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Methodological and Ideological Options

Natural Capital Accounts and Public Policy Decisions: Findings From a Survey

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ABSTRACT

There have been many initiatives and policy commitments in natural capital accounting in the recent years. Based on a survey for statistical offices, ministries and independent experts worldwide, we provide some preliminary evidence that there is very little use of natural capital accounts for public policy decisions and, more so, in developing countries. The most relevant obstacles are the lack of political support by key people and institutional leadership unable to promote policy use by other ministries. Concerning developing countries, the factor which is considered as the most relevant in preventing the use of natural capital accounts for policy making is the stage of development of the country. In addition, respondents from statistical institutes and developing countries are firstly, concerned about institutional obstacles and secondly, about data availability and cooperation. Respondents from ministries and independent experts are particularly concerned about design obstacles. Not many accounts may be available to be used in the policy-making process due to data gaps, design challenges and the required investment, the problem being more acute in developing countries. A key result of the survey is the need to evaluate the added value of natural capital accounts with respect to statistics.

1. Introduction

The concept of natural capital can be described as the components of the natural environment that can be used to generate income, goods or services (Barbier, 2011). It underlines the role of nature in supporting the economy and human well-being (Pearce et al., 1989). Natural capital can be categorised as geophysical capital (abiotic goods and services) and ecosystem capital (biotic goods and ecosystem services) (Milligan et al., 2014; Petersen and Gocheva, 2015).[1] Ecosystem services, in particular, can be defined as the outcome of biological, geochemical and physical processes and components that take place within an ecosystem and that are accessible to people (Weber, 2011; Maynard et al., 2015).[2] According to the Common International Classification of Ecosystem Services (CICES), three broad categories of ecosystem services can be identified, namely: provisioning, regulation and maintenance, and cultural services (MA, 2005; Weber, 2011).[3]

There is no single agreed-upon definition of natural capital or (economic-)environmental accounting (Hecht, 2000; Weber, 2014a). We can nevertheless identify some common elements that usually characterise this concept (Hecht, 2000). Firstly, these accounts provide tools to link environmental and economic data which enables joint analyses. Secondly, they have a comprehensive coverage and can be used for macroeconomic and sectoral policy-making, rather than for decisions at the local level. Third, the accounts have time series data produced on a regular basis which enables analyses of trends over time. In this paper, we broadly define natural capital accounts as 'the (economic-)environmental accounts that refer to the statistics that can be integrated with national economic accounts which enable to have joint analyses'.

Since the 1970s with some initiatives in Canada, Denmark, France, the Netherlands, Norway and Spain, we have witnessed substantial efforts to develop natural capital accounting (Laurans et al., 2013; Edens, 2013; Weber, 2014a).[4] In the recent years, the international natural capital accounting standards have evolved, and many capacity-

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[1] Some key features of natural capital goods and services are their depletability (or not) and their capacity (or not) to renew or self-maintain. In neoclassical economic theory, goods and services overlap since the value of the good or asset stock is derived from the net present value of expected future benefits (monetary terms) (Weber, 2014a).

[2] Ecosystem services have not yet been given an exact definition (Weber, 2014b).

[3] There is no clear-cut boundary between natural capital nor ecosystem services categories (see Milligan et al., 2014 and Petersen and Gocheva, 2015 for more details).

[4] See Edens (2013) and Weber (2015) for a summary of initiatives on natural capital accounting since the 1970s.

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building partnerships and research programs have been developed.[5] Concerning international capital accounting, the United Nations System of Environmental–Economic Accounting Central Framework (SEEA CF) has become, in 2012, an international statistical standard that describes stocks and changes in stocks of environmental assets.

The 2012 SEEA Experimental Ecosystem Accounting (EEA) provides the conceptual framework for ecosystem accounting, but does not include an integrated set of accounting tables and provides little guidance on how to implement these accounts (Weber, 2014a).The SEEA EEA defines ecosystem accounting as a coherent and integrated approach to the assessment of the environment through the measurement of ecosystems, and of the flows of services from ecosystems into economic and other human activity. The 2011 EU Framework for Ecosystem Capital Accounting in Europe enables to implement simplified ecosystem capital accounts based on the use of existing data.

The term natural capital accounting is broadly used throughout these initiatives, but not always in an unambiguous way (Weber, 2014a). The usual sense (for instance, its use by the World Bank) relates natural capital both to non-renewable resources of the subsoil and to renewable resources, as well as to the associated services. While proposing no precise definition of natural capital, the SEEA EEA suggests similar coverage for natural assets and services.[6] In the biodiversity strategy of the European Union (EU), natural capital is equivalent to ecosystem capital only. This is the terminology also used in the UNSD/UNEP/CBD project on Advancing Natural Capital Accounting (ANCA) for ecosystem capital. Natural capital can be also understood as an economic production factor or, in a broader sense, covering non-marketed ecosystem services. Capital can refer implicitly or explicitly to the standard economic theory where capital is equal to the value of discounted future benefits; or capital can be defined as physical systems with capacities and resilience.

The SEEA CF and the SEEA EEA encompass measurement in both physical and monetary terms, and this is also the scope of this paper.[7] The monetary valuation in the SEEA CF is limited in scope, since generally only goods that have a market price are included (Weber, 2014a; Petersen and Gocheva, 2015). Physical accounts are considered the basis of the framework in the SEEA EEA (Weber, 2011). Because ecosystem accounts are deeply rooted into monitoring databases, implementation presently focuses on physical accounts. Measurement in monetary terms for ecosystem accounting is generally dependent on the availability of information in physical terms since there are few observable market values for ecosystems and their services (Weber, 2014a). According to a review of national ecosystem service assessments across the EU Member States, most provisioning services are, or will be, valued using market prices. Most regulating services using methodologies based on costs, are possible. Cultural ecosystem services, which are mainly valued using stated valuation methods, are subject to methodological challenges and lack of data (Brouwer et al., 2013).

There are many challenges related to monetary valuation in natural capital accounting. Adding together supporting services and ecosystem services represents a double counting of the contribution of supporting services.[8] To avoid double counting, CICES classification assists in identifying the 'final outputs' of ecosystems (Haines-Young and Potschin, 2010). In addition, because there is often lack of resources and time to do monetary valuation studies, the benefit transfer approach extends value estimates for ecosystem services or ecosystem assets to other areas (Pascual et al., 2010). However, the values provided by ecosystem services are often strongly dependent on the local context and on the proximity of other ecosystems (Petersen and Gocheva, 2015). According to the SEEA EEA, the limited data for certain ecosystem services, the variability in methodologies and the lack of common functional variables across studies, limit the use of this approach.

Concerning the monetary valuation of natural capital, the choice of the discount rate, which attributes more relevance to costs and benefits in the present than in the future, is one of the most disputed subjects in economic theory (Russi and ten Brink, 2013). According to the SEEA CF, it is necessary to select marginal, private, market-based discount rates for environmental assets in net present value calculations, to align SEEA values with the system of national accounts. However, lower discount rates are more appropriate to account for intergenerational equity and ethical responsibilities to the world's poorest that depend directly on natural capital (Gowdy et al., 2009). Although experts agree on the principle of discounting and the formula to be used, they do not agree on the discount rate to be used for the valuation of natural capital (ten Brink et al., 2015).

Another problem related to the monetary valuation of natural capital, is the estimation of exchange values for non-market ecosystem capital, such as many regulation and cultural services.[9] The SEEA CF and SEEA EEA refer in principle to exchange values, not welfare values, similarly to the system of national accounts.[10] Accordingly, there is a need to value the quantity of ecosystem services at the market prices that would have prevailed if the services had been freely traded and exchanged. Weber (2011) states that in the case of ecosystem degradation, monetary valuation should be carried out on the basis of restoration costs rather than stated or revealed preferences as the latter are based on subjective evaluations, which make up-scaling and aggregation disputable.[11]

Besides, in general, the methods based on revealed and stated preferences are based on the measurement of changes in individual welfare, and hence prices should be generated through simulated exchanged value or price function approaches (Day, 2013; ten Brink et al., 2015). In addition, if different methodologies are used for monetary valuation, the values obtained for different ecosystem services are not directly comparable and hence difficult to aggregate (Petersen and Gocheva, 2015). Despite these caveats, the use of monetary valuation is often considered useful for communication purposes (Pascal, 2014).[12]

Regarding the areas covered by natural capital accounts, at least 33 developed (high-income) countries have experiences, out of which 26

[5] Some capacity building programs include the 2008 'United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries' (UN-REDD), the 2010 'Partnership for Wealth Accounting and the Valuation of Ecosystem Services' (WAVES) coordinated by the World Bank and the Convention on Biological Diversity 'Quick Start Package' on 'Ecosystem Natural Capital Accounts' (ENCA). Some research programs include the 2005 Millennium Ecosystem Assessment, the 2008 Commission on Measuring Economic Performance and Social Progress and the 2010 Economics of Ecosystems and Biodiversity Initiative. See Milligan et al. (2014) and Petersen (2015) for a detailed review of accounting standards, capacity-building partnerships and research programs on natural capital accounting.

[6] The SEEA CF defines environmental assets as the naturally occurring living and non-living components of the Earth that may provide benefits to humanity. The SEEA EEA proposes accounts which describe the supply of ecosystem services as well as asset accounts for ecosystems (Edens, 2013).

[7] See Petersen and Gocheva (2015) for details on the units of measurement for the different components of the accounts in the SEEA CF and the SEEA EEA.

[8] The SEEA EEA argues that peat soils and cultivated biological resources can also be subject to double counting.

[9] It is also difficult to give a market value to biodiversity since it is challenging to evaluate the benefits it provides to humans associated, among other features, with social and cultural, ethical and aesthetic values, as well as unexplored or unknown values (Lavorel, 2014).

[10] In contract with exchange values, welfare values include the consumer surplus, that is, the difference between the price consumers are willing to pay for a good or service and the market price. Exchange values do not capture the full benefits derived by the agents participating in a transaction. Natural capital accounts using exchange values are not attempting welfare valuation, and do not replace the need for cost-benefit analyses appraisal of policy changes (ten Brink et al., 2015).

[11] Others argue that restoration costs reflect technological ability rather than the value of ecosystem capital (ten Brink et al., 2015).

[12] Accounts in physical units are generally given priority to consider the capacity of ecosystems to deliver services, their resilience and, ultimately, the measurement of ecosystem degradation and enhancement (Weber, 2014a). In current approaches, physical accounts are sitting alongside economic information as a set of satellite accounts (Petersen and Gocheva, 2015).