



Discourses in Ecosystem Accounting: A Survey of the Expert Community



Michael Bordt¹

Department of Geography, Environment and Geomatics, University of Ottawa, 75 Laurier Ave E, Ottawa, ON K1N 6N5, Canada

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ABSTRACT

National ecosystem accounting is an emerging framework for measuring the links between ecosystems and human well-being for national planning. It directly addresses Sustainable Development Goal 15.9, in which countries have agreed to integrate ecosystem values into national planning. The community of practice for national ecosystem accounting includes not only the international and national researchers who develop such a framework, but also the national analysts who implement it and the decision makers who apply it. To foster **convergence** within this community on such a common measurement platform, it is first necessary to understand the issues of **divergence** of values and preferences among the diverse and international ethical perspectives, disciplines and roles involved.

A cluster analysis of a survey of 131 expert stakeholders in national ecosystem accounting reveals agreement within this community on the need for broadening the scope, addressing multiple decision contexts and mainstreaming national ecosystem accounting in national planning. The most important sources of divergence in this community of practice are attributed to ethical positions regarding monetization of ecosystem services, differences in the interpretation of several core concepts, such as biodiversity and ecosystem services, and the role of spatial analysis.

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1. Introduction

National ecosystem accounting (Bateman et al., 2013; Edens and Hein, 2013; Obst et al., 2013; United Nations et al., 2014; Vardon et al., 2016) is an emerging framework for measuring the links between ecosystems and human well-being. It has only recently been tested (Saarikoski et al., 2015; Sumarga and Hein, 2014; Sumarga et al., 2015). Its purpose is to support national decision making and international benchmarking, for example, in response to the Sustainable Development Goals, Target 15.9, in which nations have agreed to “by 2020, integrate ecosystems and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts” (United Nations, 2015). It does so by providing coherent concepts, classifications and methods required to produce ongoing official statistics. As embodied in the United Nations System of Environmental Economic Accounting—Experimental Ecosystem Accounting (SEEA-EEA) (United Nations et al., 2014), national ecosystem accounting is developing as an international standard to address national and international policy priorities.

International guidance on integrating the value of ecosystems and biodiversity into national planning would benefit from convergence on a common measurement framework that is sufficiently

comprehensive to capture the important linkages between ecosystems and human well-being, sufficiently **convergent** to be accepted by diverse perspectives, sufficiently **rigorous** for national official statistics, sufficiently **consistent** to allow for time-series and international comparisons and sufficiently **feasible** to be affordable for national governments to implement and maintain.

This implies a compromise between standardization and flexibility. Some degree of standardization is necessary to ensure consistency. However, flexibility is required to incorporate complex viewpoints, diverse national and local contexts, and differing scientific perspectives.

This paper focuses on a narrow application of a broad literature on ecosystem assessment (Carpenter et al., 2009; MA, 2005), ecosystem processes, ecosystem services and their classification (Chan et al., 2012b; CICES, 2013; Haines-Young and Potschin, 2013; de Groot et al., 2002; Luck et al., 2012; Nahlik et al., 2012), methods for appropriately applying data to decisions (Smith et al., 2011; Stirling, 2010). It also draws on the literature of international organizations concerned with mainstreaming ecosystems into decision making (Díaz et al., 2015; Lange, 2014; TEEB, 2013; United Nations et al., 2014). Bordt and Saner (2017) provide a review of related ecosystem services and accounting frameworks and conclude that more work is required to develop concepts, measures and process to support a comprehensive and convergent measurement framework for integrating ecosystem values into national planning.

Two concepts of particular interest to this research are monetization of ecosystem services and Critical Natural Capital. They are quite related

E-mail address: mbord039@uottawa.ca.

¹ Permanent address: 64 Arbordale Crescent, Ottawa, ON K2G5C9, Canada.

in that the desire to monetize all ecosystem services is seen by some as leading to the “commodification” of nature (Luck et al., 2012) implying that ecosystem services can be substituted for other forms of capital (i.e., traded off for their instrumental value to humans). Schröter et al. (2014) provide the counter-argument that assessing ecosystem services in monetary terms is not necessarily the same as using market instruments. In contrast to monetization, the concept of Critical Natural Capital (Brand, 2009; de Groot et al., 2003) suggests that some ecosystems, ecosystem processes and species are too important for ecological, cultural or moral reasons to be substituted. Saner and Bordt (2016) discuss the ethical implications of the two issues. They conclude that a convergent ecosystem measurement framework would benefit from recognizing Critical Natural Capital as components of nature that are excluded from monetization.

The **community of practice** for national ecosystem accounting encompasses diverse disciplines (geographers, ecologists, economists, statisticians, and national accountants), ethical positions (for example, anthropocentrism vs. non-anthropocentrism or weak vs. strong sustainability, see Saner and Bordt, 2016) and roles (researchers, analysts, and users) necessary to create, support, analyse and apply a common measurement framework. Given the newness of the approach, **divergence** (the lack of a common understanding of concepts, classifications, methods, approaches to implementation, and uses) on certain issues persists.

As a consequence, the SEEA-EEA is still considered “experimental” and its future research agenda includes finalizing classifications and recommending appropriate approaches for monetizing ecosystem services. It would also benefit from incorporating recommendations on implementation (Bordt and Saner, 2017). That is, how to engage national stakeholders in compiling data and using them in national planning. The work towards further **convergence** on a common measurement platform would benefit from a documented understanding of the current state of **divergence** across this community of practice. On the basis of this information, it becomes possible to formulate propositions for how this divergence can be addressed to support a common measurement framework.

This paper addresses this need with the first comprehensive survey of international and national practitioners: a cluster analysis of a survey of 131 expert stakeholders in national ecosystem accounting. The analysis first identifies issues of convergence and divergence across the entire community and then clusters the community into sub-communities of individuals with similar response patterns. Understanding the nature of these sub-communities simplifies the problem of fostering convergence. Firstly, it would focus on the divergence among a few clusters rather than among many individuals. Secondly, it would provide a means of assigning particular roles (e.g., research, codification, testing and implementation) in future work according to the preferences and perspectives of each cluster. This paper concludes with ideas for how the survey result can be used in the further development of national ecosystem accounting.

The selection of statements for the survey is based on a schema developed specifically for this analysis. This schema organizes issues of concern in national ecosystem accounting into four “stages²”: Concepts, Scope, Feasibility and Need.

2. Methods for the Survey and Analysis

2.1. Survey Concept

Among experts, there is some agreement that national ecosystem accounting (United Nations Statistics Division, 2015) consists of measuring (codifying, classifying and applying coherent methods):

- Ecosystem Extent (spatial area of each ecosystem type),
- Ecosystem Condition (biophysical measures of quality and other characteristics relevant to the provision of ecosystem services), and
- Ecosystem Services (biophysical measures of the contribution of ecosystems to the economy and other human activities). (adapted from United Nations et al., 2014)

There is less agreement (United Nations Statistics Division, 2015) on the level of detail required, the underlying scientific and ethical principles, the treatment of uncertainty, the need for monetization of ecosystem services, the classifications and concepts and the best ways to apply the new information that is generated for making decisions.

Through my participation in related work, meetings, training sessions and research on ecosystem accounting, it became evident that discussions about concepts, scope, feasibility and need were often linked to differences in interpretation of the concepts, case experiences or ethical perspectives rather than empirical knowledge. Since national ecosystem accounting is, by definition, transdisciplinary, transnational and trans role,³ operationalization requires an understanding and resolution of these differences.

To investigate these differences, I designed and conducted an online survey of international experts in this community of practice. The survey asked the experts their level of agreement or disagreement with statements relating to concepts, scope, feasibility and need for ecosystem accounting.

The analytical approach applies exploratory multivariate methods appropriate for discrete variables of subjective data to (a) identify issues of divergence and convergence, and to (b) cluster the community into sub-communities of individuals with similar response patterns (discourses) that diverge from other sub-communities. In this paper, “consensus” and “dissensus” therefore refer to the level of agreement or disagreement on individual statements. “Convergence” refers to the degree of commensurability between discourses.

2.2. Survey Technology

The approach to the survey and its analysis⁴ is intended to systematize conducting a large case study of subjective information. For surveys of this nature, Q-Methodology (Brown, 1980; Frantzi et al., 2009; Van Exel and de Graaf, 2005) is often used. Q-Methodology was reviewed and classroom-tested, however, no feasible options were found for online administration. An online approach was required, since in-person interviews with the international community of practice would not have been possible. Elements of Q-Methodology were adapted for this analysis (see Discussion).

The survey was conducted using the online facility www.FluidSurveys.com and all statistical analyses were performed in SAS/JMP v12.2 (SAS Institute Inc., 2016a).

2.3. Development of Survey Questions

The survey was conducted in two phases: (Abson et al., 2014) compiling and selecting opinion statements of interest to the community of practice and (Ajani et al., 2013) conducting an online survey of selected statements.

The survey questions were compiled based on literature review and opinions expressed in discussions with researchers, statisticians, analysts and users. From a list of candidate statements, 52 (Annex Table 1) were selected for the survey. This selection arranged the more

³ That is, the agreement among roles in national ecosystem accounting (generation of evidence, analysis of evidence and use of evidence).

⁴ The initial design and approach was approved by the University of Ottawa Research Ethics Board (File number 06-14-17; ethics@uottawa.ca). It was developed under supervision of Dr. Marc Saner.

² These are termed “stages”, since they can be viewed as interdependent steps in an iterative process of constant improvement.

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