

Expert Meeting on Ecosystem Accounts

Melbourne, Australia

16-18 May 2012

<http://unstats.un.org/unsd/envaccounting/seeaLES/egm2/lod.htm>

Common International Classification of Ecosystem Services:

Issues arising from the London expert meeting

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INTRODUCTION

At the London Meeting it was felt that CICES was an important step forward in the development of an agreed classification of ecosystem services. However, the comparison of study cases from Australia, Austria, Germany, and Switzerland with the existing CICES and the discussions during the meeting, raised the following questions on the following issues:

- Hierarchical structure of CICES and its implementation for ecosystem accounting
- Terminology
- Scope and definitions of ecosystem services, including the condition and capacity of ecosystems
- Relationship of CICES with the scale of compilation and analysis of the information in the accounts
- Exclusion of supporting services

These issues provide the framework used in this document, which seeks to clarify the nature of the concerns, and suggest how they might be resolved in taking the development of the Classification forward.

THE HIERARCHICAL STRUCTURE OF CICES

All the issue papers presented that London Group meeting, and the expert discussion based on them, acknowledged that the construction of ecosystem accounts must be able to deal with applications at different or multiple geographic scales. Moreover, depending on the nature of the application, different uses may involve different levels of thematic detail. For example, some applications may need to aggregate all provisioning services, while others may need to distinguish between them in a more detailed way. The hierarchical structure proposed for CICES¹ seeks to address both these issues, and contrasts with other international typologies such as those used in the Millennium Ecosystem Assessment and TEEB which are flatter². The rationale for the hierarchical structure is that at different geographical scales, different levels of thematic generality will be required, with broader scale accounts probably needing to use more aggregated reporting for the various types of service. The more generalised reporting categories will, however, need to group data systematically from more detailed, local studies, and this is probably most easily done using the nested approach proposed in CICES. The need for a hierarchical or 'nested' approach was also supported by the issue paper presented by Maynard and Cork (2011), which compared classifications developed at international, national and more local scales.

The key question to emerge from the discussions is not whether a hierarchical structure is in fact required, but rather how many levels would need to be defined in any standard. The proposed structure for CICES suggests that the sub-types and any more detailed subdivisions needed in a particular application could be defined by the user. **However, to take the classification system forward**

¹ The present CICES structure uses 5 levels. From the most general they are: Themes, Classes, Groups, Types and Sub-types

² Both essentially have a two-layer structure with services nested into the major categories of provisioning, Regulating, Cultural and Supporting.

to a standard, a clear and unambiguous set of definitions of services at the more detailed levels is needed. The current documentation only provides definitions at the Theme and Class level. Thus:

- *Further work is required to determine whether the five-levels proposed in CICES are sufficient in terms of the scale of compilation and analysis anticipated in the ecosystem accounts.*
- *The development and testing of the definitions used for the CICES classification at Group and Type level is now required, this is probably best done initially by cross-referencing services to international classifications used for products (The UN Common Products Classification, CPC-V2). However, it is recognised that this may only help in relation to the provisioning services represent the material outputs from ecosystems.*
- *The definitions of the more intangible outputs (Regulating and Cultural Services) may need to be looked at in relation to the classifications that are used in economic or social accounting, such as mortality, health or damage costs and benefits associated with, say regulating services (e.g. flood control and air quality), or shared social values associated with some cultural services (e.g. heritage value of landscape). In the initial proposal for CICES an attempt was made to link the services to other international classifications such as those for economic activities (International Standard Industrial Classification of All Economic Activities, ISIC-V4), and consumption (Classification of Individual Consumption by Purpose, COICOP). Further work is required to determine the extent to which these and other classifications can be used to help make the bridge to the economic and social metrics captured in SEEA. An illustration of the kind of exploratory work that required to develop service definitions is provided in the issues paper by the Swiss Federal Office for the Environment (FOEN) (Staub et al. 2011), which relate services to a wider range of benefits than would be captured merely by linking services to products.*

TERMINOLOGY

In developing the initial proposal for CICES it was argued that the system was not intended as a replacement for other typologies used for ecosystem services, but as a means of translating between these classifications. As the volume of work related to ecosystem services has increased the need to make cross-comparisons has grown, not least as the result of attempts to use benefit transfer methods to estimate their value. Furthermore, given the broad thematic scope of SEEA, it is likely that accounts will need to bring together a range of different information sources. Thus the development of tools for data integration are also a key priority in taking accounting initiatives forward, especially where these 'raw' data sources were not collected primarily for accounting purposes.

At the London meeting it was argued that if CICES to support both cross-comparisons and integration, then the terminology used must resonate with a wide range of stakeholders and disciplines. This has already been addressed in the initial proposal for CICES, is so far as it was argued that the system should, if possible, avoid introducing any new terminology, and use concepts already familiar to the wider community. The difficulty that this requirement poses is that unfortunately, in the field of ecosystem services, terminology is not being used consistently. The problem was noted in the issues paper for Maynard and Cork (2011).

In an effort to find common understanding, it has been proposed that the classification of ecosystem services should deal only with *final* ecosystem services, that is outputs from ecosystems that impact on well-being in direct and identifiable ways. That is, they can be turned into ‘goods’ that can be traded in markets, or be represented as attributes of the biophysical environment that have a measurable impact on well-being, such as flood risk or air quality. The distinction is illustrated in the papers presented at the London meeting by Gundimeda (2011), where she makes the distinction between a volume and value account for the forests of India, and by Staub et al. (2011) in the links they make between services and various benefit indicators relevant to the Swiss situation.

Although the focus on *final* services in CICES has been accepted, one area of terminology that has not presently been agreed concerns whether services and goods are used synonymously, as in the MA, or whether services and goods are distinctive, as in the UK National Ecosystem Assessment. Bateman et al. (2011) and Mace et al. (2011) have argued that from an ‘economic perspective’ ecosystem services are ‘contributions of the natural world which generate goods which people value’. Thus, for them *goods* are the things people value and services are the things ecosystems generate that give rise to them. Such ‘goods’ can include things that can be traded in markets as well as ecosystem outputs which have no market price. In this sense ‘goods’ can have both use and non-use values. A suggestion for how the distinction might be represented within the CICES framework was presented at the London meeting (see Haines-Young and Potschin, 2011, Figure 2). **The paper concluded that the distinction suggested in the UK NEA between services and goods seems to make the analysis of the contributions that ecosystems make to well-being clearer, and so it was proposed that this revised terminology is used in future discussions of CICES.** Thus in order to take the classification forward:

- *Agreement is needed on the proposal that goods and services should not be used synonymously, as in the MA, but used to differentiate the things our outputs that ecosystems generate that can contribute to human well-being (i.e. services) from the things that are valued in some way vis á vis their influence of human well-being (i.e. goods). Thus CICES is a classification of ecosystem services not ecosystem goods; the latter might be captured in categories defined using one of the standard classifications of products, say.*

SCOPE AND DEFINITION OF ECOSYSTEM SERVICES AND SUPPORTING SERVICES

This issue is clearly related to that of terminology but is perhaps best treated separately because it affects the ‘boundaries’ of the CICES framework, that is what is covered by the system and what is not. The issue is a complex one and is also closely linked to the problem identified in at the London meeting of how to handle supporting services. The two issues are, perhaps, most effectively dealt with together.

The assumption underlying the way CICES defines services is that the contributions they make to human well being are dependent on the **stock** of some asset and its **condition**. While stock is measured more straightforwardly in terms of area or volume, condition measures are more difficult to define, but essentially deal with the capacity of a unit of stock to deliver a unit of service. It has been suggested that services can generally be measured in terms of a ‘flow’ leading to some good or benefit (output per unit time), but it is not clear that not all of the services currently covered by CICES can be measured or represented in this way. The issue is particularly evident for many of the cultural services. **As part of refining the definition of services at different levels, it would also be**

helpful to give guidance on the units that can be employed to measure the different services, and in particular whether the approach would enable assessments of some underlying asset stock and condition to be made.

An examination of whether stock and condition accounts can be constructed is a particularly important issue because it helps resolve the problem of how to handle supporting services in CICES. The current proposal is that they are *excluded* from the classification. The exclusion is not meant to suggest that they are unimportant in accounting terms, but rather to underline that in terms of building an integrated set or system of economic and environmental accounts a bridging mechanism is needed, and this is provided by the notion of a final ecosystem service. It is a basic assumption of the CICES proposal that any comprehensive set of accounts would, where appropriate, include an assessment of the ecological structures, processes and functions that underpin them.

The definition of supporting services is one of the important terminological issues that can be identified in current debates. In the proposal for CICES it was suggested, in fact, that the term supporting services should not be used and that any listing, similar to the one provided by the MA was probably unhelpful in accounting terms. Instead it was argued that a terminology that followed more closely the cascade model where structures and processes were distinguished from ecosystem functions or capacities might be more helpful. These functions or capacities correspond to what some authors have called *intermediate* services. They can also be used to describe the potential of ecosystems to generate a service, even though at a particular time or place there may be no demand for it.

However, setting aside the problem of what terms to use to describe the factors that determine the output of the different ecosystem services, the difficulty of including them in CICES is that there is no simple relationship between different ecological structures, processes and functions, and the output of particular ecosystem services. Services often depend on several functions and any particular function may support a number of services. Moreover, the categories suggested in the MA, for example, are generally so far removed from the final services in terms of cause-effect, that in accounting terms an integrated system describing the entire ecosystem service cascade would be difficult to construct. **Instead we suggest that the problem of supporting series is best handled by recognising that the factors underpinning the final services described in CICES are best dealt with in the structure of the accounts themselves, potentially in terms of the stock and condition of the various natural assets that generate the final services.** Thus accounts for carbon and biodiversity would be examples of how the underpinning ecosystem characteristics which some define as supporting services would be captured in the accounts.

Given this context, in order to take the classification forward it is suggested that:

- *The proposition that supporting services are not covered by CICES is confirmed.*
- *Further work is needed to augment the development of a fuller set of definitions for the services to describe more clearly what units can be used to measure service output.*
- *While CICES does not define any set of supporting services, the status of the relevant ecological structures, processes and functions that underpin the final services are best represented in the structure of any complete set of ecosystem accounts.*

- *That further illustrative work is required to show how the notion of supporting or intermediate services can be captured in the accounts using measures of the stock and condition of assets such as land, water, soil, biodiversity and its various aggregate properties such as biomass or productivity.*

Given that accounts should help us document both the ecological inputs to the economy *and* the impact economic activity on ecological systems, the construction of these underpinning asset accounts should also reflect how different drivers of change (including policy or management interventions) might act. Thus it is proposed that the notion of supporting services is captured in the accounts using pragmatic rather than abstract scientific criteria.

CICES AND THE SCALE OF COMPILATION AND ANALYSIS OF THE INFORMATION IN THE ACCOUNTS

Several issues remain concerning the way CICES affects the scale of the compilation task needed to develop a set of ecosystem accounts. The arguments surrounding the question of whether ecosystem services are taken to be fundamentally dependent on biodiversity or whether they include abiotic ecosystem outputs does not need to be rehearsed here, because the consensus from the consultation was that it should cover both. This proposition not only increases the scale of the compilation task for any accounting exercise, but also poses a series of related questions involving where the *analytical* boundary of the accounts will lie.

In the issues paper presented to the London meeting (Haines-Young and Potschin, 2011) it was suggested that the criteria of renewability should be used to define the scope of services included in any set of ecosystem accounts. Thus abiotic outputs such as wind or water power would be covered in the classification and hence the accounts, but non-renewable products such as oil or coal would not. Subsequent discussion has suggested that the criterion of renewability is probably not helpful, particularly in relation to assets like peat. This is both a habitat and an ecosystem product which is not renewable on any timescale that make sense in economic or social terms. Under the definition it would therefore be excluded from the classification, which many people thought would be misleading.

To overcome the problems of defining the scope of the classification and hence the accounts, it is suggested that the renewability criterion is dropped, and the scope of the accounts is probably more usefully defined in an arbitrary way, by simply excluding subsoil services and assets from the classification. The question of renewability, and whether rates of exploitation or damage exceed the capacity of ecosystems to replace an asset stock or to naturally restore its condition or integrity should be dealt with in the analysis of the accounting information, *rather* than be used to define the scope of the accounts. In other words it should be seen as part of the task of determining whether resources are being used sustainably and not as part of the definition problem.

In terms of the implications of CICES for the scope of ecosystem accounts it is suggested that:

- *It is confirmed that the classification should cover both biotic and abiotic ecosystem outputs.*
- *That the criterion of renewability is not used to define the scope of the classification, but rather a pragmatic approach that excludes sub-soil assets is used.*
- *That questions of renewability are looked at as part of the analytical output from the accounts, and further work is now required to define appropriate metrics or indicators to capture such issues*

NEXT STEPS

- The CICES website remains available to promote discussion of these points amongst the wider user community, and the option to place this and the other outcome papers from the London Group remains available. Currently around 250 people are registered at the site.
- Work is also now underway as a result of the December meeting to make more detailed cross-comparisons between different classification systems with partners in Australia.
- Work is also underway as a result of discussion with JRC to test the applicability and scope of CICES in marine and coastal contexts.
- Finally, further work is required based on the experimental accounts proposed by the EEA (Webber, 2011) to better understand: (a) how the ecosystem services defined in CICES can be used to construct aggregate measures that enter into the capital accounting system so that the environmental, economic and social dimensions of the accounts can be linked in an informative way; and (b) how the capital account aggregate measures can be used to assess the potential of ecosystems to deliver the services captured in CICES.

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