BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T17a

Natural Capital Accounting in economy and finance

Hosts:

	Name	Organisation	E-mail
Host:	Alessandra La Notte	Senior Consultant at European Dynamics	alessandra.la-notte@ext.ec.europa.eu
	Domenico Pisani	European Commission Joint Research Centre	domenico.pisani@ec.europa.eu
Co-host(s):	Ioanna Grammatikopoulou	European Commission Joint Research Centre	ioanna.grammatikopoulou@ec.europa.eu

Abstract:

The structure of integrated accounting systems enables to connect ecosystem services accounts to the economic accounts used by economists and financial analysts in their tools and models. The importance of ecosystem services in Sustainable Finance is gaining momentum and the possibility to integrate ecosystem services into general equilibrium models is becoming a concrete possibility. The purpose of this session is collect experiences, initiatives or simply ideas to integrate ecosystem services accounts into economy and finance and start setting the ground to map in a consistent way the pillars that bridge ecosystems to socio-economic systems through services.

Goals and objectives of the session:

This session welcomes contributes on initiatives, applications and research proposals on how to connect ecosystem services accounting to economic and financial models and tools. The contributions could be both theoretical and empirical.

At the moment in fact there is a lot of interest on how to insert ecosystem into economic policies and financial analyses but there is a total lack of clarity on how to effectively do it.

Based on the contributions that will populate this session, we hope to set up a well-structured discussion and eventually identify the pillars that mark this learning path.

Planned output / Deliverables:

If the session will collect a meaningful number of contributions, the following options can be considered:

To write a JRC Technical Report (as an example, check previous publication https://publications.jrc.ec.europa.eu/repository/handle/JRC123667)

To propose a special issue (as an example, check previous collection https://oneecosystem.pensoft.net/topical_collection/94/)

Session format:

Standard session (presentations)

II. SESSION PROGRAM

Room: Success Avenue 1

Date of session: 18th of November 2024
Time of session: 11:00 – 12:30

Timetable speakers

Time	Name	Surname	Organization	Title of presentation
10:00 – 10:05	Domenico Alessandra	Pisani La Notte	European Commission Joint Research Centre (EC JRC) Consultant on Natural Capital Accounting	Introduction to the session
10:05–10:15	Johannes	Förster	Helmholtz Centre for Environmental Research – UFZ	Synergies and differences between national and corporate reporting of biodiversity and ecosystem services – a comparison of UN SEEA EA and CSRD
10:15–10:25	Kätlin	Aun	Statistics Estonia	Options to determine ecosystem contribution in the valuation of timber and crop provisioning ecosystem services

Time	Name	Surname	Organization	Title of presentation
10:25–10:35	Domenico	Pisani	European Commission Joint Research Centre (EC JRC)	Ecosystem services in a simple macroeconomic framework
10:35–10:45	Hanna	Fiegenbaum	Leipzig University–IMISE	Integrating resilience into nature-based carbon credits
10:45–10:52	Domenico	Pisani	First round of questions	
10:52–11:02	Josselin	Roman	European Commission Joint Research Centre (EC JRC)	Ecosystem services in a simple macroeconomic framework
11:02–11:12	Alessandra	La Notte	Consultant on Natural Capital Accounting	The assessment of nature-related risks: from ecosystem services vulnerability to economic exposure and financial disclosures
11:12–11:22	Francesco	Sica	Università La Sapienza di Roma	The assessment of nature-related risks: from ecosystem services vulnerability to economic exposure and financial disclosures
11:22–11:30	Domenico	Pisani	Second round of questions and conclusions	

III.ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Synergies and differences between national and corporate reporting of biodiversity and ecosystem services – a comparison of UN SEEA EA and CSRD

Presenting author: Johannes Förster[a] (johannes.foerster@ufz.de)

Other authors: Athanasios Sassalos[a], Karsten Grunewald[b], Sophie Meier[b], Bernd Hansjürgens[a], Tobias M. Wildner[a]

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Since 2024, the Corporate Sustainability Reporting Directive (CSRD) requests large companies to assess and report on material impacts and dependencies on biodiversity and ecosystem services following the requirements defined by the European Sustainability Reporting Standard (ESRS) for Biodiversity and Ecosystems. We assessed whether national reporting in accordance with the United Nations System of Environmental-Economic Accounting – Ecosystem Accounting (UN SEEA EA) can provide information that is relevant for CSRD reporting of corporates. Thereby, we used the national reporting in Germany as a case study and compared it with CSRD requirements. The CSRD requires companies to assess, if their activities have material impacts and dependencies on biodiversity and ecosystems. If this is the case, companies have to disclose information on both their potential and actual impacts and dependencies on biodiversity and ecosystems. The assessment of actual impacts and dependencies requires the use of measured data from within a company. In contrast, the assessment of potential impacts and dependencies can make use of other information available on biodiversity and ecosystem services at the location of a company. This raises the question, whether information from national reporting based on UN SEEA EA can be used by corporates for CSRD reporting. As information from national reporting is statistically robust and officially recognised, such data could also be beneficial for the transparency, quality assurance and comparability of corporate sustainability reporting. Furthermore, corporate sustainability reporting could also provide insights into the interlinkages of the economy and nature across major economic sectors. Ideally such information will help to identify potential risks and opportunities and inform decision making both within companies and at national level. This work is part of the Bio-Mo-D Project with Value Balancing Alliance (VBA) acting as partner for

piloting approaches for including biodiversity and ecosystem services into corporate accounting and decision making (https://bio-mo-d.ioer.info/en).

Keywords: ecosystem accounting, corporate reporting, biodiversity

2. Options to determine ecosystem contribution in the valuation of timber and crop provisioning ecosystem services

Presenting author: Kätlin Aun[a] (katlin.aun@stat.ee)

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With the approval of the ecosystem accounting as a statistical concept (and partly also as a standard), a need for a new stream of statistical literacy has appeared. The purpose of the ecosystem services account is to connect ecosystem services to the economic accounts used by economists and financial analysts in their tools and models. For the integration of ecosystem accounting to SNA common framework described in SEEA EA should be developed further. The definitions, valuation methods, semantics and communication are important as the concept of ecosystem accounting is new and the knowledge on methods and how to use the information is not yet widespread. The paper addresses parallel methods for the assessment of the ecosystem service of crop provision and timber provision ecosystem services. Different methods express ecosystem contribution to the service in various degrees. Similarities and differences are discussed and the communication issues regarding the results of the alternative approaches for given ecosystem services are described and links to expected users and applications are considered. The selection of the valuation methods for ecosystem services are based on the suggestions outlined in UN SEEA EA and Guidance Notes on accounting for ecosystem services by Eurostat relevant to the implementation of the regulation of European environmental economic accounting. The work is based on efforts carried out in the framework of Eurostat grants "Development of the land account and valuation of ecosystem services regarding grassland ecosystem" (831254-2018-EE-ECOSYSTEMS), "Development of the ecosystem accounts" (881542-2019-ENVECO), "Development of the environmental accounts" (101022852-2020-EE-ENVACC) and "Development of the forestry, environmental subsidies and ecosystem accounts" (101113157-2022-EE-EDG).

Keywords: ecosystem services, valuation, ecosystem contribution, crop provision, timber provision

3. European SMEs' Exposure to Ecosystems and Natural Hazards: A First Exploration

Presenting author: Domenico Pisani[a] (domenico.pisani@ec.europa.eu)

Other authors: Serena Fatica[a], Dominik Hirschbühl[a], Ioanna Grammatikopoulou[a], Alessandra La Notte[b]

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Nature-related financial risks have emerged as critical concerns for policymakers and financial actors. Central to this issue are ecosystem services, which play an integral role in various production processes but may be interrupted due to the degradation of nature. This article delves into the vulnerability of European SMEs by combining firm-level exposures to ecosystem service dependencies with regional information on the relative abundance of ecosystem services provisioning and the risk of natural hazards. Focusing on long-term debt positions to gauge financial stability implications, the results reveal moderate nature risks for European SMEs at the current stance but also highlight a possible concentration of risks and a need to further refine the use of available indicators.

Keywords: ecosystem services; natural capital; nature degradation; physical risks; environmental risks; ENCORE; risk management; SMEs

4. Integrating resilience into nature-based carbon credits

Presenting author: Hanna Fiegenbaum[a] (hanna.fiegenbaum@gmail.com; hanna.fiegenbaum@uni-leipzig.de)

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Total Economic Valuation (TEV) offers a comprehensive approach to valuing the benefits derived from nature by considering both use and non-use values (Costanza et al., 1997; Pearce & Moran, 1994). Although the Nature's Contributions to People (NCP) approach to valuation (Díaz et al., 2018; Pascual et al., 2017) moves beyond the dichotomy of instrumental versus intrinsic valuations of nature by incorporating broader value perspectives (Pascual et al., 2023; IPBES, 2022), in the context of natural capital accounting and nature or climate finance, the valuation of ecosystem services still tends to dominate (e.g. Brander et al., 2024). It primarily operates by valuing individual ecosystem services and aggregating their values. In the academic literature,

approaches have been suggested that aim to account for interdependencies of ecosystem services and for higher-order services such as resilience or maintenance (Laurila-Pant et al., 2015; Kumar, 2012; Admiraal et al., 2013; Quaas et al., 2019). However, this integration is often absent in financing instruments such as nature-based carbon credits from forestry (Balmford & Swinfield, 2023) due in part to their commodification mechanisms. Beyond influencing investment and land management choices, this can not only lead to undervaluation but also result in incomplete de-risking strategies. The presentation aims to explore and encourage the incorporation of resilience and adaptation into nature-based carbon credits and their de-risking strategies.

Keywords: nature-based carbon credits, nature-based climate solutions, biodiversity resilience value, biodiversity insurance value

5. Ecosystem services in a simple macroeconomic framework

Presenting Author: Josselin Roman[a] (josselin.roman@ec.europa.eu)

Other Authors: Bjorn Dohring[b], Ioanna Grammatikopoulou[a], Alessandra La Notte[c], Beatrice Pataracchia[a], Domenico Pisani[a], Christophe Planas[a], Alessandro Rossi[a], Anna Thum-Thysen[a], Mayra Zurbaran Nucci[a]

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Economic activity is exerting increasing pressure on natural ecosystems while it depends at the same time on the provision of the services that these ecosystems provide. In this paper, we build on the conceptualisation of ecosystem services in line with the statistical framework developed by the United Nations namely the System of Environmental Economics Accounting Ecosystem Accounting (SEEA EA). We use a simple aggregate production function augmented with the direct and indirect contribution of ecosystem services to illustrate the dependence of economic activity in EU Member States on forest ecosystem assets. Simulating the degradation of ecosystems 25 and 60 years ahead, we show that the negative impact on economic activity in the EU could be sizeable. This is particularly so when we assume that fixed capital and labour cannot easily substitute for the loss of forest assets. While our analysis is limited to one type of ecosystem and our quantification purely illustrative, our framework serves as a proof of concept for tools that could usefully inform macroeconomic policy decisions for the medium-term.

Keywords: Forest ecosystem services, natural capital, potential output

6. The assessment of nature-related risks: from ecosystem services vulnerability to economic exposure and financial disclosures

Presenting author: Alessandra La Notte[a] (alelanotte@gmail.com)

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Nature-related risks can lead to financial losses. The connection between ecosystems and socioeconomic systems is complex and multifaceted. Ecosystem services are the ecological processes that serve human needs. The degree to which a specific ecological process fails to meet specific human needs could be a useful metric able to ground the cascade of risks to which companies, governments, financial institutions can be exposed. Linking the ecosystem services dimension and the risk dimension is the first step in building a framework that introduces ecosystems into sustainable finance. The growing need to factor nature into financial and business decisions prompted the formation of a Taskforce on Nature-related Financial Disclosures, meant to develop a risk management and disclosure framework to report and eventually act on nature-related risks and opportunities. This paper describes how to use the Integrated system for Natural Capital Accounts to measure and account for ecosystem vulnerability, which constitutes the first component of nature-related risk. Based on ecosystem vulnerability accounts, it is possible to also assess sectoral exposure to risk. Ecosystem vulnerability accounts could represent a valuable source of information for the TNFD, enabling it to assess impacts and dependencies. A case study of the agricultural sector in Europe is presented.

Keywords: nature-related risk; ecosystem accounting; natural capital accounting; ecosystem services vulnerability; financial disclosures

7. Using remote sensing to manage the economic value of urban natural capital: Gross Forestry Product appraisal through the night lights data

Presenting author: Francesco Sica[a] (francesco.sica@uniroma1.it)

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The purpose of this study is to discover evidence and a more direct approach for determining the total economic value of ecosystems to be included in the decision-making process that drives cities' richness equipment. The competition between city's natural and economic assets is investigated, and economic-environmental accounting criteria are identified to move beyond the Gross Domestic Product (GDP) towards the Gross Ecosystem Product (GEP).A remote sensing accounting approach is examined through the night-time light data as proxy for city productivity and environmental quality. As the ecosystem of interest is selected to take into consideration the urban forest. In order to estimate the Gross Forestry Product (GFP) pertained the urban landscape, the correlation between the spatial extent of urban forests ecosystem, socioeconomic indicators of yearly GDP and the night light sources measured by satellite inside the set of 22 megacities is examined. Data on night-time light intensity is provided by the night-time light product, which serves as a stand-in for information on tree canopy cover ($R2=0.76$) and urban profitability ($R2=0.71$) spatial distribution. The correlation analysis validates the feasibility of employing GDP and nocturnal data to describe the richness of cities under the economic and ecosystem perspective. The difference between GDP values computed with and without night-time light data embodies the total economic value of the urban ecosystems, in this case the Gross Forestry Product, as a 1997 study by Sutton and Costanza widely demonstrated with concern the implementation of the night-time light data to capture the intangible wealth of cities. The suggested study calls into question the standard interpretation of urban wealth moving economic assessments towards ecosystems' economic relevance. The night-time lights proves to be a good proxy for megacity economic GEP, making it an innovative instrument for models of economic growth and ecosystem services footprint in urban landscape.

Keywords: Natural capital; economic value; Gross Ecosystem Product; night light data