Non-monetary techniques for the valuation of ecosystem services

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Introduction and 'State-of-the-art'

Non-monetary approaches can be applied in various stages of ecosystem planning and management, e.g. in problem framing, mapping, valuation, and decision making. They examine the importance, preferences, needs or demands expressed by people towards nature, and articulate plural values through different qualitative and quantitative measures other than money (Chan et al., 2012). They can grasp the multi-dimensional nature of human well-being with monetary value being just one aspect of importance beside e.g. symbolic, cultural, ecological and spiritual.

Non-monetary valuation (NMV) has a long tradition in some fields of environmental policy making (e.g. in delineating protected areas; Kukkala and Moilanen, 2013), and in the last decade different international initiatives have acknowledged its role in ecosystem services (ES) valuation (e.g., the MA, TEEB, IPBES). In spite of the growing policy and scientific interest, the non-monetary valuation of ES does not yet constitute a formalized methodological field (Nieto-Romero et al., 2014). As such, it often applies coarse and arbitrary indicators (Seppelt et al., 2011) and produces results whose accuracy and reliability is hard to judge or difficult to operationalize. To increase the applicability of NMV it is necessary to clarify the boundaries and the terminology of the field, and address considerations with regard to the context-specificity of non-monetary techniques.

Problems / Issues to be discussed

1. Unclear terminology and blurred boundaries

The term non-monetary valuation[1] emerged and has proliferated in a time when the ES valuation literature has been dominated by monetary valuation and raised controversies around commodification. In this context NMV offers an alternative to equating the valuation of ESs with their monetization and reflects upon the plurality of values attached to ESs. Monetary and non-monetary methods, as well as different non-monetary methods themselves, are capable to capture value plurality and heterogeneity to different extent, which is explored in more detail by Jacobs, Martín-López et al. (in preparation). Here, we use NMV as an umbrella concept that brings together a wide range of different approaches and techniques which are practiced under different names.

NMV methods include quantitative and qualitative research techniques (i.e. surveys, interviews), participatory and deliberative tools (focus groups, citizens juries, participatory or rapid rural appraisal (PRA/RRA), Delphi panels, etc.), as well as methods expressing preferences in non-monetary but quantifiable terms (i.e. preference assessment, time use studies, Q-methodology) (Christie et al., 2012). Some studies also consider the spatial representation of ESs (i.e. ES demand mapping) (Milcu et al., 2013)

[1] Non-monetary valuation is sometimes used synonymously to non-economic valuation. However, it is important to note here the contested notion of the 'economic'. While usually one might think of the 'economic' as defined by orthodox neoclassical economics, other schools of thought in economics (e.g. feminist, institutional, ecological, etc.) argue for a broader conception of the term 'economic' where market relations are just a subset of the sphere of the economy. We choose the term monetary as a less contested term that defined a well delimited domain.

and analytic tools rooted in biophysical approaches (e.g. emergy and exergy analysis) as part of the broader family of NMV tools (Naredo, 2001). These methods follow different pre-analytical visions (ontology and epistemology[2]). They define the subject of valuation and the meaning of value along different perspectives, and they can be used to value different ESs and aspects therein.

Those non-monetary techniques that focus on the human expressions of preferences conform a more homogeneous subgroup within NMV. However, there are still various labels and definitions to NMV in this narrower sense, which are often interchangeably used. Some labels, e.g. social, qualitative or deliberative valuation, refer to the technique applied. Terms such as 'qualitative' or 'subjective' valuation (Aretano et al., 2013) suggest that results reflect the subjective perceptions of stakeholders. 'Discourse based' (Wilson and Howarth, 2002) and 'psycho-cultural valuation' (Kumar and Kumar, 2008) reflects broad umbrella concepts that consider preference formation as part of the valuation process and emphasise that personal and group values are important to understand. Recently, 'sociocultural valuation' has been applied as an umbrella term of non-economic methods analyzing social preferences towards ESs (Castro et al., 2014).

Due to the large heterogeneity of preference-based NMV techniques, it is difficult (and probably not desirable) to arrive at the same level of methodological consistency as in the case of monetary valuation. However, some level of formalization of NMV methods is possible if smaller and more coherent subgroups of similar techniques are created while maintaining the plurality of methodological approaches within the field. A first attempt of this formalization is represented by Figure 1. A more in-depth comparison of preference-based NMV techniques has been developed recently, focusing on the key aspects of variability among socio-cultural methods that makes these methods capable of flexible adaptation to specific worldviews and decision contexts (Santo-Martín et al., 2016).

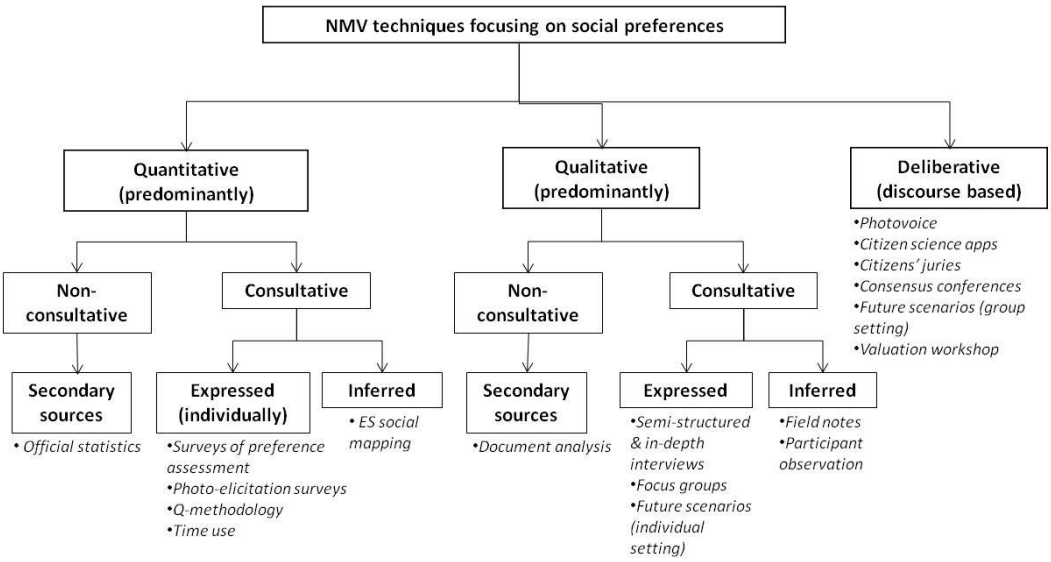

Fig 1: Subgroups of NMV techniques according to methodological similarities in data collection

2. The context-specific applicability of non-monetary methods

The choice among NMV methods should depend on several factors: 1) the capabilities and the socio-cultural context of the communities involved, 2) the institutions and the value-systems held by stakeholders, 3) the needs and purposes of the decision-makers and of the concerned project, 4) the commitment and capacity of the researchers and practitioners who carry out the valuation process and 5) the main characteristics of the decision making process affected (i.e. number of relevant stakeholders, the level of conflicts, etc). These contextual factors can remarkably influence the process and the results of valuation. For example, the use of monetary valuation to inform decisions may be more appropriate in a market economy than in a context of peasant, indigenous, or other community based societies where

[2] Ontology and epistemology are two key terms in the philosophy of science which can be used to compare the philosophical background of different methodologies and therefore to make a conscious methodological choice. Ontology refers to existence (i.e. what is reality?), while epistemology refers to knowledge (i.e. how can we figure out what is reality?).

environmental values are deeply interwoven with community and spiritual values. Likewise, results may also be influenced by the (false) expectations of stakeholders and the mandate of the researchers and practitioners who carry out the valuation process. A key step towards the applicability of non-monetary valuation of ESs is, thus, to provide guidance on which valuation contexts enable the use of which methods (and which methods cannot be used reliably in certain contexts).

Significance to OpenNESS and specific Work Packages[3]

The major contribution of NMV to the OpenNESS project is to shed light on the multiple and often incommensurable value dimensions of ESs. Understanding how different value dimensions are linked to ESs may inform decision making processes at different spatial scales.

WP1 (Key challenges and conceptual frameworks): Improving methodological tools to capture different values of ESs to describe different conceptualizations of value and of the relationship between ecosystems and human well-being.

WP2 (Regulatory frameworks and drivers of change): Tailoring non-monetary methods to specific decision making contexts requires sound knowledge on decision making structures, institutional systems and the expected outputs of valuation processes. This need is reflected in Deliverable 4.3 and the forthcoming D4.4 (Preliminary and Final guidelines for integrated assessment and valuation of ecosystem services in specific policy contexts) which both establish strong links between various decision contexts and the applicability of different (monetary and non-monetary) methods.

WP3 (Biophysical control of ecosystem services): Non-monetary methods can help to reveal how stakeholders attach social and cultural values to species, ecosystems and other biophysical components of the environment. The interconnected nature of biophysical assessments and economic and socio-cultural valuation is reflected by the fact that WP3 and WP4 jointly develop forthcoming Deliverables 3.3 and 4.4 (Final guidelines for integrated assessment and valuation of ecosystem services in specific policy contexts). Within this joint Deliverable, emphasis is put on the applicability and technical requirements of different methods, as well as on the value domains captured by various techniques.

WP4 (Valuation of the demand for ecosystem services): Integral part of WP4 (task 4.3) investigating the real life applicability of non-monetary methods and contributing to the synthesis on integrated valuation.

WP5 (Place-based exploration of ES and NC concepts): More than half of the case studies expressed interest in the NMV of ESs. Detailed guidelines on the proposed methods will support case studies to carry out their own context specific NMV processes.

Relationship to four challenges[4]

Human well-being:	**Sustainable Ecosystem Management:**
• NMV grasps how ESs contribute to different well-being dimensions (e.g. material, health, social, spiritual) • Some NMV methods are capable of inferring subjective well-being by describing how stakeholders define well-being components and what the locally relevant aspects are in relation to ESs	• Results of NMV can be integrated with supply and demand side indicators in integrated methodologies (i.e. mapping, MCDA or BBN) that provide key information for ES management. • NMV explores the beliefs, motivations and socio-demographic factors that influence individual and social choices in ES management, which helps identify potential intervention points to present unsustainable practices

3 For a brief description of the OpenNESS Work Packages see: http://openness-project.eu/about/work-packages

4 There are certainly more societal challenges; the reduced number presented here is due to the four major challenges mentioned in the work programme of FP7 to which OpenNESS responded.

Governance:	Competiveness:
• NMV provides information on multiple and incommensurable values and trade-offs induced by management decisions • NMV could increase social support and engagement to certain environmental policies which is a key to effective and successful policies • NMV encourages to be transparent about the methodological choice	• NMV promises a deeper insight into human-nature relationship, which allows doing business more sustainably than nowadays • A key strength of NMV is to value cultural ESs. Hence a major business oriented target group could be the SMEs dealing with ecotourism, recreation, cultural heritage and contact with nature under different interventions

Recommendations to the OpenNESS consortium:

In the OpenNESS project we address NMV techniques which unfold the value of ESs by revealing the social preferences. To increase the clarity of our terminology we suggest to use the term 'sociocultural' (instead of non-monetary valuation) as an affirmative umbrella concept that expresses the essence of this group of valuation techniques. However, due to the unclear terminology and the heterogeneity of methods within this field, greater transparency on the ethical aspects of the valuation process is required, including the justification (ontological and epistemological background) of the methodological choice.

Until the field of sociocultural valuation becomes more settled and formalized, we suggest the consortium to use a 'learning by doing' protocol to test and improve the applicability of non-monetary methods in different institutional and socio-political contexts. Methods proposed to be tested in case studies are: time use study, preference assessment variations (incl. the ESs card game, photo elicitation survey), focus group and deliberative techniques (incl. photovoice, valuation workshop, citizens' juries). Identifying weaknesses and strengths of the proposed techniques through place-based applications is necessary to provide guidance on which valuation contexts enable the use of which methods.

Suggested "must read" papers

Chan, K.M.A. et al. (2012): Where are Cultural and Social in Ecosystem Services? A Framework for Constructive Engagement. *BioScience* **62(8):** 744-756.

Christie, M.et al. (2012): An evaluation of monetary and non-monetary techniques for assessing the importance of biodiversity and ecosystem services to people in countries with developing economies. *Ecological Economics* **83:** 67-78.

Martín-López, B. et al. (2012): Uncovering ecosystem services bundles through social preferences: Experimental evidence from Spain. *Plos One* **7:** 1-11.

Santos-Martín, F. et al. (2016): Socio-cultural valuation approaches. In: Burkhard, B. and J. Maes (eds) *Mapping Ecosystem Services.* Pensoft Publishers Ltd, Sofia

Further Cited papers or Background papers:

Aretano, R.et al. (2013): People perception of landscape change effects on ecosystem services in small Mediterranean islands: A combination of subjective and objective assessments. *Landscape and Urban Planning* **112:** 63-73.

Castro, A. et al. (2014): Multidimensional approaches in ecosystem service assessment. In: Alcaraz-Segura, D., Di Bella, C.D., Straschnoy, J.V. (eds.): *Earth Observation of Ecosystem Services,* CRC Press, Boca Raton, pp. 427-454.

Jacobs, S. et al. (in preparation). Because the means determine the end:Biophysical, monetary and social valuation methods capture different values of nature. Ecosystem Services? OpenNESS Special Issue in *Ecosystem Services.* to be published in 2017.

Kelemen, E. et al. (2015). *Preliminary guidelines for integrated assessment and valuation of ecosystem services in specific policy contexts.* EU FP7 OpenNESS Project Deliverable 4.3., European Commission FP7.

Kukkala, A.S. and A. Moilanen (2013): Core concepts of spatial prioritisation in systematic conservation planning. *Biological Review,* **88**: 443-464.

Kumar, M. and P. Kumar (2008): Valuation of the ecosystem services: a psycho-cultural perspective. *Ecological Economics* **64(4):** 808–819.

Milcu, A. I.et al. (2013): Cultural Ecosystem Services: A Literature Review and Prospects for Future Research. *Ecology & Society* **18(3):** 565-598.

Naredo, J.M. (2001): Quantifying natural capital: beyond monetary value. In: M. Munasinghe, O. Sunkel (eds.): *The sustainability of long term growth: socioeconomic and ecological perspectives.* Edgar Elgar, Northampton.

Nieto-Romero, M. et al. (2014): Exploring the knowledge landscape of ecosystem services assessments in Mediterranean agroecosystems: insights for future research. *Environmental Science & Policy* **37:** 121-133

Seppelt, R. et al. (2011): A quantitative review of ecosystem service studies: approaches, shortcomings and the road ahead. *Journal of Applied Ecology* **48(3):** 630-636.

Wilson, M.A. and R.B. Howarth (2002): Discourse-based valuation of ecosystem services: establishing fair outcomes through group deliberation. *Ecological Economics* **41(3):** 431–443

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Disclaimer: This document is the final version of the Synthesis Paper on the topic within the OpenNESS project. It has been consulted on formally within the consortium in 2014 and updated in 2016.