17510 • Barcelona study on OPERAs website: http://www.operas-project.eu/node/318 • Link to Pinterest site http://ow.ly/g8K2309i4hD

(8) UNDERSTAND ACTOR BEHAVIOUR

Source: ww.opperas.eu

Exemplary case	Value and governance of Posidonia seagrass meadows for the Balearic Islands, Spain
Aim	(1) Better understanding of the perceptions of seagrass systems and why regulations to release pressures on seagrass meadows are not effective (2) Learn about perception of benefits provided by seagrass meadows of Posidonia amongst different actors (3) Identify perceived pressures on Posidonia amongst different actors seagrass meadows (4) Assess the governance system surrounding Posidonia
People addressed	Representatives of government, NGOs, recreational businesses, commercial and recreational fisheries, and the general public
Methods	Semi-structured face-to-face interviews
Formats	Interviews (perceptions: stakeholder representatives May-June 2015, general public March 2017; and on governance: April-June 2016)
Exemplary results	Results shows a ranking of the perceived importance of the different benefits derived from Posidonia and the pressures that degrade this ecosystem. Furthermore, results show the difference in awareness between the main stakeholder groups that are generally well informed and the general public who is mostly unaware of the role that Posidonia plays for society.  Fig 8.1: Exemplary interview result Source: Manu San Félix Regarding governance, results reveal that stakeholders consider the amount of existing regulations to reduce pressure on Posidonia as sufficient. Yet, a simplification, application and enforcement of these regulations is needed. Interviewees consider that this will only happen through public awareness raising of the role of Posidonia.
Use of the results	The social valuation study identified considerable knowledge gaps among many stakeholders, including the public, as a crucial bottleneck in the implementation of existing regulations. Non-professional actors are not aware of the benefits seagrass meadows provide to society and how these serve private interests. Furthermore, people generally lack knowledge about existing regulations, and therefore do not comply with them. Informing and educating key actors and the public is therefore seen an effective way to better enforcement of regulations and release pressure on seagrass meadows. But even for professional stakeholders, such as commercial fishers and local authorities, the existing regulations turned out to be over-complicated and un-practical which hinders their enforcement even amongst the professionals.
Contact	Ana Ruiz (anaruiz@imedea.uib-csic.es) and Núria Marba (nmarba@imedea.uib-csic.es), IMEDEA, Illes Balears, Spain
References and further sources	• Balearic study on OPPLA: http://www.oppla.eu/casestudy/134 • Balearic study on OPERAs website: http://operas-project.eu/node/320 • Balearic study in the OPERAs News blog: http://www.operas-project.eu/Surfseagrassandsustainablesands • Ruiz-Frau, A., Gelrich, S., Hendriks, I.E., Duarte, C.M., Marbà, N. Under review. Seagrass Ecosystem Services: from buzzword to practice. Ecosystem Services. • Ruiz-Frau et al. In preparation. Socio-cultural valuation: how should we take it into account?

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Appendix: Inventory of Methods

Workshop techniques			
Methodology	**Characteristics**	**Usage**	**Illustrated references**
Expert workshop	This workshop method is designed to gather the existing knowledge on a certain issue/case study. Respective experts are invited to present and discuss their experiences and focus towards a specific subject.	This method is used for the free exchange of information and to gather objective in-depth knowledge during the initiating process of a project. Additionally, it is useful to get an overview of the relevant stakeholders.	Fischer, A., Wentholt, M., Rowe, G. 2013. Expert involvement in policy development: A systematic review of current practice. Science and Public Policy, 41(3): 332-343.
Participatory workshop	The participatory workshop is open for a broad range of participants. This format seeks to create a supportive environment in which learning (on a specific subject) takes place. The moderator merely facilitates an open learning process by the exchange of ideas and experience between the participants. Additional expertise or experience from the moderator is not necessarily needed. To get the involvement of the participants, ample methods are available.	Participatory workshops are an interesting option to start an interaction with and between different stakeholder groups. It is an open process, where the participants are given the opportunity to learn from each other or get to know different perspectives. The workshop needs careful preparation to get meaningful and satisfactory results.	Chambers, R. 2002. Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities. Earthscan. New York. Seedsforchange. Facilitating Participatory Workshops. https://we.riseup.net/assets/25682/FacilitatingWorkshops.pdf .
Focus groups	The timeframe of this group format is usually set between 45 - 90 minutes. The best group size is between 6 -10 participants. The process is led by a guided group discussion on a particular topic. It is structured through a set of carefully predetermined questions (not more than 10) with a free flowing discussion. The quality of results is highly sensitive to the individual planning and execution process. Here, for example, the group mix (e.g. age, sexes, social and professional backgrounds) should be considered, due to its influence on results.	The method uses group dynamics to generate information and a deeper understanding on collective views and participants' experiences or beliefs. It is also useful for preliminary data collection to prepare a follow-up questionnaire.	Kitzinger, J. 1995. Introducing focus groups. BMJ, volume 311: 299-302. Nagle, B, Williams, N. o.J. Methodology Brief: Introduction to Focus Groups. Center for Assessment, Planning & Accountability. Morgan, D. L. (1997). Focus groups as qualitative Research. In: Qualitative research methods series, 2. Edition.
Participatory Mapping	Participatory mapping is a group-based map-making process that attempts to visualize the association between land and local communities on a defined	The method is primarily used to represent a communities' priorities, needs and also knowledge in land-use planning and	International Fund for Agricultural Development / IFAD 2009. Good practices in participatory mapping.

	spatial scale. Participatory maps are planned around a common goal and strategy for use and are often made with the input from an entire community in an open and inclusive process. For this method, minimal intervention from moderator is required. For the mapping process there are also tools available, ranging from multimedia and internet-based mapping tools to GIS applications.	resource management. It is helpful to identify (spatial) conflicts and hotspots. The possibility, to articulate their situation is also beneficial for networking and communication to strengthen bonds and the solidarity among a community.	
Scenario Analysis	Scenario analysis is a systematic process where a set of four to five plausible and contrasting narratives of a future development is created. It is usually divided into five different phases: 1) identification of the scenario field, 2) identification of key factors, 3) analysis of key factors, 4) scenario generation, and if necessary 5) scenario transfer. The (often) opposing scenarios visualize consequential social, political, economic and technological impacts. The scenarios should be participatory process together with key decision-makers, experts and stakeholder representatives.	The scenario analysis is an effective tool to develop and analyse prospects of changes in ecosystem service provisioning and possible trade-offs. It augments the understanding of future effects on present decision-making. A visualization of possible outcomes helps therefore to minimize risks and provides a solid base for informed decisions and enhanced consensus.	Aplizar, F. and Boavarnick 2013. Targeted scenario analysis: a new approach to capturing and presenting ecosystem service values for decision making. UNDP. Kosow, H., Gaßner, R. 2008. Methods of future and scenario analysis: Overview, assessment and selection criteria DIE Studies 39. USB Köln. ValuES Method Database: http://aboutvalues.net/method_database/
Citizen juries	The process of citizen juries involves the creation of a “jury” with a representative sample of citizens (usually selected randomly or in stratified manner). They are briefed in detail on the respective background and current situation on a specific issue or project. The concerned issue will be one that affects the community. The “jury” then has to decide between a range of alternatives and present their decision as they would in legal juries.	Citizen juries as participatory processes involve the community in the decision-making process in a representative manner. They are intended to complement other forms of consultation, as the “evidence” (values, concerns, etc.) has to be gathered beforehand.	EPA 2017: Public Participation Guide: Citizen Juries. https://www.epa.gov/international-cooperation/public-participation-guide-citizen-juries

Interview techniques			
Methodology	**Characteristics**	**Usage**	**Illustrated references**
Structured interview	Structured interviews are verbally administered questionnaires with a list of predetermined questions. In this type of interview, there is no flexibility for variations or optional follow-up questions to responses.	The interviews are quick and easy to administer and are used for clarification of certain questions. However, this method only allows limited participant responses and is not suited for an in-depth interview format.	Taylor, S.J., Bogdan, R., DeValt, M. 2016. Introduction to Qualitative Research Methods: A Guidebook and Resource. 4th edition. Ney Jersey.
Semi-structured interview	Semi-structured interviews are composed of several prepared key questions to define the field of interest. In addition, they give the opportunity of flexible follow-up questions to pursue important insights, discoveries and allow therefore the elaboration of information.	The method is considered to be average in time-consuming. It is used to gather detailed personal insights of views, experiences, beliefs and motivations towards a specific subject. This leads to a deeper understanding of social phenomena than would be obtained from, e.g. a questionnaire. The method is especially appropriate when dealing with sensitive or problematic topics. Usually, the in-depth interview is composed of a semi-structured format.	Taylor, S.J., Bogdan, R., DeValt, M. 2016. Introduction to Qualitative Research Methods: A Guidebook and Resource. 4th edition. New Jersey.
Unstructured interview	Unstructured interviews are long-lasting formats which can last up to several hours. There are no preconceived theories or predetermined questions required. Nonetheless, it could start with an open question.	The method is highly time-consuming and especially useful for a significant in-depth approach for (sensitive) topics where detailed insights are required. It gives the opportunity to learn about totally new subject areas where little prior knowledge on the studied phenomenon is available. Still, for the researcher it is important to have a clear agenda for the inquiry.	Cohen D, Crabtree B. "Qualitative Research Guidelines Project." July 2006. http://www.qualres.org/HomeUnst-3630.html Gill, P., Stewart, K., Treasure, E., Chadwick, B. 2008: Methods of data collection in qualitative research: interviews and focus groups. British Dental Journal 204: 291-295.
STREAMLINE technique	The streamline method consists of a set of A3 canvasses and combination of image tiles, writing and storytelling, which allow an interactive approach to capture the interviewees' point of view. It combines the flexibility and depth of a semi-structured interview with the rigour of a structured session so rich data can be gathered in relatively little time.	Streamline's open and interactive format gives the interviewee the freedom to lead the interview towards his/her personal priorities. Therefore, the method is best used within a fixed frame on a specific case study (e.g. spatial planning or landscape scale conservation).	http://www.streamline-research.com/format De Vries Lentsch A & Metzger M. Forthcoming. Bonkers but Good" Introducing the STREAMLINE format. International Journal for Biodiversity and Ecosystem Services Management.

Survey techniques			
Methodology	**Characteristics**	**Usage**	**Illustrated references**
Structured Questionnaire	Questionnaires are based on predetermined questions and / or stated preferences. For a valid data collection and meaningful results, a representative sample size is required. Typically, questionnaires are delivered via post, e-mail, digital devises, handout or face-to-face interviews (see structured interview).	Questionnaires are quick and easy to administer and are used to establish the prevalence of a particular condition and to collect information on behaviour, beliefs or experiences. The method is useful to get targeted information about a specific topic. They are also used to elicit ranking or scoring parameters for a non-monetary value estimation.	Mathers, N., Fox, N., Hunn, A. 2009: Surveys and Questionnaires. National Institute for Health Research. Joffe, M. 1992. Validity of Exposure Data derived from a structured Questionnaire. American Journal of Epidemology 135: 564-571.
Choice experiment	In a choice experiment, the participant is presented with a choice set, consisting of two or more alternative representations of a certain good or situation, which are tabularly displayed. Following Lancaster's theory, value choice experiments are built on the assumption that individuals obtain benefits from certain characteristics of a good, i.e. attributes, rather than the good itself.	The method is used to derive with concrete results that consist of the preferred participants' choice. Hence, it can give direct courses of action and decisions. Through this approach, a high external validity can be covered. On the other hand, concrete viable options of the have to be in existence.	Lancaster, K.J. 1966. A new approach to consumer theory. The Journal of Political Economy 74:132-157. Auspurg, K., Liebe, U. Choice-experiments and the measurement of behavioural decisions in sociology. Köln Z Soziol 63: 301-314.
Rating methods	With the rating method, respondents rate each value on a scale of importance. The scale can individually be generated according to the necessities.	A rating method is especially suited for measuring the personal values of respondents, because it yields data that are amenable to parametric statistical analyses. Compared to ranking methods, it is easier to administer and also practicable over telephone.	McCarty, J.A., Shrum, L.J. 2000: The Measurement of personal values in survey research: a test of alternative rating procedures. The public Opinion Quarterly 64: 271-298.
Ranking method	With a ranking technique, the respondent is asked to compare options to each other by placing them in order of preference. For optimal results, there should not be significantly more options than five. Later, the average ranking for each option can be calculated.	Ranking approaches are also suitable for measuring peoples' perceptions. In contrast to rating methods, the respondents are presented with different choices, which automatically provides and visualises a relationship between the different options.	Alwin, D.F., Krosnick, J.A. 1985. The measurement of values in surveys: a comparison of ratings and rankings. Public Opinion Quarterly 49: 535.552.
Delphi Method	The Delphi technique is designed as an expert group communication process that aims at conducting detailed discussions of a specific issue. Through	The Delphi method is well suited as a means for consensus-building as this method allows the participants to reassess	Hsu, C.C., Sandford, B.A. 2007: The Delphi Technique: making sense of consensus. Practical Assessment,

	adjusted questionnaires the method allows an open number of controlled feedback rounds. The number of respondents depends on the topic, as it should represent all judgements regarding the target issue.	their initial judgments about the information provided in previous iterations. From the planning perspective, this open-end approach can be more time-consuming than other methods.	Research & Evaluation: 12/10.
Q-methodology	Participants of the Q-methodology are asked to decide what is meaningful and significant from their perspective. The technique is called Q-sort and presents the people with a broad range of standpoints/statements towards a specific topic which they then have to sort according to their personal priority. The statements are generated from prior research or interviews. The sorting of previously gained statements reveal the individual subjectivity as the so called Q-grid leads the participants to decide on a scale of consent (e.g. between -5 to +5). The participants' Q-sorts are then correlated and factor-analysed.	The method is specifically designed to express the participant's subjectivity, their collective means but also subtle differences. In the planning process, sufficient time for statement preparation has to be included. For conducting such a research a manual and a free program for the factor analysis is available on the Q Methodology Website.	Watts, S., Stenner, P. 2005: Doing Q methodology: theory, method and interpretation. Qualitative Research in Psychology 2: 67-91. Coogan, J., Herrington, N. 2011: research in secondary teacher education, Vol. ½: 24-28. Q Methodology: https://qmethod.org/

Document and media analysis			
Methodology	**Characteristics**	**Usage**	**Illustrated references**
Social media analytics	As social media is a predominant communication platform, lots of valuable information can be derived. Social media analytics consist of informatics tools to collect, monitor, analyse, summarize and visualize social media data. There are three main methods: - Text analytics: content and opinion analysis to draws comprehensive and replicable conclusions out of large datasets - Social network analysis: analyses the relationship between different actors, e.g. organisations, NGOs, states to identify key user and option leader. - Trend analysis: identifies and forecasts new themes and trends in social networks. With different available tools systematic results can be derived.	Social media analytics target the challenge to analyse the high quantity of user-generated content to gain meaningful insights into the diffusion of information, opinions and sentiments as well as emergent issues and trends (towards certain areas of interest). It therefore can support the targeted decision making process as it displays social perception and importance of the targeted subject.	Stieglitz, S. Dang-Xuan, L. 2013. Social media and political communication: a social media analytics framework. Soc. Netw. Anal. Min. 3: 1277-1291. Stieglitz S, Dang-Xuan L, Bruns A, Neuberger C 2014. Social Media Analytics. An Interdisciplinary Approach and Its Implications for Information Systems. Bus Inf Syst Eng. doi:10.1007/s12599-014-0315-7.
Visual classification	Visual classification is a general term for the visualization of data mining results in general or social media evaluation. Here, different diagrams, images or videos can be created. Some common visualization methods are decision trees, tag clouds, diagrams etc..	As classification is one of the major tasks of data mining, appropriate visualization is essential for a comprehensive representation.	Ankererst, M., Elsen, C., Ester, M., Kriegel, H.P. 1999. Visual classification: an interactive approach to decision tree construction. KDD ’99: 392-396.

Additional analytical techniques			
Methodology	**Characteristics**	**Usage**	**Illustrated references**
mDSS software	The mDSS software is a generic indicator-based Decision Support System (DSS) developed to assist decision makers in the participatory management of environmental problems by applying several Multi-Criteria Analysis Methods and Group Decision Making.	Specifically, it supports decision and policy makers in instances where there are choices to be made between alternative options for environmental management with the involvement of multiple actors. Moreover, this methodology facilitates the integration of environmental, social and economic concerns to express preferences in terms of options sustainability with consideration of alternative exogenous scenarios drivers.	OPPLA marketplace: http://oppla.eu/marketplace?p_p_id=marketplace_WAR_OpplaGCMportlet&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=1&_marketplace_WAR_OpplaGCMportlet_mvcPath=%2Fhtml%2Fmarketplace%2Fshow_product.jsp&_marketplace_WAR_OpplaGCMportlet_productId=1
Multi-Criteria Analysis (MCA) / Multi-Criteria Decision Analysis (MCDA)	Multi-Criteria Decision Analysis (MCDA) and the Multi-Criteria analysis (MCA) are methods of research and decision making analysis. The terms describe any structured approach used to determine overall preferences among alternative options. In MCA /MCDA, desirable objectives are specified and corresponding attributes or indicators are identified. The actual measurement of indicators need not be in monetary terms, but are often based on the quantitative analysis (through scoring, ranking and weighting) of a wide range of qualitative impact categories and criteria. The criteria to be used for evaluation can cover economic as well as social and ecologic aspects. There is a wide range of MCA/MCDA tools available.	The Multi-Criteria methods offer the possibility to integrate economic and non-economic aspects, which cannot be quantified (or are difficult to be quantified) in monetary terms. This is particularly applicable to complex problems where single-criterion approaches (such as cost-benefit analysis) fall short, especially where significant environmental and social impacts cannot be assigned with monetary values.	Department for Communities and Local Government 2009. Multi-criteria analysis: a manual. London. http://eprints.lse.ac.uk/12761/1/Multi-criteria_Analysis.pdf Velasquez, M., Hester, P.T. 2013. An analysis of multi-criteria decision making methods. International Journal of Operations Research 10/2: 56-66.