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Advancing the System of Environmental-Economic Accounting (SEEA) Experimental Ecosystem Accounting Research Agenda

This material was prepared by UNSD

(for discussion)

Advancing the System of Environmental-Economic Accounting (SEEA) Experimental Ecosystem Accounting

Advancing the EEA Research Agenda

This work was undertaken as part of the Advancing the SEEA Experimental Ecosystem Accounting project. The project is led by the United Nations Statistics Division in collaboration with United Nations Environment Programme through its The Economics of Ecosystems and Biodiversity Office, and the Secretariat of the Convention on Biological Diversity. The project is funded by the Norwegian Ministry of Foreign Affairs.

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1 Introduction

The System of Environmental-Economic Accounting 2012 Central Framework (SEEA Central Framework) was adopted by the United Nations Statistical Commission (UNSC) at its 43rd session in 2012 as the international statistical standard for environmental-economic accounting. Further, at its 44th session in 2013, the UNSC endorsed SEEA 2012 Experimental Ecosystem Accounting (SEEA-EEA). The SEEA EEA 2012 offers a synthesis of the current knowledge in ecosystem accounting and serves as a platform for its development at national and subnational levels. It provides a common set of terms, concepts, accounting principles and classifications, and an integrated accounting structure of ecosystem services and ecosystem assets in both physical and monetary terms.

The paper *''Towards a medium-term programme of work for the SEEA Experimental Ecosystem Accounting''* was presented in the Eighth meeting of the UNCEEA in 2013 for discussion. The UNCEEA expressed strong support for testing and experimentation in ecosystem accounts using SEEA EEA and agreed on a set of priorities for the research agenda, identifying the short-term priorities as:

a) delineation of spatial units and associated classifications, including their link to economic units;
b) methods to measure ecosystem services and ecosystem assets;
c) presentation of structure, including structure of the tables and relevant indicators that can be derived from the accounts;
d) linkages with socioeconomic data; and
e) valuation of ecosystem services.

It also agreed with the proposed medium to long term research priorities:

1) accounting concepts,
2) connection between ecosystem services and ecosystem condition, and
3) aggregation and ecosystem-wide indicators

During the UNCEEA ninth meeting in June 2014, a ''Programme of work for the SEEA Experimental Ecosystem Accounting'' was approved, including the initiation of the project ''Advancing Environmental Economic Accounting through testing SEEA-EEA in pilot countries'' (AEEA) funded by the Norwegian government.

Over the past year AEEA has been working on addressing the above mentioned short- and medium to long term research priorities with varying levels of depth. The next section presents a summary of the work undertaken for each of the research priorities.

2 Advancing the research agenda: AEEA project

A thorough process of technical development was undertaken within the project, to provide comprehensive support to countries wishing increase their capability or pilot SEEA-EEA. This process started with the development of **nine AEEA research papers**[1]. These papers discuss both generic and

[1] Accessible online: http://unstats.un.org/unsd/envaccounting/workshops/eea_forum_2015/lod.asp

specific concepts, methods and data options across the research themes, and consequently served as an input to the compilation of a Technical Guidance (TG) document, and a series of training modules. An additional (tenth) paper is being finalized currently, that aims to clarify some of the issues surrounding biodiversity in ecosystem accounting.

The **Technical Guidance** document presents updates and extensions of ecosystem accounting concepts, methods and structures building on the SEEA EEA 2012. Some concepts and definitions have been refined substantially including ecosystem units, and the introduction of fundamental ecological principles into the accounting concepts and methods. These principles refer to ecosystem function and structure as the key entry points to defining and classifying ecosystem assets and services.

The guidance also presents an overall ecosystem accounting structure containing a number of related tables including *Ecosystem asset account* and its characteristics e.g. ecosystem extent, condition and monetary account (where possible); *Ecosystem service accounts*, including supply and use tables in physical and monetary (where possible) terms; and *Integrated accounts* including tables with institutional sectors and national sector balance sheets (See Figure 1 below from Technical Guidance). Thematic cross-cutting accounting tables on land, water, forest etc are retained for consistency with the SEEA-CF structure.

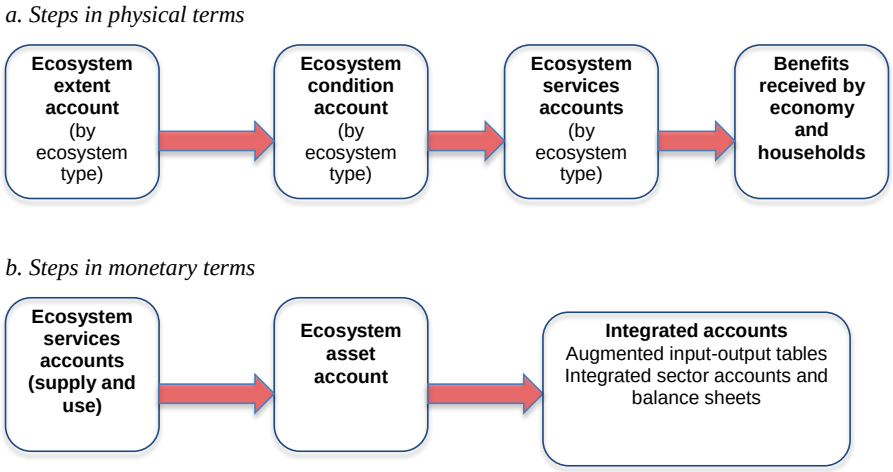

Figure 1 Basic steps in compiling ecosystem accounts

The second **Expert Forum** meeting was convened in April 2015 to discuss the research papers and technical guidance. The meeting was attended by more than 60 experts, with expertise from many fields including national accounting, modelling, remote sensing, assessment and classification of ecosystem services etc.

Four issues were addressed, in accordance with the order of the Research agenda priorities outlined above, namely:

a) Ecosystem accounting units – discussion of approaches and methods
b) Ecosystem service classification and links to ecosystem functions and conditions
c) Measurement and modelling of ecosystem conditions, functions and services
d) Structure of Ecosystem accounts – compilation of accounting outputs and tables

An issue paper was drafted for each of the session[2] which included a list of objectives for testing and recommendations for further research and development[3]. The sessions started with an opening, detailed introductory presentation of each outstanding issue, followed by three to five discussant presentations by experts who were invited to provide critical reflections. These sessions were complemented with group and plenary discussions resulting in many of the technical issues advancing with concrete next steps being recommended[4]. The next section provides an overview of how each of the research priorities has been addressed and advanced within the AEEA project.

3 AEEA Progress Summary

The AEEA project has contributed significantly to extending and understanding many of the issues identified in the SEEA-EEA research agenda. A key challenge remains in the pursuit of agreement on terms and definitions of ecosystem units and services, classification and measurement/modelling techniques of ecosystem services that are in accordance with statistical production criteria and drawing on the experience of SNA. These efforts are continuing to move forward through expert-based revision of available literature, materials and practices, including testing and experimentation by countries that seek to refine and test the options.

Table 1 below provides a summary of the materials developed in the AEEA project and there correspondence to the SEEA EEA research agenda.

Table 1 Summary of technical progress.

	AEEA Research paper complete	Training modules developed (levels 0, 1 and 2)	Included in generic Technical Guide	FORUM review
A. Spatial units, land	√	√ (0, 1, 2)	√	√ (session 2)
- Land accounts and ecosystem extent (assets)	√	√ (0, 1, 2)	√	
B. Methods for measuring ecosystem services and condition	√		√	√
- Ecosystem function and links to assets and services	√		√	√
- Ecosystem condition	√	√ (0, 1, 2)	√	
- Classification of ecosystem services	√	√ (0,1)	√	√ (session 3)

[2] Also available on the FORUM meeting website: http://unstats.un.org/unsd/envaccounting/workshops/eea_forum_2015/lod.asp
[3] http://unstats.un.org/unsd/envaccounting/workshops/eea_forum_2015/lod.asp
[4] See full overview in the FORUM 2015 minutes : http://unstats.un.org/unsd/envaccounting/ceea/meetings/tenth_meeting/Paper10A.pdf

- Biophysical modelling	√	√		√ (session 4)
- Linkages between assets and services	√		√	√
- Carbon accounts	√	√ (0, 1, 2)		
- Water accounts	√	√ (0, 1, 2)		
- Biodiversity	√ (draft)	√		
C. Accounting structure		√	√	√ (session 5)
D. Linking with socio-economic accounts (geospatial methods)				
E. Valuation methods			√	

4 Proposed Research Agenda

The next sections provide detail on the streams of work that have emerged as recommendations from the April expert forum, which will be taken in the proposed research agenda.

4.1 Common definitions and classifications

The ecosystem accounts need a unified set of definitions and classifications for ecosystem units and services (both supply and use). Further, this needs to be built on sound ecological science that incorporates the function and structure of ecosystems and links with condition and capacity issues.

4.1.1 Ecosystem assets and services

During the forum, it was recognized that existing approaches to ecosystem service classifications, SEEA EEA, CICES and FEGS have similar coverage but differ significantly in detail. The forum recommended further analysis be undertaken of the commonalties and differences in these approaches in view of accepted international criteria for creating a statistical classification. SEEA is useful to promote the harmonization and inter-operability between CICES and FEGS and other classification systems.

Further, work has been initiated by UNSD (in collaboration with US EPA and EEA) to develop a paper that will provide an overview of statistical criteria, working processes and guidelines that need to be in place for a classification. The classifications may need to consider ecosystem units, ecosystem function & structure, intermediate and final goods and services separately (as CPC and ISIC) but with the possibility to cross-link between the classified items.

4.1.2 Land and ecosystem extent

Similarly as for ecosystem services, reaching a exhaustive and commonly agreed classification on land cover is also challenging, although a preliminary set of 14 land cover classes has been agreed upon and published in the SEEA-CF. Good correspondence between land accounting (for SEEA-CF) and extent accounting for SEEA-EEA needs to be achieved to ensure internal consistency and comparability between the accounts.

Further work will be undertaken to examine the links between CF land cover classifications and the new EEA guidance material. This will also consider other global land cover nomenclatures and link to ongoing big data projects in collaboration with Group on Earth Observations (GEO).

4.2 Modelling and measuring techniques for ecosystem assets and services

Ecological and environmental measurements that are needed for accounting can only be observed for limited areas, e.g. samples, point-measurements, vegetation. Ecosystem accounts need complete spatial (national/regional) coverage and multi-temporal observations. Therefore some form of modelling will normally be needed to fill in the 'gaps' in both space and time.

Ecosystem accounting addresses a very wide area of interlinked ecological, environmental and economic parameters, each of which in principle can be measured or modelling separately at a varying degree of precision. In an accounting framework these parameters need to be consistently estimated to ensure reliable quantifications of a function (with interlinked processes) that informs on the status of the ecosystem condition, related bio-physical process/structures, generation and use of ecosystem services. The forum recommended starting a review of appropriate modelling techniques in accordance with accounting criteria. UNSD will continue this work in the latter half of 2015 as part of the AEEA project.

4.3 Mechanisms for moving forward

In Session 45 (UNSC 2014, E/CN.3/2014/35) the Statistical Commission agreed to establish a technical committee on the SEEA Experimental Ecosystem Accounting to advance its research and testing agenda prioritizing those issues that could be solved in the short to medium term. Further they encouraged the Committee to establish cooperation with the geospatial community and with existing initiatives on the measurement and assessment of ecosystems, such as Wealth Accounting and Valuation of Ecosystem Services and The Economics of Ecosystems and Biodiversity.

The technical committee will be used as the mechanism for broader consultation and familiarisation to test and extend the new concepts and methods that result from work on the research agenda including the AEEA project.

5 Questions for discussion

Do you agree with the progress to date and the suggested way forward noted above in Section 4?