
# BOOK OF ABSTRACTS



## I. SESSION DESCRIPTION

**ID: T17a**

Natural Capital Accounting in economy and finance

**Hosts:**

| | Name | Organisation | E-mail |
|---|---|---|---|
| Host: | Alessandra La Notte | Politecnico di Torino | alelanotte@gmail.com |
| Co-host(s): | Ioanna Grammatikopoulou | European Commission Joint Research Centre | ioanna.grammatikopoulou@ec.europa.eu |
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**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

## III.ABSTRACTS

*The first author is the presenting author unless indicated otherwise.*

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

*First authors(s):* Serena Fatica

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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

### 2. Beyond Total Economic Valuation: Remaining Challenges

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Total economic valuation (TEV) is an inclusive way of valuing benefits from nature because it assesses nature in terms of use value and non-use value (Costanza et al., 1997). Use value can be further divided into direct, indirect, and optional value, whereas non-use value is divided into bequest value and existence or 'passive' use value (Pearce & Moran, 1994). Although TEV is

still promoted (e.g., TEEB, Natural Capital Protocol), it should be noted that total economic valuation is utilitarian in nature. Several challenges arise from reducing nature to its utilitarian values, especially given the interconnected nature of ecosystems where the provision of ecosystem services is grounded in other social and ecological components and functions (see, for instance, Weiskopf et al., 2024). While more comprehensive approaches to valuation have been suggested (e.g., Laurila-Pant et al., 2015; IPBES, 2022), they still fail to take into account the spatial and temporal (auto)correlations of ecosystems and their connectedness beyond system "boundaries." Although suggestions have been made to account for the economic requirements arising from these issues (Admiraal et al., 2013), these challenges keep recurring with the emergence of new nature financing instruments such as carbon or biodiversity credits and the valuation challenges they pose (Wells et al., 2023; Swinfield et al., 2024; Wunder et al., 2024). The presentation seeks to list remaining challenges.

*Keywords*: natural capital valuation, TEV, resilience, multi-dimensional, multi-criteria

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

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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*: sustainability reporting, national accounting, business, corporate, CSRD

## 4. A compass for the use of Natural Capital Accounting in Economy and Finance

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The purpose of this presentation is to summarize what can be identified as (i) the main drivers, (ii) the main needs and (iii) the main set of users in the economic and financial sectors for natural capital accounts, based on all the contributions made during this session. Indeed, there are different perspectives (from macro- and micro-economics, to macro- and micro-geographical scales, to flagship and operational initiatives) that play a role in determining what kind of accounts are needed.

The purpose of this presentation is to stimulate discussion and lay the foundations for organizing an active network of interested practitioners.

*Keywords*: Natural capital accounts, ecosystem services, economics, finance

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

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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

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

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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

## 7. Ecosystem services in a simple macroeconomic framework

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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.

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

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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 nighttime 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 nighttime 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