Statistiska centralbyrån Statistics Sweden

Abstracts for 24th London group meeting

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Contents

METHODOLOGICAL WORK SEEA CF

1. Testing of a method of statistics on fossil fuel transactions from the SEEA

Author: Viveka Palm, Statistics Sweden

The SEEA community can provide data for the Agenda 2030 by identifying the fossil fuel related transactions in the national accounts. The data used for the current global assessments is today largely being collected by energy companies (for the IEA) and by ministries (to OECD). The statistical system could provide statistics in a coherent way from the national accounts. For countries with a developed SEEA, the provision of statistics on emissions and energy use by industries can increase the quality of data and the possibilities for analysis. There is now a suggestion on how to follow up fossil fuel subsidies in the SDG monitoring. It needs to be tested in countries. Last year we started to discuss how to do this. We suggested to create a group of experts to discuss the methods once presented (via web) during 2018. We will use the method proposed by the Expert group led by UN Environment as a starting point.

1. Discuss and test the measurement definition for the transactions of interests – subsidies, investment grants and social transfers in kind, indirect transactions: as well as some suggested reference values

2. Evaluate and adjust proposal

3. Propose an approach to the SEEA – discuss the proposal at UNEP/London group 2018/2019

4. Go through established process: SEEA Technical Committee and UNCEEA and publish on SEEA website.

A paper will be summarizing the outcome of the work done so far.

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2. Classification of environmental activities

Author: Veronika Vysna, Eurostat

Abstract: The SEEA CF research agenda has two interrelated items about the definition of resource management and implementation of the classification of environmental activities (CEA). Eurostat, as the lead agency for those two items, is engaged into a project to review them. This project has a long time schedule because international classifications involve statisticians beyond environmental accountants and require more coordination and discussion. This might be achieved in late 2021 or early 2022 with the approval of a revised CEA as international classification by UN Statistical Committee.

In parallel, and with shorter delivery date, European compilers need guidelines about implementation of the CEPA and CReMA classifications used in current data collections. A Eurostat task force of European compilers is updating explanatory notes for CEPA and developing them for CReMA. The goal is to provide guidance to European compilers ideally for data collections taking place in 2019. This task force is also providing input to the long term review of CEA in particular by

considering options for an integrated classification of environmental protection and resource management activities.

This document reports progress on this work and seeks a discussion by the London Group of experts about some questions identified by the Eurostat task force.

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3. Natural resource reserve index - Abstract

Author: Gabriel Gagnon, Statistics Canada

Profit, royalties, and export revenue stemming from extracted natural resources such as oil, gas, and gold contribute substantially to Canada's economy. Likewise, natural resources that are economically and technologically feasible to extract are a potential source of future income. However, natural resource wealth is highly volatile, primarily due to fluctuations in resource prices, but also because of changes in reserves. Thus, it is inherently volatile as it embodies highly unpredictable factors such as resource prices, extraction costs and resource rent. The physical reserve of a resource which is the basis of the wealth, also occasionally undergoes changes due to extraction, technological advancement and discoveries or re-evaluations of resource stocks. Price-induced volatility in natural resource wealth is well-established, however the impact of changes in physical reserves on wealth is seldom studied.

Currently the SEEA CF discusses physical and monetary asset accounts (section 5.3), both volatile measures which the natural resource reserve index (NRRI) aims to rectify.

The number of studies on NRRI is limited to Australia and the Netherlands. The approaches taken by the two countries are quite different and serve different purposes. The Australian Bureau of Statistics index measures constant price of monetary assets for their inclusion in the national balance sheet accounts, but does not aggregate physical reserves. The Netherlands' approach is based on a pre-defined scale and examines the state of ecosystems. Canada's proposed article would compute a NRRI and link it with monetary wealth.

The proposed index is created by averaging physical reserves weighted by their relative share of wealth. Simply adding reserves of different resources is not meaningful since for instance, oil is measured in cubic metres and gold is measured in tonnes. The chain-Fisher index, with 1990 as the base year, tracks the physical dimension of reserves over time and enhances interpretation of monetary wealth. Findings reveal that natural wealth moved in tandem with the NRRI in most years, however the two occasionally diverted.

The NRRI would:

- track year-over-year change in aggregate natural resource stock
- identify which category of resources is depleting faster than it is being replenished
- analyze the wealth volatility stemming from changes in reserves.

A comprehensive understanding of natural resource assets would be enhanced by a reserve index. Furthermore, such an index, in conjunction with human capital and produced capital, can be used as

an indicator of sustainable development. With the availability of data, similar indexes can be estimated at the provincial-territorial level, and the index can be used for designing sustainable development strategies, as well as for inter-provincial comparisons.

It is recommended that a section be added to the SEEA CF that outlines the concepts and methodology of the NRRI. Canada proposes adding section “5.3.4 Conceptual form of the natural resource reserve index.”

SEEA CF implementation

4. Natural Capital Accounting in the U.S.: Preliminary Tables, Methodological Issues, and Data Challenges*

Presenting author: Scott Wentland (U.S. Bureau of Economic Analysis)
Powell Natural Capital Accounting Working Group:
Zachary Ancona – *U.S. Geological Survey*
Kenneth Bagstad – *U.S. Geological Survey*
James Boyd – *Resources for the Future*
Carl D Shapiro – *U.S. Geological Survey*
Carter Ingram – *Ernst & Young*
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Ann Miller – *U.S. Department of Interior*
Kirsten L.L. Oleson – *University of Hawaii*
Lydia Olander – *Duke University*
Charles Rhodes – *U.S. Env. Protection Agency*
Marc Russell - *U.S. Env. Protection Agency*
François Soulard – *Statistics Canada*
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Michael Vardon – *Australian National University*
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Brian Voigt – *University of Vermont*
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*Disclaimer: Any views expressed here are those of the authors and not necessarily those of the U.S. Department of Commerce, U.S State Department, U.S. Environmental Protection Agency, Statistics Canada, World Bank, or agencies/organizations therein.

Abstract
An interdisciplinary working group comprised of experts in economics, accounting, and the natural sciences has worked to develop proof-of-concept natural capital accounts (land, water, and ecosystems) for the United States using existing data sources. With support from the National Socio-Environmental Synthesis Center (SESYNC) and the USGS Powell Center, the group has endeavored to integrate data from multiple sources to assemble accounts following methods from the SEEA CF and SEEA EEA at national and subnational scales. Specifically, the land and water accounts draw on (1) existing land cover and land use datasets generated by the USGS and others, (2) property value data from Zillow provided to the Bureau of Economic Analysis (BEA) through a public-private partnership, (3) USGS water use reports, (4) USGS and U.S. EPA water quality and emissions data, and (5) BEA and USGS data to quantify water productivity. The preliminary land account tables link land use, land cover, and land value data at state and national levels to generate linkages between land and industry/commercial uses via NAICS classifications. In addition, the group has worked to develop four initial water accounts, physical supply and use, water emissions, water quality, and water productivity, with an effort to conceptually map the linkages between water quality constituents monitored by USGS and economic sectors tracked in 5-year USGS water use reports. Ecosystem accounts have begun by quantifying condition, capacity, and physical supply-use for several ecosystem services, starting in the U.S. Southeast and then scaling to the national level. As part of this effort, we wish to solicit critical feedback on the scope, data sources, methodologies, and quality of these first-generation, experimental products (for the United States).

Specific Contributions to the London Group Meeting: Our paper and presentation will document issues and challenges shared by statistical agencies from around the world who seek to implement SEEA CF and SEEA EEA accounts and make progress on the SEEA CF research agenda. Among a number of broader linkages to the London Group and SEEA CF research agendas, this presentation will include an overview of the U.S. accounts thus far, with specific questions to leverage the London Group's expertise regarding integration of the physical accounts with valuation data, linkages to industry classifications and economic sectors, and advice for next steps with ecosystem services and other accounts.

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5. Bringing two water accounts together – an integrated water account for the Australian Capital Territory (Australia)

Wayne Qu, Steven May, Janice Green and Michael Vardon (ABS/BoM/ANU collaboration)

Water accounting is a way of arranging water information to suit a variety of management and policy needs. There are many types of water accounts produced by a variety of Australian business and government organisations, from catchment management regions to river basins, states, territories and at the national level. As competition for water resources increases so too does the need to fully and consistently account for how water is shared between the economy, people and the environment.

In Australia, several State government agencies produce water accounts, while two Federal government agencies – the Australian Bureau of Statistics (ABS) and the Bureau of Meteorology (BoM) – produce annual national water accounts of different types, for differing but complementary purposes.

The Bureau of Meteorology's National Water Account (NWA) and the Australian Bureau of Statistics' Water Account Australia (WAA) emphasise different aspects of Australian water resources and the use of these resources by the Australian community. The NWA focuses on the volume of water in the environment, its availability, the rights to abstract water and the actual abstraction over time. The NWA includes information on climate and weather impacts on water availability, along with water management policies and practices. The WAA shows how much water is used by human activity. It focuses on flows of water from the environment to the water supply industry and other economic activities, particularly agriculture and the flows of water from the water supply industry to households and businesses. The WAA also records the monetary values associated with water supplied and used in the economy.

The ABS water accounts follow the key concepts of the SEEA framework, however the ABS accounts pre-date both the SEEA Central Framework and SEEA Water and some aspects do not align exactly with these frameworks. The BOM uses a National Water Accounting Standard accounting system, a framework that was first issued in 2009.

This project utilises the SEEA framework to integrate these water accounts, which were compiled under two different frameworks by two different organisations. It provides an excellent example of an NSO working with another government organisation to produce an integrated environmental-economic account.

It is proposed that the paper will outline four types of integrated water accounts for the Australian Capital Territory (joint work is still required between ABS and BOM to finalise the content):

- The water asset account, detailing the amount of water occurring in the environment, including artificial reservoirs, inflows from rainfall and upstream sources and the amount extracted from the environment for use.
- The physical supply and use tables for water, displaying the amount of water extracted from the environment by households and industry, how this flows through the economy, and the volumes that are returned to the environment (e.g. the discharges of treated sewerage water).
- The monetary supply and use tables for water, presenting information on the monetary supply and use of water in the Australian economy, including valuation of natural inputs (Ecosystem service of water provisioning) revenue from sales of water and the provision of water and sewerage services expenditure on water and sewerage services by industries and households.
- A water condition account, covering the condition of lakes, rivers and streams using a range of ecological measures (e.g. water bugs, turbidity, pH).

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6. Up-to-date environmental accounts. Quarterly emissions to air.

Author: Susanna Roth, Statistics Sweden

Since 2015, Statistics Sweden has published regular quarterly environmental accounts on greenhouse gas (GHG) emissions and air pollution (see Statistics Sweden, 2018). The statistics make it possible to follow emissions trends on a quarterly basis. The current production time is around four to five months after the previous quarter. Quarterly statistics also enables production of preliminary annual statistics (sum of four quarters) which is published ahead of the final annual statistics on emissions to air.

To produce quarterly statistics calculations are carried out differently for stationary combustion, mobile combustion and other emissions. More information on the methodology can be found in a report from Statistics Sweden from 2016 (Statics Sweden, 2016).

The proposed paper will focus on a number of future extensions and improvements for the quarterly emissions statistics:

- Residence principle. There are often very large variation in emissions in especially international maritime traffic but also air transport. Current calculation methods also make it difficult to distinguish between Swedish and foreign actors, which means that the results in this industry should be interpreted with caution. The paper will investigate this issue further including possible alternatives for better methodology for residence adjustment.
- "Speed up publication". To publish environmental accounts at the same time or in connections with the national accounts' quarterly statistics, to make the statistics more relevant and up to date. Quarterly national accounts are published around two months after the previous quarter. There is though a trade off with the quality in assessments and possible problems with access to short-term statistics that will be further investigated in the paper.
- Seasonal adjustment. As of today, there is no treatment of seasonality and calendar effects in estimating quarterly emissions, which need to be further investigated.
- Quarterly Input Output models. Investigate the possibility and potential use of quarterly input output models.

- Indicators. Development of indicators for better and more policy relevant communication of the quarterly and preliminary annual statistics on air emissions.

Reference

Statistics Sweden, 2018, Air emissions by industry SNI 2007(NACE) and subject, Quarter 2008K1 - 2017K3, http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__MI__MI1301__MI1301B/MiljoUtslappAmneSNIK/?rxid=df7e4ebc-e9fa-46dc-8c01-2445884ae6d3

Statistics Sweden, 2016, New method for up-to-date environmental accounts: -quarterly emissions to air, MIR 2016:3, https://www.scb.se/Statistik/_Publikationer/MI1301_2008I15_BR_MI71BR1604ENG.pdf

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7. STATISTICAL STRENGTHENING FOR THE CONSTRUCTION OF ENVIRONMENTAL AND ECONOMIC ACCOUNTS IN COLOMBIA.

Author: Bayron de Jesús Cubillos López

In recent years, Colombia has made significant progress in implementation of the System of Environmental and Economic Accounting (SEEA), which is reflected through the results broadcasted by the Environmental Satellite Account (EAS). There are highlights in methodological advances for the estimation in physical units, in the Environmental and Economic Accounts of: mineral assets and energy resources, land resource, timber resource; energy flows, forest goods flows, water flows and material flows (air emissions and solid waste); the account of environmental activities and related transactions to the environment is stated in monetary units.

During the last year different inter-institutional agendas have been developed, headed by DANE, as the National Statistical System (NSS) coordinator, with the aim to generate actions directed to strengthen statistical production and the usage of administrative records, involving several actors and different types of analysis are addressed:

 Methodological integration of environmental and environmental-economic analysis instruments: methodological standardization for the analysis and use of statistical information from administrative records and statistical operations which are inputs of the National Water Study (NWS) 2016 and the National Water Account, made by the Institute of Hydrology, Meteorology and Studies Environmental (IDEAM) and the National Administrative Department of Statistics (DANE), respectively. For the first semester of 2018, several analyses had been done related to coverage, exhaustiveness and information quality held by the country and related to the water resources management of the following economic activity divisions: agriculture, cattle raising, forestry, fishing and manufacturing industry. The next stages are projected in order to review the information quality attributes for the following economic activities: mining and quarrying and services. In addition, to keep record of the methodological differences of each instruments used in the analysis of the final results.

 Environmental activities Account and its integration with the tools for the Climate Change Strategy: the work has been done on the standardization of the methodology for the analysis and use of statistical information, which is an input in the preparation of the Account of environmental activities and related transactions to the environment (Expenditure on environmental protection and resource management) carried out by the DANE and the Monitoring, Reporting and Verification System (MRV) for financing of climate change, led by the National Planning Department (DNP). For the first semester of 2018, the nomenclatures and classifications to be used in the different measurements have been analyzed, and actions have been taken to standardize it, which include the adaptation of the Classification of Environmental Activities to Climate Change Actions; The analysis has been done to the coverage, exhaustiveness and quality of the statistical operations and administrative records, where the government institutional sector and manufacturing industry economic activity investment and expenditure is related to environmental protection or resource management. The next stages are expected to review the attributes of information quality for the following divisions of economic activities: agriculture, cattle raising, forestry and fishing; mining and quarrying, services, external sector. In addition to document the methodological differences of each of the instruments to be taken into account in the analysis of the final results.

 Valuation of Non-Financial and Non-Produced Assets: inter-institutional work spaces have been established for the discussion of valuation methods for non-produced and non-financial assets, mainly related to natural resources (renewable and non-renewable). Initially, these tests are being done to measure the timber resource through the joint work between DANE and IDEAM and of mineral and energy resources with the National Mining Agency (NMA).

 Experimental Ecosystem Account: one of the main challenges of the Environmental Satellite Account in Colombia is the methodological development of the Experimental Ecosystem Account - Orinoquia Case. This is the continuance of a work that was accomplished till 2017, with support from WAVES initiative of the World Bank; and expectantly to make available to the public in 2018. By now, conceptual and theoretical framework analysis have been made, primarily based in the international recommendations defined by the SEEA-E; specific technical agreements related to the use of ecosystem maps for the periods 2005-2009 and

2010-2012 have been defined; Initially it is proposed to carry out the analyzes for Orinoquia´s Macro-watershed, through defined indicators and complemented by DANE´s and IDEAM´s technical team.

METHODOLOGICAL WORK SEEA EEA

8. Developing ecosystem condition accounts for the EU on the basis of parameters identified under the EU MAES process as critical for ecosystem condition in Europe

Author: Jan-Erik Petersen, Markus Erhard, Kremena Gocheva (EEA) and Joachim Maes (JRC)

The European Union (EU) has set itself ambitious targets for the preservation and better management of natural capital in the 7th Environmental Action Programme of the EU and the EU Biodiversity Strategy to 2020. To build the knowledge base for achieving these objectives, a shared project was set up at EU level to develop an integrated system for natural capital and ecosystem services accounting (KIP INCA). The key goal for KIP INCA is to establish a system that enables regular ecosystem accounting at EU level building on the SEEA-EEA and methodological developments under the EU's Mapping and Assessment of Ecosystems and their Services (MAES) initiative.

This paper sets out the methodological approach for identifying and developing priority accounts for measuring ecosystem condition in Europe. In 2018 the working group MAES delivered as special report on ecosystem condition (Maes et al. 2018). This defines ecosystem condition as 'the physical, chemical and biological condition or quality of an ecosystem at a particular point in time', which corresponds well with the definition published in the SEEA EEA technical recommendations: Ecosystem condition reflects the overall quality of an ecosystem asset in terms of its characteristics.

The 2018 MAES report identifies a concrete set of indicators for mapping and assessment of ecosystem condition at European level. A set with specific indicators for each of the nine broad ecosystem types that form the foundation for mapping and assessing ecosystems and their services under the EU MAES initiative. In addition, a core set with key indicators is identified to support an integrated ecosystem assessment across ecosystem type.

This 5th MAES report constitutes a good starting point identifying and developing priority accounts for measuring ecosystem condition in Europe. The paper will describe the methodological approach employed in selecting the priority condition parameters as well as the means foreseen for developing them at a spatial scale that is commensurate with the distribution and size of broad ecosystem types in Europe. The paper will explain out how data sets and a data architecture are being set up for measuring ecosystem condition on the basis of examples on spatial nutrient accounts and water quality accounts for Europe.

To further develop a spatial and integrated accounting approach, this ongoing work needs to be rolled out to other condition parameters in the context of generating spatially explicit ecosystem accounts that integrate information across a wider set of ecosystem condition factors. The paper thus aims to analyse key issues for measuring ecosystem condition in a spatially explicit manner as a contribution to developing the methodology for accounting for ecosystems condition in an SEEA EEA context.

9. Biodiversity accounts that link to environmental reporting for the Australian Capital Territory (Australia): a case study

Author: Suzi Bond (ABS) and Michael Vardon (ANU)

We present a set of novel butterfly accounts for the Australian Capital Territory (ACT), Australia. These accounts identify the theoretical and practical issues in producing biodiversity accounts and assess the implications of such biodiversity accounts for public policy and the management of species and public areas in the ACT and beyond. The accounts are to be used in ACT State of Environment reporting and considered for broader national biodiversity application.

The butterfly accounts span from 2014-15 to 2017-18, and the data sources and methods underpinning the accounts are detailed in the paper. The accounts aim to include butterfly species presence and abundance by habitat type and season for each survey year and between two points in time, butterfly species area of distribution by habitat and a land cover account.

These types of biodiversity accounts will support the development of the SEEA-Experimental Ecosystem Accounting framework and the UN ambition to elevate the system to an international standard.

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10. Testing the development of biodiversity accounts for measuring ecosystem condition in the EU

Author: Steven King, UNEP-WCMC

The European Union (EU) has set itself ambitious targets for the preservation and better management of natural capital in the 7th Environmental Action Programme of the EU and the EU Biodiversity Strategy to 2020. To build the knowledge base for achieving these objectives, a shared project was set up at EU level to develop an integrated system for natural capital and ecosystem services accounting (KIP INCA). The key goal for KIP INCA is to establish a system that enables regular ecosystem accounting at EU level using the SEEA-EEA and methodological developments under the EU's 'Mapping and Assessment of Ecosystems and their Services' (MAES) initiative.

This paper describes methodological approaches developed under KIP-INCA to calculate thematic accounts for biodiversity, which can support ecosystem condition accounting in the EU. The first set of such accounts were developed in 2017 using data supplied by Member States under the reporting obligations of the EU Habitats and Birds Directives (collectively the Nature Directives). A number of different accounting constructs were developed and tested using this data. For example, comparing the indicators derived from the accounts using all data, focusing on species groups (e.g., Common Birds) and disaggregating data to the ecosystem typology developed under MAES. These accounts were found to provide a useful foundation for informing on policy objectives in the EU. Most importantly, they support an integrated approach to ecosystems management to achieve goals of the EUs Biodiversity Strategy for habitats and birds in the context of other land use concerns.

One key limitation for these accounts is their ability to support detailed spatial analysis at sub-national scales. Further experimentation with data reported under the Birds Directive, identified that information on distribution could be used to support accounting for suitable habitat condition. However, spatial disaggregation of statistics on bird and species status derived from the Nature Directives was not possible beyond national or biogeographical scales.

To further develop a spatial and integrated accounting approach, work is ongoing during 2018 to test approaches using georeferenced data on bird species observations. This work is being progressed in collaboration with the European Bird Census Council (EBBC) and will draw on micro data used to inform the Pan European Bird Monitoring Scheme (PECBMS). These data are being obtained from selected EU Member State organisations with the responsibilities for national bird monitoring surveys that inform the PECMBS. During the course of 2018 the intention is to test a more concrete spatial approach to biodiversity and ecosystem condition accounting using this data. In addition, the use of wider data (e.g., grassland butterfly surveys) will also be explored in the context of generating spatially explicit ecosystem accounts that integrate information across a wider set of species groups.

It is hoped that testing the development of these different biodiversity accounts and their use for measuring ecosystem condition in the EU will support others interested in accounting for ecosystems condition. Given, this is a challenging area of work for ecosystem accounting it generates multiple methodological issues for discussion.

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11. SNA and non-SNA benefits investigated through CICES - NESCS

Main authors: Alessandra La Notte, Charles Rhodes

Long Abstract

In the SEEA-EEA, ecosystem services are depicted through supply and use tables. Starting from the proposed SEEA-EEA Technical Recommendations, the item 'product' in the use table can be expanded to include not only SNA but also non-SNA benefits. At the moment, the SEEA-EEA general frame considers SNA benefits to be 'products' with economic inputs and with or without ecosystem services inputs, and non-SNA benefits to be the corresponding ecosystem services that are consumed directly (like economic 'products', but without including substantial economic inputs) by end-users. In order to supplement basic accounts with additional information, benefits can be disentangled from services (both SNA and non-SNA benefits), depicted in the products section of the use table.

Table 5.1 in the SEEA-EEA Technical Recommendations can be expanded by disentangling from the "products" section the SNA and non-SNA benefits.

One crucial element to be considered is that to be able to allocate specific benefits to specific beneficiaries there can be in the use table different uses of ecosystem flows within a type of economic unit, where each use-user combination can have identifying physical and monetary flows. We proceed to a pilot demonstration of allocating benefits this way: identifying "use" breakdowns for the types of economic units that are the "users" of ecosystem services.

NESCS is the only classification system that provides a systematic framework that separates uses and users, where NESCS builds codes by Environment—Ecological End-Product—Use—User (WW.XX.YYYY.Z…Z). In Table 1, we show potential complementarity between CICES (which builds codes by Section—Division—Group—Class (A.B.C.D)) and NESCS, for types of ecosystem services that each system names.

Table 1 – Examples of complementarity between CICES and NESCS

CICES classification, v.5	*Re-phrased as contribution of ecosystem*	*NESCS*		
		Ecological End-products [SNA and non-SNA Benefit]	"Use"	*NESCS* "User"/Beneficiary
Pollination and seed dispersal (2.2.2.1)	Wild crop pollination	***Fauna (.3.)*** [SNA: wild pollinators not directly in SNA, but represented through crops]	Support of plant or animal cultivation Code: 2(2).1105	Agriculture (111) [SNA] 2(2).3.1105.111 Households (2) [non-SNA] 2(3).3.1105.2
…				
Experiential use of…animals…in different environmental settings (3.1.1.1)	Enjoyment of wild animals in a natural setting	***Fauna (.3.)*** [SNA: tour services under Administrative and Support, ISIC:791; NAICS:56152]	In-situ recreation/tourism Code for animals in forests only: 21.1207	Administrative Support… (561) [SNA] 21.3.1207.561 Households (2) [non-SNA] 21.3.1207.2

In the use table NESCS ecological end-products are rows (in Figure 1). Attributing appropriate types of uses may add columns on the left-hand side of Figure 1, where existing columns are industrial sectors, households, or broad societal groups such as domestic and non-domestic governments.

In Table 1, within each economic sector a NESCS use category is attached so that the same ecological endpoint can be allocated to different beneficiaries with a different use category. Note that for both example rows, CICES v.5 has one code, but NESCS has two, because there are two types of Users for the same Use (one SNA, and one non-SNA). This is demonstrated in the "experiential interaction with nature" row, as either an SNA benefit to the tourist service industry, or a non-SNA benefit for households who enjoy the ecosystem services of wild animal watching without economic mediation by a hired service.

We are currently working on a paper that conceptually explains the logical flow that drives this framework. The paper will be made available for the London Group meeting together with a detailed appendix (likely xls file) reporting ecological endpoints one by one in a modified use table, expanded to include representative use categories.

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12. The combination of SEEA-AFF and SEEA-EEA for provisioning services. A first pilot in EU.

Main authors: Alessandra La Notte, Silvia Cerilli et al. (there are many contributors for the case study applications: the list of authors will be updated)

Abstract

The FAO develops the SEEA-Agriculture Forestry and Fisheries (AFF), which applies the environmental economic structures and principles described in the System of Environmental Economic Accounting - Central Framework (SEEA-CF) to the activities of agriculture, forestry and fisheries. The value-added of SEEA AFF lies in the integration of information that is considered standard from either an SNA or SEEA perspective. The JRC, as part of the KIP-INCA project, develops the ecosystem services supply and use tables of the SEEA-EEA.

There are data, knowledge and methodology available to advance the development of the SEEA-AFF integrating provisioning ecosystem services, consistently with the SEEA-EEA.

After an initial screening, a simplified procedure (i.e., tier one and/or tier two approach) can be formulated for provisioning services. The simplified procedure will assess the contribution of ecosystem types starting from the SNA products they generate and are reported, with the specific features that characterize agriculture, forestry and fisheries, by the SEEA-AFF. To start from the SEEA-AFF to build the simplified procedure for SEEA-EEA provisioning services guarantees full consistency of the provisioning ecosystem services accounts with the SEEA-CF and with the SNA.

This application will show specifically: crop provision and timber provision. For crop provision, an emergy-based approach is used to assess both the ecosystem contribution and the human input to crop production. The main outcome of this application shows how important its is to disentangle crop provision as service from crops as product. The latter should not be used as proxy for the former as it is. For timber provision, the simplified procedure is tested by using the JRC biomass study on forests. Preliminary results of both applications will be presented and discussed.

This is still a work in progress that has just begun. However, few crucial issues already raise and need to be addressed.

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13. Integrating ecosystem extent and condition accounts to identify ecosystem capacity, illustrated by an example of accounting for prioritized ecosystem services in the metropolitan area of the Oslo Region

Authors: Per Arild Garnåsjordet (SSB/NINA), Margrete Steinnes (SSB), David N. Barton (NINA), Zofie.Cimburova (NINA), Iulie Aslaksen (SSB). Potential co-authors to be contacted: Megan Nowell (NINA), Carl Obst, Lars Hein.

SEEA EEA research area: 1. Spatial areas. Classification of ecosystem types.

Abstract:

Methodological issue, (what needs to be clarified/changed): In SEEA EEA the ecosystem extent and condition are established in separate accounts. There has been less focus on how ecosystem condition measures used in ecosystem service modelling and mapping are often required at a higher resolution, in particular when identifying land cover qualities that determine ecosystem capacity.

Considering the relationship between the delineation of spatial areas and the generation of ecosystem services, e.g. regulating services generated over spatial areas that cross ecosystem types, introduces a spatial complexity not reflected in the current version of SEEA EEA. This complexity calls for more flexible spatial scales and integrated extent and condition accounts, in order to identify ecosystem capacity, to compare generation of ecosystem services with location of beneficiaries of those services, and to find the relevant level for aggregation and communication of ecosystem values in policy analysis. Drawing the boundary of urban ecosystems particularly illustrates this point.

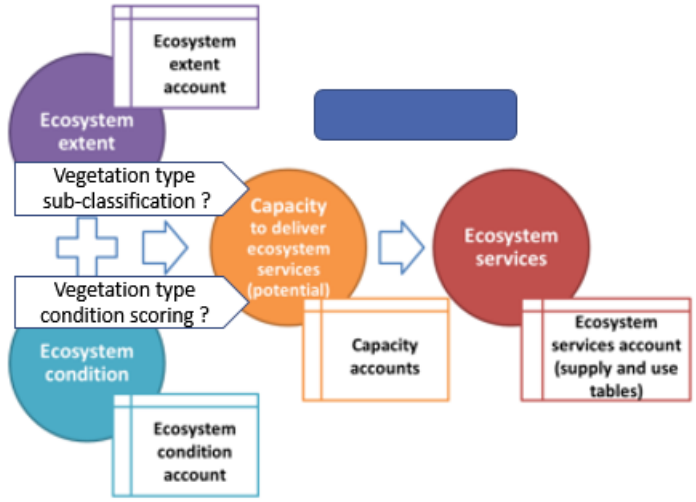
Status (In the current SEEA CF/SEEA EEA and/or Technical Recommendations): The extent accounts have a fixed spatial scale, based on basic spatial units. "The Ecosystem assets that are the basis for ecosystem accounting are spatial areas. Consequently the delineation of spatial areas within a country is a fundamental part of ecosystem accounting" (Technical guidance 2015). Condition indicators based on existing environmental monitoring programmes are generally not representative of the basic spatial units chosen for ecosystem extent accounts at national level. Ecosystem service mapping (e.g. Zulian et al.2017) often uses detailed land cover sub-classifications as proxies for ecosystem condition, and combined with expert judgement on capacity by landcover subclass, as proxies for ecosystem service capacity. This blurs the conceptual boundaries between extent and condition accounts.

History (What has been discussed previously on the topic): In SEEA EEA ecosystem capacity is defined in terms of sustaining a "basket"/"bundle" of multiple ecosystem services from an ecosystem at a given spatial level. Ecosystem capacity is thus the ability to generate ecosystem services, at the maximum level that does not negatively affect future supply (Hein et al. 2016). An accounting system may under-communicate that different services may not be used in full capacity because of trade-offs. The supply of one ecosystem service can reduce the ecosystem's capacity to supply other services. The reduction in capacity may be expressed in different ways in separate accounts, and an integration of accounts is called for in order to illustrate trade-offs between current and future services.

Proposal(s) for way forward: In this paper, in the context of the URBAN EEA project, we discuss integration of ecosystem extent and condition accounts in order to identify ecosystem capacity, by exploring some examples of cultural and regulating ecosystem services that are policy priorities, and we will explore one of the ecosystem services pollination, water run-off, or recreation, that are consistent with the land use change examples to be used in the paper, for the metropolitan area of the Oslo Region. We explore how the definition of urban ecosystem extent depends on assumptions about ecosystem condition, e.g. to what extent the limit of the urban ecosystems should be defined by built-up area, or by a zone of urban influence on different ecosystem services, depending on the resolution of mapping. Moreover, within built-up areas, high resolution combinations of land use and land cover data show that built-up areas are not only built-up surfaces, but contain large areas with abiotic and biotic conditions that provide habitat and regulating ecosystem services. By combining data from satellite images, detailed land use maps and a detailed land register system, with information on loss of agricultural land in peri-urban areas, we test an integration of ecosystem extent and condition accounts that makes cultural and regulating ecosystem service mapping more sensitive to incremental changes in vegetation condition experienced across an urban-rural transect.

Proposal of changes/additions in the SEEA CF/EEA: There is a need for practical compromises on spatial resolution for extent accounting in order to represent ecosystem condition in the ecosystem accounting framework. Based on our analysis of land use change in urbanization, we discuss how integrated extent-condition accounting can take steps towards identifying ecosystem capacity, while the quantitative modelling that is still missing to properly identify ecosystem capacity. We suggest how this approach can contribute to implementation of flexible spatial accounts in SEEA EEA.

Figure 1. Ecosystem extent and condition accounts and their possible relation to ecosystem capacity.



Source: adapted from European Commission (2018) Mapping and Assessment of Ecosystems and their Services. An analytical framework for mapping and assessment of ecosystem condition in the EU. Discussion Paper - Final Version January 2018.

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14. Valuation of cultural ecosystem services in ecosystem accounting – a comparison of methods for local nature recreation in the Oslo Region, Norway

Authors: David N. Barton (NINA), Kristine Grimsrud (SSB)

SEEA-EEA research area 4: Accounting treatments and valuation - Issue 5: Valuation methods for key ecosystem services

Abstract: *Methodological issue (what needs to be clarified/changed):* Local recreation near and in urban areas such as Oslo has no bservable market price. However, it can involve a large number of users using relatively small green and blue public spaces. Per unit area welfare values for recreation use of urban and peri-urban ecosystems are expected to be high. The information value of *accounting compatible valuation methods* is in question if credible exchange values can only be computed with exceptional assumptions.

Status (In the current SEEA EEA Technical Recommendations): Stated preference valuation methods (contingent valuation and choice experiments) and travel cost methods have been the most common in valuing nature recreation. However, SEEA EEA TR clearly states that methods estimating consumer surplus /economic welfare measures are not accounting compatible. However, the TR

recommend that recreation demand information from stated preference and travel cost methods can sometimes be retrieved and used to simulate market demand and estimate exchange value. TR show that all monetary valuation methods for open access recreation require strong, but varying assumptions.

History (What has been discussed previously on the topic): Simulated exchange values have been proposed as an approach to accounting compatible valuation of open access nature recreation. However, simulated exchange value methods are also challenged by context specific circumstances. Strong assumptions are required about the characteristics of management (significant variable costs of management for additional visitors), physical characteristics of the ecosystem service (uniqueness, non-substitutibility) and institutional conditions (excludability). Particularly in Nordic countries 'everyman's right of access' to non-unique, and often quite ubiquitous nature that is close to cities, makes the use of simulated exchange method more challenging than for recreational 'destinations'.

Proposal(s) for way forward: With strong assumptions required to simulate exchange values, there is a possibility that accounting values are computed that have low relevance as indicators for managing local urban nature. In this paper we compare the pros and cons of different valuation methods for local nature recreation in the context of ecosystem accounting (Figure 1). We compare empirical valuation estimates based on exchange values (1-4, 7), based on welfare estimates (5-6) and non-monetary value indicators such as recreation time on site (8) (see Figure 2 for method types).

Proposal of changes/additions in the SEEA CF/EEA: With our empirical example we discuss a set of criteria for assessing the appropriateness of valuation methods which could contribute to the SEEA EEA TR, including (Figure 2 method-criteria appraisal matrix):

- Compatibility with the production boundary
- Avoiding double counting
- Exchange value compatibility
- Value significance
- Fit-for-policy-purpose (accuracy, reliability)
- Information costs

The paper develops valuation examples initially presented to the London Group 2017 in https://seea.un.org/sites/seea.un.org/files/lg23_barton_et_al._2017_-_urban_eea_-_valuation_v3.pdf

Figure 1 Valuation methods in ecosystem accounting

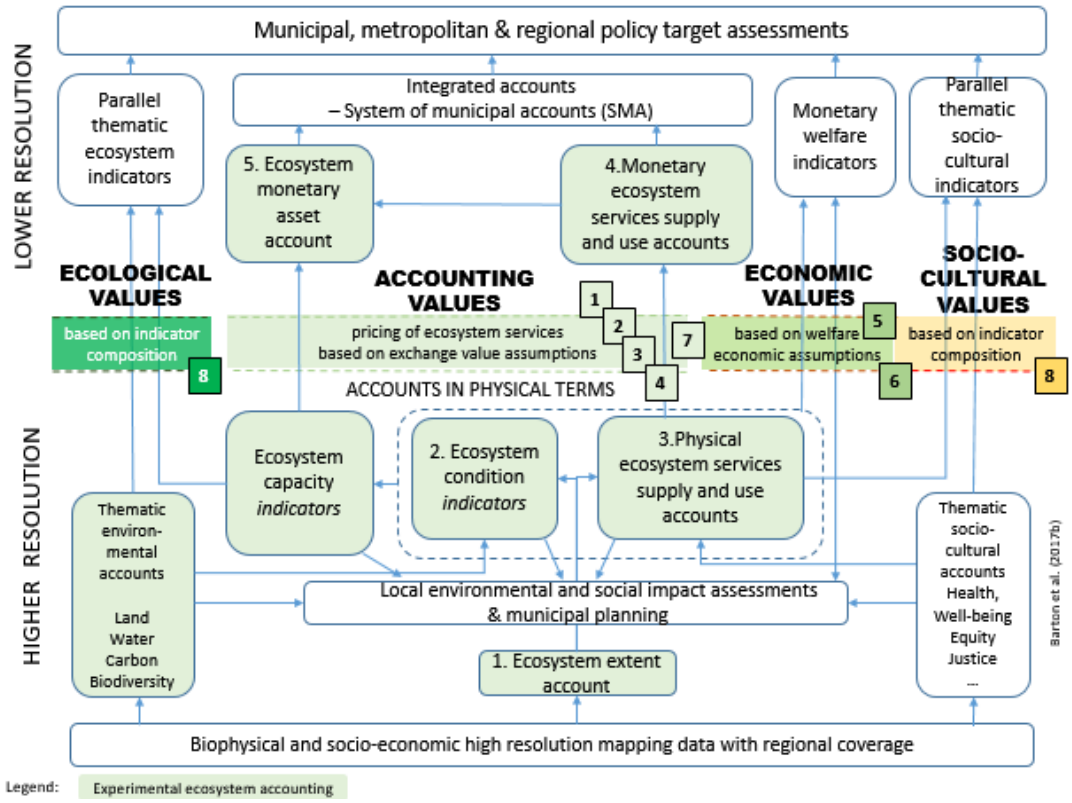
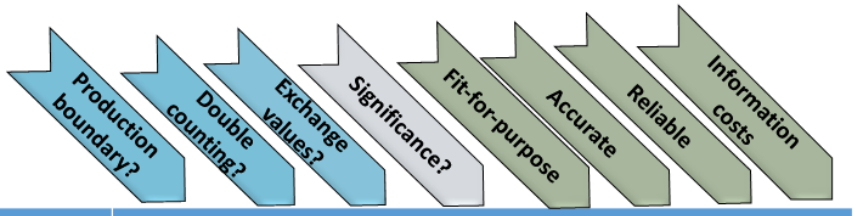


Figure 2 A proposal for valuation method appraisal criteria in ecosystem accounting – no ideal method



Monetary valuation method		Method evaluation							
1. Opportunity cost of time	1	No	Depends	Yes	Yes	No	Yes	Yes	Low
2. Replacement cost	2	Yes	Depends	Yes	Maybe	Maybe	Maybe	Maybe	Low
3. Hedonic pricing	3	Yes	Depends	Yes	Yes	Yes	Maybe	No	High
4. Travel expenditure	4	Yes	Depends	Yes	No	Maybe	Yes	Yes	Low
5. Travel cost (consumer surplus)	5	No	Depends	No	Maybe	Maybe	Maybe	No	High
6. Stated preference	6	No	Depends	No	Yes	Yes	Maybe	No	High
7. *Simulated exchange (not tested)*	7	Institutional assumptions*	Depends	Potential	Expect ed	Instit. assumpt*	Unlikely	No	High
Non-monetary value method									
8. Time on-site (days, hours	8	No	Parallel thematic	No	Yes	Yes	Yes	Yes	Low

*may conflict with institution in place

Note: The table is an illustration of an appraisal approach – the content is hypothetical, to be substantiated in the paper for the case study example of local nature recreation the Oslo Region

15. Spatial urban ecosystem accounts – Making use of housing and ordnance survey data

Author: Hamish Anderson[1], Emily Connors[1], Vahe Nafilyan[1], Rocky Harris[2], Colin Smith[2]

Suggested topic areas: Topics for SEEA EEA - Accounting treatments and valuation, including 'Valuation concepts for ecosystem services and ecosystem assets' and 'Valuation methods for key ecosystem services'. Could also be applied to 'Classification of ecosystem types', 'Characteristics and indicators of ecosystem condition' and 'The description and classification of ecosystem services'.

The urban environment is often overlooked when thinking about nature, however the urban environment is where the majority of the UK population resides but where green space is relatively limited in extent, therefore ecosystem services are in high demand and short supply so have a high value. There is also interest in the health impacts urban green space has on the population. A number of studies have shown beneficial health impacts green space has on the population; this includes improved mental health, reduced cardiovascular morbidity and mortality and reduced obesity (WHO, 2016).

In this paper and presentation, collaborative ONS and Defra urban ecosystem accounts for Great Britain will be presented. The accounts aim to help value and monitor nature in the urban environment and help policy makers prioritise investment and make informed decisions. The urban accounts offer a coherent way of looking at the value of green space in urban areas within the UK and raise awareness of their social and economic significance.

The urban account for Great Britain will consist of an extent, condition and ecosystem service account, in both physical and monetary form.

The extent account using Ordnance Survey aerial imagery data to estimate smaller patches of green and blue space, previously too small to register in other extent accounts. This includes the size of different functional (public parks/gardens, allotments, cemeteries, etc) and non-functional green spaces (grass verge, road-side vegetation, etc), as well as private gardens.

The condition indicators include Green Flag Status, Sites of Special Scientific Interest condition designation and Ordnance Survey Open Greenspace Access points. Green Flag status gives a good indication of the quality of a green space due to the criterion that needs to be met in order for it to be awarded. We aim to include further condition indicators in the final report.

Finally three new ecosystem service methodology and estimates have been developed:

- **A bundle of cultural services** estimated using a hedonic pricing method, to estimate the extent to which environmental amenities provided by natural capital affect house prices. From this the value of cultural services (access to green space for recreation, aesthetic views from windows, etc) implicit in house prices can be estimated.

[1] Office for National Statistics, United Kingdom
[2] Department for Environment, Food and Rural Affairs, United Kingdom

- **Local climate regulation** has been estimated by valuing the service vegetation has in cooling temperatures in cities, leading to higher productivity.
- **Noise pollution protection** has been valued by estimating the damage to health and associated costs that has been prevented by vegetation diffusing noise.

Estimates are due to be published in July 2018, a summary of the accounts will be presented at to the London Group.

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16. Valuation of ecosystem services for ecosystem accounting – challenges with hedonic valuation on an urban rural gradient in the Oslo Region, Norway

Authors: Kristine Grimsrud (SSB), David N. Barton (NINA)…

SEEA-EEA research area 4: Accounting treatments and valuation - Issue 4: Valuation concepts for ecosystem services and ecosystem assets

Abstract: *Methodological issue (what needs to be clarified/changed):* Hedonic valuation is considered an accounting compatible method for valuing non-market ecosystem services in SEEA EEA. The implicit prices found using this method are considered exchange values. There are several challenges when applying this method for valuing blue/green spaces in a large metropolitan area. A metropolitan area such as the Oslo region, may on the one hand be considered a single real estate market, but within this market there are different sub-markets, based on the type of home such as apartments and single homes and the location along rural-urban gradients and urban typologies.

The implicit price of the same type of blue/green space may change both within the submarket and along the rural-urban gradient. Some reasons for this are that apartments likely have greater per unit area value of urban blue/green space than single homes surrounded by their own garden; moving from rural to urban areas, i) the total area of blue/green space becomes scarcer causing the per unit area value of blue/green space to increase; ii) the number of users of green spaces increase along the gradient also contributing to increasing unit area value; iii) and the preferred mode of travel changes on the rural urban gradient. Slower modes of travel (walk/bike) may increase the enjoyment of smaller blue/green spaces compared to faster modes of travel by car or public transportation. Furthermore, the distance decay of the value of blue/green spaces may change both within submarkets and along the gradient.

The types of blue/green spaces available to people change along the gradient. In rural areas there are forests and agricultural land, but fewer public parks, while in the urban center green structures are dominated by various types of parks and managed green space around buildings and there is little agricultural land and seldom much forest.

Status (In the current SEEA CF/SEEA EEA and/or Technical Recommendations): According to the SEEA EEA TR, the hedonic valuation method may be used to derive accounting compatible values for ecosystem services because the derived value estimates do not include consumer surplus as required for accounting.

History (What has been discussed previously on the topic): Even though the values derived using hedonic valuation do not include consumer surplus and as such are accounting compatible there are several challenges with using the method to derive exchange values. The hedonic pricing method typically values bundles of several ecosystem services that are considered separate categories in the SEEA EEA accounting framework. Second, the implicit price (as part of the asset value of the home) is sensitive to how the specification of the variable for the ecosystem service is defined. For example, there are different spatial definitions of accessibility such as Euclidian buffer, network distance and walking distance.

Proposal(s) for way forward: Hedonic valuation is one way to derive exchange values for ecosystem services according to SEEA EEA TR, but some issues must be resolved regarding identifying blue-green property and neighbourhood attributes linked to particular ecosystem services, or rules for distributing 'bundled' implicit price estimates to specific ecosystem services in a large metropolitan area.

Proposal of changes/additions in the SEEA CF/EEA:

Since the values of blue/green spaces changes on this gradient and within the submarkets and along the gradient, it may be necessary to include for example urban-transect specific effect variables, and distance decay functions differentiated by green space functional types. Further hedonic pricing raises the question of whether we can define 'property amenity' as an ecosystem service in SEEA EEA supply and use tables in order to take advantage of accounting compatible monetary exchange values (which are generally hard to observe). If so this raises the question of how to address possible double counting with local nature recreation as a separately identified cultural ecosystem service in the same accounting tables.

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17. An ecosystem services typology for capacity accounts.

Authors**:** Alessandra La Notte, Sara Vallecillo, Alexandra Marques, Joachim Maes

Introduction

Capacity accounts have been presented in the SEEA-EEA Technical Recommendations (TR) as one of the most difficult module of the whole frame. Capacity accounts have the critical role of linking condition accounts with ecosystem services accounts and it is still not clear how the capacity accounts in physical terms will link to the capacity accounts in monetary terms.

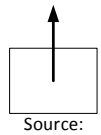
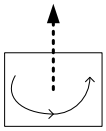
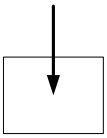
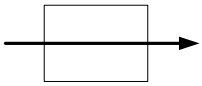
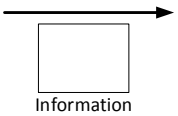
In this contribution, we are going to focus on capacity accounts in monetary terms following the approach suggested in the TR, but suggesting a modification on how some ecosystem services should be accounted for. In order to deal with capacity accounts in monetary terms, we first introduce a typology of ecosystem services for accounting purposes.

Typology of services

In the TR, ecosystem services are taken into account by following macro-classifications such as: provisioning, regulating and maintenance, cultural. Although accepting ecosystem services classification systems (such as CICES), we show that it is also important to identify the role of the

ecosystem types in the delivery of ecosystem services flows. We identified five major typologies of ecosystem services, based on the role of the ecosystem type as vector for transfer of mass, energy or information (see Table 1). Please note that this frame is not a classification system: in fact, it could fit any classification system (from TEEB, to CICES, to FEGS and NESCS). Table 1 reports the different ways ecosystems can deliver ecosystem services. An actual flow of ecosystem services (or simply, actual flow) occurs when the ecosystem services that can be delivered by an ecosystem type (here referred to as ecosystem services potential, or simply potential) interacts with the ecosystem services demand (or simply, demand). Thus, the actual flow, represents the transactions that take place between ecosystem types and economic sectors and households. The actual flow is the amount of ecosystem services that is recorded in standard supply and use tables. In most of ecosystem services applications, authors refer to the concepts of Service Providing Area (very close to the concept of potential) and Service Benefiting Area (that correspond to the concept of demand).

Table 1 - Typologies of ecosystem services to accounting purposes

Role of the ecosystem	Delivery of mass/energy/information	Description	Examples
 Source: productivity	Net delivery of biomass or energy feasibly leaving the ecosystem	Ecosystems act as sources of matter and energy in the form of biomass.	Generation of mass and biomass
 Source: suitability	Delivery of biomass and energy generated within the ecosystem	Ecosystems act as sources of matter and energy by providing suitable habitats	Habitat maintenance, pollination, pest control and diseases control
 Sink	Net flow of matter or energy entering the ecosystem	Ecosystems act as sink to store, immobilize or absorb matter	Absorbing pollutants, carbon, nutrients, heat assimilation
 Buffer	Flow of matter or energy absorbed by ecosystem	Ecosystems act as a transformer changing the magnitude of flows of matter or energy	Water retention, flood control
 Information	Flow of information	Ecosystems deliver information The information generated does not modify the original state of the ecosystem	Scenic view, outdoor recreation activities, scientific investigation

In measuring the actual flow taking into account the typologies present in Table 1, we identified two options for accounting for ecosystem services.

On the one hand, for the ecosystem services belonging mainly to source-productivity and sink typologies, a threshold could be issued because the rate of service use might exceed the regeneration

and the absorption rates. This threshold will thus enable the assessment of sustainable levels of use. In the case of source-provision services, it is possible to define the maximum flow of services that the ecosystem can provide while ensuring its provision through time. For sink-related services, a sustainability threshold can be established for individual ecosystem services considering the ecological status and legal requirements concerning the concentration of pollutants harmful for human health and for the environment. Once the regeneration and absorption thresholds are established, potential flows can be assessed.

On the other hand, the ecosystem services belonging to source-sustainability, buffer and information typologies, are deeply influenced by land cover and/or land use and the direction and extent of changes therein. Therefore, the ecosystem service potential can be estimated at the beginning of the accounting period: it can be affected by changes in initial conditions, but it is not possible to have overuse of those services during the accounting period.

Linkage to capacity accounts

Concerning the capacity accounts, the TR makes reference to ecosystem assets in terms of an "expected basket of ecosystem services flows" and capacity could be measured by calculating the net present value (NPV) of these ecosystem assets. Here we explicitly disaggregate the basket into individual flows of ecosystem services and calculate the NPV of each of them as a "virtual" stock. For source-suitability, buffer and information services the NPV can be calculated from the actual flow as currently suggested in the SEEA-EEA. For source-productivity and sink services, the asset account for the institutional sectors 'ecosystem types' needs to be accounted differently: interaction with economic sectors and households may generate overuse of the yearly flow of the service (actual flow recorded in supply and use tables). This overuse could undermine the ability of ecosystem types to provide the same amount of service flow for future accounting periods. In this case, the NPV should consider the difference between the potential and actual flow. Figure 1 shows a simplified flow chart of an asset account sequence for ecosystem services.

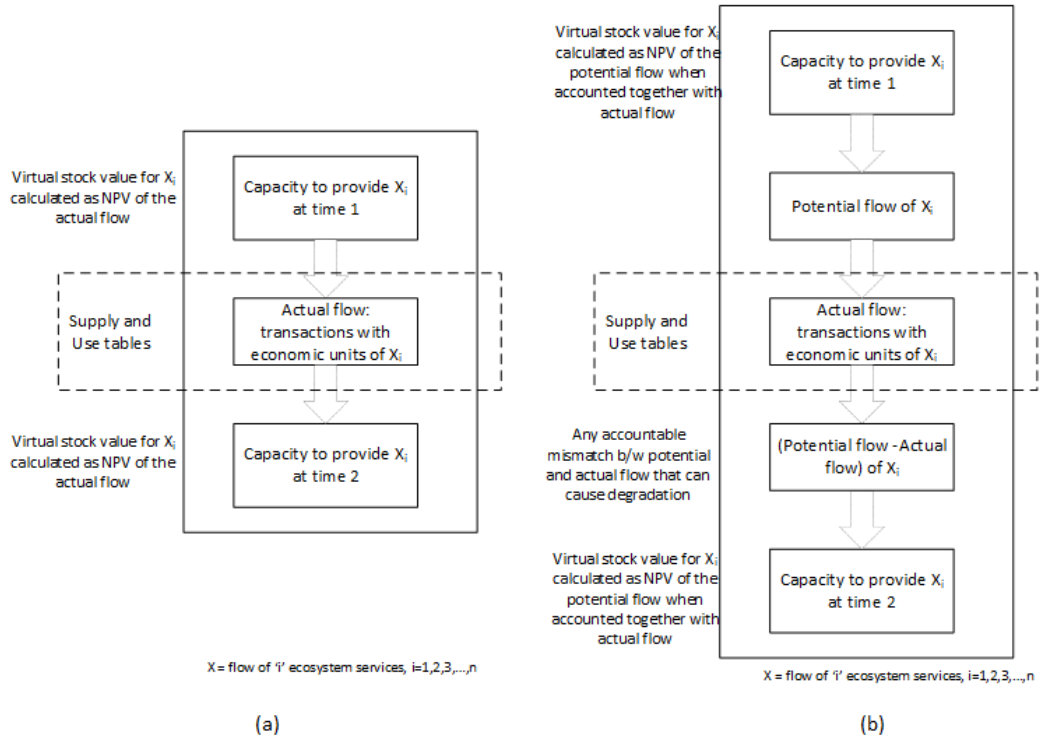


Figure 1 – Linkage between supply and use table and capacity (graphical simplification) for source-suitability, buffer and information services (a) and source-productivity and sink services (b)

The difference with the current approach in SEEA-EEA is the modified procedure adopted when dealing with source-provision and sink services (Figure 1 (b)), and not when dealing with to source-suitability, buffer and information services (Figure 1 (a)). Accounting for the NPV of individual ecosystem services does not contrast with the ideal "basket of expected ecosystem services". When a representative number of ecosystem services are assessed and valued the sum per ecosystem type can be performed as yearly flow or as NPV (Figure 2).

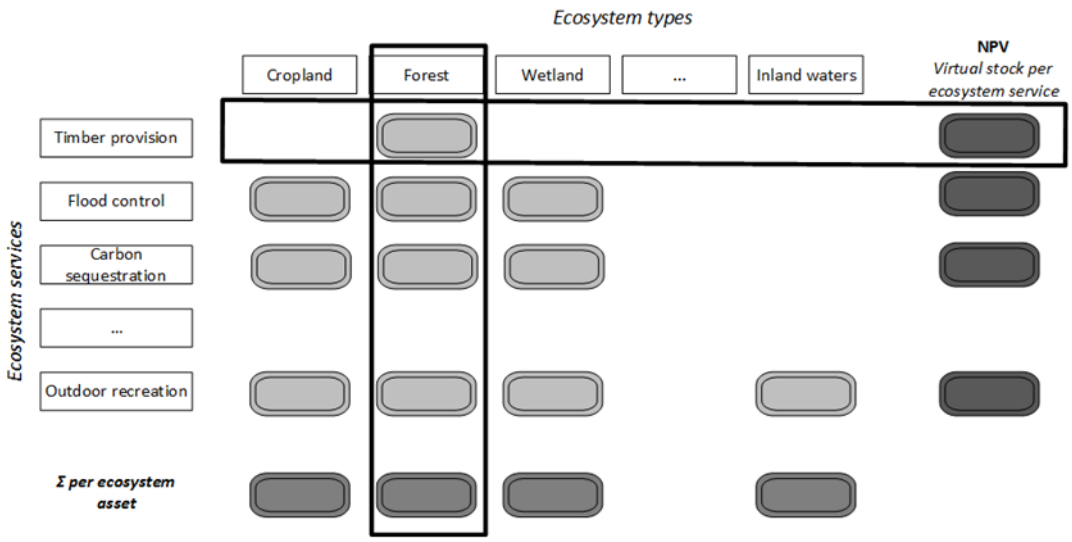


Figure 2 – The supply table: the linkage between ecosystem services, ecosystem types and capacity in monetary terms (NPV)

Compared to other studies that address the definition of capacity (specifically Hein et al., 2016), the concepts here stated are very similar, the few differences are reported in Table 2.

Table 2 – Comparison between ecosystem service concepts presented in this paper and the ecosystem services concepts presented in Hein et al. (2016)

Hein et al. (2016)		This paper	
Ecosystem services flow	$f(Ext, Cond, Mgmt\|D)$	Actual flow	$f(Ext, Cond, Mgmt\|D)$
Capacity	$f(Ext, Cond, Mgmt\|D, S)$	Capacity (monetary)	NPV $[f(Ext, Cond, Mgmt\|D, S)]$
Potential flow	$f(Ext, Cond, Mgmt\|S)$	Potential flow	$f(Ext, Cond, Mgmt\|S)$
		Ecosystem services potential	$f(Ext, Cond, Mgmt)$

Note: Ext= extent, Cond= condition, Mgmt= management regime, D= demand, S= sustainability rates (regeneration and absorption)

Final remarks

The identification of the services that need the assessment of potential flow as complementary information, for accounting purposes, requires considering the role of ecosystems in delivering services: the well-known classification in provisioning, regulating and maintenance, and cultural services is not enough. Regulating service can in fact include both services that require the assessment of the potential flow (sink) and services that do not (source-suitability, buffer). Once identified and assessed, natural processes can be included in national accounts. This allows to track sustainability and to establish meaningful linkages with the economic sphere.

A paper, currently under revision process for publication, explains in detail all the above-summarized content and presents three empirical applications (water purification, crop pollination and outdoor recreation). The paper will be made available for the London Group meeting.

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18. SEEA-EEA in the Natural Capital Report of Italy

Authors: Giacomo Pallante, Greti Lucaroni, Fabio Eboli, Andra Molocchi, Aldo Ravazzi: Italian Ministry of Environment, T.A. Sogesid S.p.A.

In Italy, the National Law 221/2015 “Environmental measures for promoting green economy and limiting the excessive use of natural resources” has the mandate to provide, through Annual Reports, a measure of physical and economic dimensions of Natural Capital stocks and flows, following the methodologies defined by the United Nations Organization and the European Union, as well as ex ante and ex post assessment of the effects of public policies on Natural Capital and Ecosystem Services. The Second Report on the state of Natural Capital in Italy has been published in February 2018. Significant progress has been made to provide information and data on Natural Capital and ecosystem services and, in particular, the SEEA-EEA accounting application for Italy in the contest of the JRC KIP INCA project.

The approach tested by the JRC on a European scale and adopted in the report with a specific application for Italy, provides an initial framework on biophysical assessment and economic

accounting for some Ecosystem Services (SEsESs). In this first experimentation, the JRC analysed and evaluated three ESSEs for Italy: crop pollination, recreational services, and water purification.

In this paper we present the results obtained in the report and the economic value of the ES analysed. Although the focus of the paper is on analysing the results, developing and defining possible policies to be adopted to preserve ES in Italy.

Finally, a literature review of the economic evaluation studies in Italy is used to analyse how valuation approaches and methods can capture diverse values, including non-market values of ecosystem services, ecosystem assets and linkages to welfare values as opposed to the accounting values based on exchange prices considered in the SEEA EEA.

The aim of this work is to present the Italian experience with the SEEA EEA, to share the difficulties encountered, and the possible solutions.

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EXTENSIONS AND POLICY APPLICATIONS

19. Combining Forces on public and private sector work on natural capital

Author: Carl Obst, IDEEA Group, Marta Santamaria, Natural Capital Coalition

The challenge to improve decision making with respect to the environment is highly relevant to both the private and the public sectors. Unfortunately, experience around the world is that work in this space as developed separately in the two sectors. As the significance of environmental issues continues to increase, the need to make connections between the different initiatives also increases.

Work on environmental issues by both sectors has been increasingly overlapping through the lens of natural capital. Discussions between experts involved in the leading private sector initiative, the Natural Capital Coalition, and from the SEEA community have led to establishing the Combining Forces initiative https://naturalcapitalcoalition.org/projects/combining-forces-on-natural-capital/, which was launched in November 2017 at the third World Forum on Natural Capital. Combining Forces aims to provide a platform to support exchanges across sectors and promote ongoing engagement and collaboration.

This presentation will summarise the ongoing developments with respect to natural capital within the private sector, introduce the Natural Capital Protocol as the main framework for aligning natural capital approaches within the private sector, and highlight connections and opportunities for connecting work in the private and public sectors. There are substantial opportunities for the concepts, definitions and measurement approaches of the SEEA to inform discussion for businesses and industries as well as substantial knowledge and experience in the private sector on environmental measurement.

A discussion on this topic at the London Group is especially timely given the relevance being placed on engagement with the private sector in a number of international projects including the UNSD/UN Environment project on ecosystem accounting, the World Bank WAVES partnership and the EU Business @ Biodiversity Platform.

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20. Accounting for Nature in the private sector, and links with national environmental accounts

Abstract for the 2018 London Group Meeting

Authors: Peter Cosier, Celine Steinfeld and Bruce Thom.

In 2008, the Wentworth Group of Concerned Scientists and other experts in science, economics, statistics and public policy, published the *Accounting for Nature* model. This model places scientific information about the condition of environmental assets (native vegetation, soil, rivers, fauna) into an accounting framework. This helps community and policy makers to understand complex scientific information that is needed to underpin policy and evaluate investment decisions, and the success of these investments over time.

In 2016, Australia's Regional Natural Resource Management authorities, in cooperation with scientists, economists and statisticians in universities and Commonwealth and state government

agencies, completed a 5-year continental scale trial to test the practical application of the *Accounting for Nature* model. This trial formed the basis of a revised methodology (Accounting for Nature 2016) and a proposal to the Commonwealth Government to establish the first set of National Environmental Accounts of Australia.

The next step is to examine the practicality and value of environmental condition accounts for a range of private sector enterprises and nature conservation managers. The Wentworth Group is collaborating with three Australian organisations as part of a new trial: Austral Fisheries who operate an MSC certified Patagonian Toothfish fishery in the World Heritage Heard and Macdonald Islands; Kilter farms, a large agri-business located in western Victoria, who manage 9,000 ha of mix cropping and grazing land spanning 35 farming enterprises; and the Tasmanian Land Conservancy for their Five Rivers 6,000 ha private conservation reserve in and around the World Heritage Tasmanian highlands.

The goal is to evaluate how the *Accounting for Nature* model can be used as a cost effective pathway for industry, farmers and conservation managers to measure the condition of environmental assets that underpin the sustainability of their businesses.

This paper outlines the outcomes of these trials, and explores some new concepts and opportunities to link public and private sector environmental condition accounting to inform financial and management decisions. The paper also evaluates the application of the *Accounting for Nature* accounting framework at a range of scales – from property, ecosystem, sub-national (regional), and national scales.

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21. How can we engage better with potential account users?

Author: Michael Vardon[1,2] and Juan-Pablo Castaneda[2]

[1]Australian National University

[2]World Bank

Abstract

A better of understanding of potential uses and users of environmental-economic accounts is needed to ensure it is incorporated in into government decision making. While the System of Environmental-Economic Accounting (SEEA) was first available in 1993, following the Rio Earth Summit in 1992, and accounting concepts and practice have advanced significantly since then, the impact on public policy and decision making has at best been difficult to demonstrate. In this paper we examine the different possible uses of accounts and describe our recent attempts to better link account producers to account users in countries (e.g. Australia, Guatemala, Indonesia and Zambia). Based on this experience and drawing on the "10 Living Principles to Make Natural Capital Accounting Fit-for-policy" we outline a modular approach to engaging with government on the development and use of environmental-economic accounts. As part of this, we present classifications of (1) account uses and (2) account users, as well as some suggestions for ways to move potential users to actual users.

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22. Working title: How to communicate Environmental accounts"

Author: Mr. Karim Salah, Statistical office of Tunisia? Aldo Femia, IStat

Abstract (French):

Dans l'objectif d'améliorer son système des statistiques de l'environnement, l'institut national de la statistique a procédé a des réflexions approfondis qui ont conduit à la nécessité d'améliorer son système de communication, à la fois avec les producteurs de données qu'avec les utilisateurs, et d'adopter l'approche participatif comme méthodologie de travail en se basant sur le principe que chacun est expert dans son domaine.

De ce fait et en profitant d'un projet de jumelage avec la commission européenne, à travers l'INSEE et a l'ISTAT, l'institut national de la statistique a fixé comme objectif pour le domaine de l'environnement la réalisation d'une publication sur les statistiques de l'environnement et d'une autre sur les comptes de l'eau. Les publications constituent les meilleurs exercices pour tester et ajuster la stratégie relationnelle avec les intervenants dans le domaine de l'environnement.

De l'exercice, et des travaux d'avant, il ressort le problématique de communication des résultats des comptes de l'eau. Comment communiquer les résultats et les définitions des variables d'une manière compréhensible et convaincante à tous les catégories, et principalement aux gestionnaires de l'eau, sachant qu'ils ont l'habitude d'utiliser le langage du gestionnaire c'est-à-dire ils travaillent dans une perspective de gestion alors que les comptes sont conçus dans une perspective de politique publique.

Les conclusions et les recommandations en matière de communication des résultats auprès des intervenants feront l'objet de cet article. Les discussions vont porter sur les confusions en matière des définitions des variables des comptes de l'eau, la significativité des sommations dans les tableaux, les variables prioritaires pour les gestionnaires de l'eau etc... Le pouvoir informationnel des comptes de l'eau en Tunisie sera aussi discuté.

Abstract (English with google):

With a view to improving its system of environmental statistics, the National Statistical Institute has made in-depth discussions which have led to the need to improve its communication system, both with the producers of with the users, and to adopt the participatory approach as a working methodology based on the principle that everyone is an expert in their field.

As a result, and taking advantage of a twinning project with the European Commission, through INSEE and ISTAT, the National Institute of Statistics has set as its objective for the field of the environment the realization of one publication on environmental statistics and another on water accounts. The publications are the best exercises to test and adjust the relational strategy with stakeholders in the field of the environment.

From the exercise, and previous work, it appears the problem of communication of the results of the water accounts. How to communicate the results and definitions of variables in an understandable and convincing way to all categories, and mainly to water managers, knowing that they are used to

using the language of the manager that is that is, they work from a management perspective while the accounts are designed from a public policy perspective.

Findings and recommendations for reporting results to stakeholders will be the subject of this article. The discussions will focus on the confusions regarding the definitions of the variables of the water accounts, the significance of the summations in the tables, the priority variables for the water managers, etc ... The informational power of the accounts of the water in Tunisia will also be discussed.

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23. Presenting SEEA CF and SEEA EEA statistics together: UK experience and lessons learnt

Abstract for the London Group, April 2018

Emily Connors[3], Gemma Thomas[1], Rocky Harris[4], Colin Smith,

Suggested topic areas: Topics for SEEA CF - Any other methodological issues (e.g. linkages or overlaps between SEEA CF and SEEA EEA)

In 2011 the UK Government committed to working with the UK Office for National Statistics (ONS) to incorporate natural capital into the UK Environmental Accounts by 2020. The aim of this project being that the benefits of nature would be better recognised. In partnership with the Department for Environment, Food and Rural Affairs (Defra), ONS has been developing and publishing natural capital and ecosystem accounts for a number of years.

By 2020 we envisage the accounts moving beyond experimental status, to be part of the UK Environmental Accounts, and integrated as far as possible. As the 2020 target draws nearer it has led to a lot more discussion and thought about how the general Environmental Accounts, which tend to follow the SEEA Central Frameworks (CF) and the UK Ecosystem Accounts, which follow the SEEA Experimental-Ecosystem Accounts (EEA), are presented together.

Currently, there is a wealth of environmental information being published in the UK Environmental Accounts, including air emissions, environmental protections expenditure, waste and renewable energy. When this is combined with the natural capital and ecosystem accounts it can be difficult to pull this information together in a user friendly way, which has affected the impact our statistics have. The end user of the statistics produced by each framework may not be the same, so further thought is needed to establish who the users are.

Consistency issues can arise and ONS have researched and developed solutions to ensure the accounts are consistent. Cross-over areas were identified in a presentation and paper at the 2017 London Group. An update with further issues encountered and solutions found to align and present the two sets of environmental statistics will be given in this presentation.

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[3] Office for National Statistics, United Kingdom

[4] Department for Environment, Food and Rural Affairs, United Kingdom

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24. SEEA CF and tourism accounts – the Italian experience

Authors: Carolina Ardi, Emanuela Recchini, Angelica Tudini – Istat; Cesare Costantino – UNWTO Consultant

Abstract

The proposed paper concerns 'SEEA CF and tourism accounts', an issue currently not part of the SEEA CF research agenda but part of the subjects selected for long term development.

Since 2015, developing accounting frameworks for describing sustainable tourism has been high on the international statistical agenda as it one of the main objectives of the World Tourism Organization (UNWTO) project - Measuring Sustainable Tourism (MST) that has been supported by the UN Statistical Commission (UNWTO, 2016). In the UNWTO approach, the proposed statistical framework basically stems from the integration of two existing accounting frameworks – the Tourism Satellite Accounts (TSA) and the System of Environmental-Economic Accounting (SEEA), both consistent with the accounting framework for measuring the economy – the System of National Accounts (SNA). An initial set of relevant accounts and tables and related indicators as well as implementation guidelines are provided in the TSA-SEEA technical note (see Obst, 2017) prepared upon encouragement by the UN Committee of Experts on Environmental-Economic Accounting (UNCEEA) and by the UNWTO Committee on Tourism Statistics and TSA. Further methodological developments, including for example coverage of the social dimension, are provided in the draft Statistical Framework for Measuring Sustainable Tourism (see UNWTO, 2018).

Istat, as a member of the Working Group of Experts on Measuring Sustainable Tourism, has been involved in the consultations on the draft UNWTO Statistical Framework and also contributed to the UNWTO project by developing a case study on environmentally extended tourism satellite accounts for Italy.

The proposed paper will focus on the measurement of SEEA-consistent environmental flows related to tourism industries as accounted for in the TSA while the measurement of assets will not be part of the paper. The first part of the paper will analyse – on the basis of the experience gained in the context of the Italian case study – the extent to which the methodological guidelines provided in the UNWTO SF allow to calculate environmental flows related to tourism industries as well as the portion attributable to visitor activity and hence to tourism (the so called tourism share of environmental flows). The second part of the paper will present the state of the art on other environmental flows related calculations that were not implemented for the Italian case study and that are still under methodological development; examples are the calculation of environmental flows according to the consumption perspective and the assessment of certain flows associated with transport activity.

The objective of the paper is to stimulate discussion within the LG, mainly on the following issues:

1. review of selected SEEA-tourism accounts/tables in order to assess whether they are mature enough to be integrated to SEEA Applications and Extensions. Tables covered would be for example: tourism industries flow accounts (energy, emissions, etc.) as well as combined presentations;

2. review and comments on topics that need further methodological development.

Main references

Obst Carl, 2017, *Linking the TSA and the SEEA: A Technical Note,* Sixth UNWTO International Conference on Tourism Statistics MEASURING SUSTAINABLE TOURISM, Manila, Philippines, 21 – 24 June 2017;
http://cf.cdn.unwto.org/sites/all/files/pdf/obst_sess2_conf2017manila_central_paper.pdf

UNWTO, 2016, *Measuring Sustainable Tourism Project concept note*,
http://cf.cdn.unwto.org/sites/all/files/docpdf/mstconceptnote17032016.pdf

UNWTO, 2018, *Statistical Framework for Measuring Sustainable Tourism,* Consultation Draft, unpublished

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25. The use of ecosystem services accounting in economic analysis: two case studies

Authors: Alessandra La Notte, Alexandra Marques

Long abstract

Satellite accounts are meant to be combined with economic accounts in order to be used in decision-making, policy review and formulation, analysis and research. Based on available case studies on ecosystem services accounts, we attempt to present how the bridging with economic accounts might take place through two applications.

The first application is based on water purification accounts for the EU. Sustainably managing ecosystem services is critical to guarantee the well-being of current and future generations. To do so it is essential to take into consideration that there might be a spatial disconnection between the place where the service is supplied and the place where the service ends up.

Multi-regional input-output analysis has been widely used to quantify the environmental impacts associated with consumption activities and international trade by tracing all the impacts occurring throughout the supply chain. The main feature of a multi-regional input-output model is the coverage of the world economy and the interrelationships between the different sectors, from different countries. In this work we used the 2013 Release of the World Input-Output database (WIOD), with a disaggregation level of 40 countries, one Rest of the World region and 35 industries, covering the time period between 1995-2011. We have extended the database with the production-based water purification accounts linked to the agricultural sector. The computation of the consumption-based water purification accounts followed the standard environmentally extended input-output model.

Our results show that the top net importers of water purification ecosystem services import it from regions whose water bodies are under high nitrogen pressure. The majority of actions to improve the good ecological status of water bodies in Europe are planned at the River Basin level; nevertheless our work shows that taking a systems perspective that considers the benefits from nature as well as the

flows of ecosystem services between different countries is possible and may provide new alternatives to tackle degradation and overexploitation of natural capital.

The second application is based on crop pollination accounts for the EU. Ecosystem services underpin the functioning of societies and their economies. In the last decades, humankind has experienced great increases of economic prosperity, at the expense of the quality of ecosystems and their capacity to provide services. A way to account for the economic consequences generated by changes in ecosystem services flow is to bridge ecosystem services accounts with macroeconomic models. In this work, we followed the following steps to integrate ecosystem services accounts into a macroeconomic modelling framework: (i) the identification of critical variables in biophysical models, (ii) the identification of affected and /or affecting variables already structured in CGE models, and (iii) the building of bridging functions that would quantify the impacts of ecological changes on the economy and vice versa. This procedure has been tested for a case study concerning the introduction of an alien species (*vespa vellutina*) that shocks the production of specific pollination dependent crops in specific regions of France and Spain. The shock in production is modelled through Global Trade Analysis Project (GTAP) and the outcomes at global level are shown and analyzed for different sets of economic variables.

Both applications are described in details in the JRC scientific and policy report "LISBETH I: Linking Integrated accounting of ecosystem Services and Benefits to Economic models THrough bridging functions" that is currently in progress. It will be completed soon and thus made available for the London group meeting.

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26. Multidimensional framework for the evaluation of the effectiveness of environmental instruments, present state and way forward

Authors: Kaia Oras, Statistics Estonia, Tea Nõmmann SEI-T

Document provides an update of the effort to develop the indicator framework that would help to evaluate the policies related to implementation of the ecological tax reform on national level. Initial framework considered two dimensions settled by Estonian Ecological tax reform (2005) reform: environmental efficiency and the neutrality of an overall taxes impacts. In addition three aspects suggested by OECD (Organisation for Economic Co-operation and Development), have been included in initial version: use of revenues, distributional and competitiveness impacts (OECD, 2011). The suggestions of the London Group experts (2017) to widen the scope has been followed and the attempt was made to integrate accounts and indicators relevant for additional aspects. According to the suggestions received from the experts the equity ("polluter's pays perspective") and environmental efficiency aspects have been analysed further and additional components have been added to the framework. Those comprise environmental expenditures but also environmental instruments regarding land and natural resources. The opinions of the users of the statistics would be analysed and alternative approaches discussed.

Way forward in order to design a sound framework for monitoring of the efficiency of environmental instruments and the implementation of ecological tax reform in Estonia would be touched upon.

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27. Ensuring policy relevance and promoting the use of SEEA Central Framework: UK Experience

Abstract for the London Group, April 2018

Gemma Thomas[5]

Suggested topic areas: ***Extensions, applications and implementation***

Over the past 15 years, the UK has developed its Environmental Accounts. Much of this development has been driven by, or in collaboration with, the development of European legislation. The UK Government has launched a range of strategies that have an environment focus, including the Clean Growth Strategy[6], the Industrial Strategy[7], which lists Clean Growth as one of four 'Grand Challenges', and the 25 Year Environment Plan8. These new environmental policies, at the same time, as the UK's decision to leave the European Union provides a unique opportunity for Office for National Statistics (ONS) to reflect on the statistics published and their dissemination. This has resulted in a period of stakeholder engagement, to raise awareness of available data and its potential uses, ensure development and presentation of the UK Environmental Accounts best suit user needs.

This paper will discuss the findings from this stakeholder engagement, and the resulting outcomes.

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28. New policy relevant indicators on national consumption and environment

Author: Viveka Palm, SCB

The 3 year research project on environmental pressure from national consumption will be finalized in June 2018. The project has investigated several new areas, like fish consumption and chemical use as part of the footprint from households consumption, public consumption and investments.

The project has also resulted in a model where the multiregional input output model Exiobase is now combined with national environmental accounts and national accounts data.

Some results and discussions on new insights and experiences will be presented.

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[5] Office for National Statistics, United Kingdom

[6] https://www.gov.uk/government/publications/clean-growth-strategy

[7] https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

[8] https://www.gov.uk/government/publications/25-year-environment-plan