BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T17b

Advancing the role of ecosystem accounting in urban areas, fine-scale applications, and impact assessments

Hosts:

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Host:	Trond SIMENSEN	Norwegian Institute for Nature Research	trond.simensen@nina.no
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Abstract:

There is growing research and policy interest in developing standardized ecosystem accounts, moving beyond ad-hoc mapping and assessment of ecosystems and their services. The adopted United Nations System of Environmental Economic Accounting – Ecosystem Accounting (SEEA-EA) provides a consistent accounting framework which ensures certain level of standardization while enabling flexibility to accommodate accounts at various spatial levels and decision-making contexts. While SEEA-EA is a valuable tool for consistently monitoring changes in ecosystems,

their rules and principles still need further testing and adjustment, particularly in highly modified ecosystems and systems that require high resolution data to capture the relevant features for accounting, such as urban ecosystems, agroecosystems, site-specific environmental impact assessment projects, and municipal planning.

This session will focus on two core topics:

1. The application of ecosystem accounting to highly modified ecosystems, such as urban ecosystems and agroecosystems.
2. The integration of ecosystem accounting into existing environmental policies, Environmental Impact Assessment (EIA) and territorial planning, especially for fine-scale applications.

The session will build on recent experiences of hosts studying the advancement of ecosystem accounts for urban ecosystems, and their application to inform site-specific projects and municipal plans.

For example, urban ecosystem accounts may play a key role in tracking net restoration targets of the Nature Restoration Law for cities and towns, as well as in biodiversity offsetting and no-net-loss objectives. Additionally, the amendment of the Directive on environmental accounts suggests using urban ecosystem accounts to track changes in temperature and humidity regulation services in urban areas.

In terms of fine-scale applications, ecosystem accounting can provide a comprehensive socio-ecological overview, expanding beyond current practices in impact assessments and planning that typically focus on rare, threatened or endangered nature. Also, ecosystem services are often targeted in EIAs, but there is currently no standardized methodology for their assessment. For example, the socio-ecological impacts of infrastructure development projects can be analyzed more comprehensively within an accounting context.

In this session, we will encourage discussions by both researchers and practitioners on:

- Conceptual, methodological, or practical advancements in urban ecosystem accounting and other highly modified ecosystems.
- The suitability of ecosystem accounting for environmental impact assessment and territorial planning, including land-use priority setting and specific projects.

Contributions can range from specific case study applications and ecosystem accounting pilots to conceptual contributions and analyses of challenges and opportunities for ecosystem accounting applications at the local level, including their potential to support policy design and decision-making.

Goals and objectives of the session:

The overall aim of this session is to discuss conceptual, methodological, and operational advances in applying ecosystem accounting to fine-scale applications and urban ecosystems in Europe. The session is open to research-oriented and practitioner-oriented studies, as well as work developed collaboratively among researchers, practitioners, and public institutions.

A practical goal is to bring together professionals who are tackling issues that arise when applying SEEA EA to fine-scale applications and developing urban ecosystem accounts at local, regional or national levels. To support this, a panel discussion and open debate will be held at the end of the session, and the possibility of creating a new ESP sub-group will be discussed with speakers and attendees.

Of particular interest to this session are studies focused on the following key themes:

1. Framework integration, technological advancements, and policy impact/relevance.
2. Applications of ecosystem accounting to urban and regional planning, and land-use allocation including housing, recreation, industry, mining, transport infrastructure, energy infrastructure development, and priority setting of restoration and nature conservation areas.
3. Assessment of proposed development projects and expected landscape changes using ecosystem accounting (ecosystem extent accounts, indicators of ecosystem condition, and ecosystem services).
4. Local or regional ecosystem accounts for urban ecosystems and their specific policy and planning applications at municipal, metropolitan, or regional level.
5. Conceptual and operational aspects of SEEA EA when applied to urban ecosystems to ensure ecological robustness and policy/planning value.
6. New methods or approaches for compiling specific accounts (extent, condition, ecosystem services, monetary ecosystem assets) in urban ecosystem accounting.
7. The development of urban biodiversity accounts, such as those starting to be compiled for other ecosystems.

The session welcomes any research or practical work on ecosystem accounting applied to fine-scale applications and highly modified ecosystems beyond the listed topics.

Planned output / Deliverables:

Potential outputs of this session, depending on the number and type of contributions collected, will include:

1. A special issue or thematic volume in a peer-reviewed journal featuring studies presented during the session and welcoming other relevant studies.
2. The organization of an ESP thematic working sub-group focused on applying ecosystem accounting to fine-scale applications and urban ecosystems.

II. SESSION PROGRAM

Room: Expert Street 6

Date of session: 19th of November 2024

Time of session: 11:00-12:30 & 14:00-15:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
11:00 11:06	Hosts & co-Hosts of Session T17b		-	Introduction to the Session
11:06 11:18	Javier	Babí Almenar	Politecnico di Milano NBFC	Thematic urban ecosystem accounts: challenges, lessons and ways forward.
11:18 11:30	Trond	Simensen	Norwegian Institute for Nature Research	A Comparative Review of Project-Level Ecosystem Accounting Methodologies.
11:30 11:42	Bart	Immerzeel	Norwegian Institute for Nature Research	Zooming in on ecosystem accounting: a gap analysis of INCA-Tool's suitability for local and regional decision-support.
11:42 11:54	Lori	Giagnacovo	VITO	Dynamic fine-scale habitat mapping to facilitate ecosystem extent accounting and biodiversity monitoring.
11:54 12:06	Giulia	Capotorti	Sapienza University of Rome	Current opportunities and challenges for urban ecosystem typification and assessment in Italy.
12:06 12:18	Jonathan	Reith	Federal Statistical Office of Germany	Assessing Urban Ecosystems in Germany: Extent, Condition, and Services.
12:18 12:30	Victor Javier	Colino Rabanal	University of Salamanca	Quantifying the Economic Value of Ecosystem Services in Vineyards of Castilla y León, Spain: A Logic Chain Methodology.
12:30 14:00	LUNCH BREAK			
14:00 14:12	Bálint Marton	Czúcz Kiss	Norwegian Institute for Nature Research University of Szeged	The dependence of urban microclimate regulation on ecosystem characteristics – a qualitative evidence synthesis.

Time	First name	Surname	Organization	Title of presentation
14:12 14:24	Mattias	Gaglio	University of Ferrara	Wetland type matters: evaluating distinct sets of ecosystem services for reliable ecosystem accountings.
14:24 14:36	Graciela	Rusch	Norwegian Institute for Nature Research	Biodiversity and ecosystem services in performance standards that evaluate impacts of infrastructure development projects.
14:36 14:48	Maria	Korkou	Norwegian Institute for Nature Research	Policy and Planning Relevance of Oslo's City's Biodiversity Index.
14:48 15:00	Arron	Wilde-Tippett	Norwegian University of Science and Technology	Ecosystem accounting: pathways for impacting municipal spatial planning in Norway.
15:00 15:30	PANEL DISCUSSION & OPEN DEBATE			
-	Informal Discussion about the potential creation of an ESP sub-group (After the Session - Location & Time to be decided)			

III.ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Dynamic fine-scale habitat mapping to facilitate ecosystem extent accounting and biodiversity monitoring

First authors(s): Marcel Buchhorn
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The United Nations Statistical Commission standard on the SEEA Ecosystem Accounting and the Convention of Biodiversity Global Biodiversity Framework (GBF) requires ecosystem extent maps as a base to derive accounts and indicators. VITO has developed a unique method of creating ecosystem extent accounts for Europe based on detailed EUNIS habitat maps. The habitat mapping method comprises a complex hierarchical workflow with many input features among LiDAR, climate and soil data, and optical satellite data, and requires field-validated geolocations linked to accurate EUNIS classifications. Once the database contains sufficient training data for

all EUNIS classes, this method could be upscaled to create a global wall-to-wall habitat map, which will be explored in the upcoming ESA WEED (World Ecosystem Extent Dynamics) project. Although the habitat maps are an intermediate product in the extent accounting, they contain important information when it comes to landscape planning since the habitats (in comparison to ecosystem extents) can be linked to a Red List status that indicates their need for conservation or restoration. Besides, yearly habitat maps raise possibility of change detection and eventually also scenario analysis.

Keywords: SEEA-EA, habitat mapping, ecosystem extent, Integrated Natural Capital Accounting, landscape planning

2. Wetland type matters: evaluating distinct sets of ecosystem services for reliable ecosystem accountings

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Following the launch of the System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA-EA) by the United Nations in 2021, ecosystem accounting has become a prevalent means of incorporating natural capital value into policymaking processes. Nevertheless, the reliability of such a tool depends on the accuracy and reliability of data at the level of individual ecosystems. This aspect is of particular importance when applied to deltaic environments, where aquatic ecosystems provide different and distinct bundles of ecosystem services (ES).

The present study aims to evaluate the diverse sets of ES delivered by four transitional wetlands, representing the aquatic ecosystems of the Po delta (Italy), based on empirical data gathered from primary sources. The results demonstrate that wetlands exhibit considerable variation in their qualitative and quantitative values, contingent upon their specific uses, management practices, and ecological characteristics. Coastal, closed lagoons and saltworks are primarily utilized for provisioning and cultural ES with direct market value, while other ES are of lesser monetary significance. In contrast, the value of regulating ES (i.e. water regulation) is prevalent in the inner wetlands.

Although primarily utilized for productivity purposes, the wetlands of the Po Delta exhibit distinct sets of ES according their specific features and differ in total ES value. By providing a detailed understanding of the ES provided by different wetland types, this study highlights the importance of tailored management practices to maximize the ecological and economic benefits of these critical ecosystems. The findings indicate a clear need for ecosystem-level studies in deltaic environments as a foundation for the scaling up of ecosystem accounting at regional and national levels.

Keywords: Ecosystem accounting, River deltas, SEEA-EA, Ecosystem-level studies, Wetlands

3. Zooming in on ecosystem accounting: a gap analysis of INCA-Tool's suitability for local and regional decision-support

First authors(s): Bart Immerzeel
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The European Commission has proposed the introduction of national ecosystem accounts following SEEA EA guidelines, and standards are under development for the creation of ecosystem accounts by statistics bureaus at the EU member state level. At the same time, ecosystems are for a large part managed at lower administrative levels, and the creation of local ecosystem accounts can therefore be a useful decision-support tool. A potential opportunity exists in the regional and local application of ecosystem accounting methods currently developed for the national level. INCA-Tool is a flagship tool for ecosystem services accounting, currently under development at VITO and being tested for national accounting by statistical bureaus across Europe. Whether INCA-Tool can be useful as a tool for regional and local ecosystem accounting depends on how well it answers to decision maker's needs regarding reporting requirements, policy setting, spatial planning and impact analysis.

We present the results of an analysis of the relevance and practical usefulness of ecosystem services accounts created by INCA-Tool for the regional and local level in Norway. We present physical and monetary ecosystem service accounts for one county and three municipalities, and the results of a workshop in which we present and discuss these INCA-Tool outputs with county and municipal decision makers. This leads to a gap analysis based on the workshop results, showing the fit between decision maker needs and INCA-Tool's contents, temporal and spatial resolution, output formats, accessibility of data inputs, uncertainty in outputs, user-

friendliness, and compatibility with local and regional accounting, reporting and spatial planning systems. Finally, we suggest adaptations to INCA-Tool models, data inputs and outputs to better answer to local and regional decision-support needs.

Keywords: Ecosystem accounting, INCA-Tool, local decision-support, ecosystem service

4. Biodiversity and ecosystem services in performance standards that evaluate impacts of infrastructure development projects

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The importance of protecting biodiversity and ecosystem services has been repeatedly highlighted in recent assessments and new international obligations related to the Kunming-Montreal Agreement. At the same time, new infrastructure development, including from the energy sector, increasingly puts pressure on nature. An allocation of areas to renewable energy infrastructure implies a trade-off with other land-uses, including nature conservation and the protection of ecosystem services. These conflicting objectives places great demands on the processes for renewable energy development projects, and the private sector has an important role in making effective protection of nature an integral part of all planning and development of renewable energy.

Recently, considerable emphasis has been placed to revert trends of biodiversity and ecosystem functions loss. For the goals to be credible, the implementation should follow a systematic approach to quantify and manage impact. To this end, standards to help the private sector manage biodiversity impacts have been developed, among others, the IFC performance standard on “Biodiversity Conservation and Sustainable Management of Living Natural Resources” (PS 6), which has been specifically tailored toward the private sector operating in infrastructure development projects.

We first present an overview of the concepts embedded in the mitigation hierarchy; a decision-support tool often used in Environmental Impact Assessments (EIA), which assumes an assessment of the magnitude of impact on nature. We present the IFC PS 6 criteria to assess local impacts of infrastructure development projects and relate them to the mitigation hierarchy

using the example the Norwegian Nature Diversity Act and the national guidelines for EIAs. We finally identify gaps in how EIAs evaluate impacts on ecosystem services and discuss the potential of ecosystem accounting at the local level to bridge these gaps.

Keywords: EIA, Mitigation Hierarchy, Private sector, ecosystem accounting

5. A Comparative Review of Project-Level Ecosystem Accounting Methodologies

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Environmental impact assessments (EIAs) are currently the most central knowledge base for assessing the environmental consequences of development projects. However, EIAs have faced criticism for varying quality, legitimacy, and relevance in planning and permitting processes, and they are not tailored to cover emerging knowledge needs such as quantitative biodiversity offsetting or corporate sustainability reporting (CSR) Corporate Sustainability Reporting (CSR). Ecosystem accounting offers a novel framework for integrated cross-scale analysis of ecological, economic, and social impacts, but examples of project-level implementations and best practice guidelines are still limited. Improved planning methods and tools are needed to balance society's need for areas for development with ambitious goals for nature conservation, restoration, and no-net-loss land management.

In this study, we review 20 existing fine-scale, project-level ecosystem accounting tools and approaches from the temperate-boreal sone, with the aim of identifying relevant applications and areas of use. We assess key properties of the methods including thematic scope, data requirements, methodological complexity, and relevance to various purposes such as layout and alternative selection, application of the mitigation hierarchy, CSR, and quantification of net biodiversity loss or gain. We compare project-level ecosystem accounting approaches with EIA requirements by use of document studies, summary statistics and multivariate statistical analyses.

Results will reveal key properties of existing methods for fine-scale, project-level ecosystem accounting, assess how they relate and differ, how they compare to traditional tools such as EIAs, and how they meet novel requirements for CSR, as well as 'no net loss' / 'net gain' policies that implicitly rely on accounting concepts.

Based on our findings, we will highlight knowledge needs, suggest improved practices, and discuss implications for policy and decision-making.

Keywords: Ecosystem accounting , Environmental impact assessments, Corporate Sustainability Reporting

6. Ecosystem accounting: pathways for impacting municipal spatial planning in Norway

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The global loss of biodiversity and natural capital driven by land use change, is a risk for vital ecosystem services, such as air and water filtration, food provisioning, climate regulation and wellbeing. Ecosystem accounting (EA) is a framework for documenting ecosystem extent, condition and the goods and services which they produce. Questions remain about the way in which this new framework for organising data can be implemented and utilised in spatial planning. Research in planning support tools (PSTs) highlights an implementation gap due to a lack of understanding of decision makers' expectations as well as of the planning context. We draw on decision theory to understand how EA can contribute to zonal planning practice. We complement this with qualitative data from planning professionals to understand the divide between policy and practice. Systems engineering is then used to conceptualise the planning system and practice in Norway. In Norway, municipalities hold the authority over local planning through the Planning and Building Act (2008). We provide systems models of zonal planning, indicating how ecological data is utilised with the view of addressing gaps that can be filled by EA data. Finally, we propose a new theory to activate participation in planning through the use of framing of EA data.

Keywords: Ecosystem Accounting, Systems Engineering, Spatial Planning.

7. Thematic urban ecosystem accounts: challenges, lessons and ways forward.

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Ecosystem accounts can serve as a framework to monitor changes not only in natural ecosystems, but also in anthropogenic ones such as urban ecosystems. Urban ecosystems are both drivers of global and local biodiversity change, and the primary living spaces for humans. This makes urban ecosystem accounts a valuable tool for revealing trade-offs between multiple benefits and for informing diverse sets of policies at various spatial levels. Developing a global urban ecosystem accounting framework could also help enhance our understanding of urban ecosystems and their sustainable management. To introduce the topic of the session on "Advancing the application of ecosystem accounting to urban ecosystems", we discuss the potential development of a global urban ecosystem accounting framework based on SEEA-EA thematic accounts. Moving from a review of the literature, we outline key challenges in thematic urban ecosystem accounting, and present potential solutions based on lessons and approaches gathered from past experiences. Our analysis shows that urban ecosystem accounts share challenges with accounts of most ecosystems. However, challenges related to ecosystem extent and condition accounts are mainly specific to urban or anthropogenic ecosystems. Various approaches have been used to define and classify urban ecosystems, but there is no global consensus in terms of delimitation and classification yet, at least from an accounting perspective. The analysis also highlights that policy uses of urban ecosystem accounts are varied but often unclear, with local policy push potentially lacking in part due to this issue. As a final reflection, we note that urban ecosystem challenges are interrelated, and some are dependent on each other. This reflection sets the stage for the ESP session, where current conceptual, methodological, and operational advances (and strategies) for addressing these challenges will be discussed.

Keywords: cities; natural capital; ecosystem services; urban sustainability; science for policy.

8. Current opportunities and challenges for urban ecosystem typification and assessment in Italy

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Current challenges for sustainable, resilient and safe urban ecosystems require integrated approaches, able to strength the science-policy interface [1]. Especially, current EU regulations, which include thematic accountings for urban ecosystems, devoted measures for nature restoration in cities, and the foreseen monitoring of soils under the Soil monitoring Law, call for the support of scientific research as regards the definition of i) viable urban boundaries, ii) urban ecosystem types and sub-types, iii) reference systems with proper and multi-responsive indicators and iv) baseline conditions.

In Italy, a country with an outstanding complexity for both natural setting [2] and settlement history and geography [3, 4], such challenges are similarly complex. The implementation process of the upcoming regulation on Ecosystem Accounting (SEEA-EA) was therefore started by building a broad and interdisciplinary working group, within which not only different institutions but also a number of scientists from the National Biodiversity Future Center (NBFC) are actively interacting. The interdisciplinary group represents an opportunity to compare and align different approaches for the definition, delimitation and assessment of urban ecosystem types and sub-types in Italy, with an active debate on the challenges already identified at the EU level and on those arising from national peculiarities (e.g. FUA vs LAU reference frameworks; DPSIR indicators for distinguishing sub-groups; structural, configurational and socio-economic condition indicators and respective baselines).

The wish is that outcomes from the work shall represent a benchmark for preparing the national restoration plan required by the recently approved EU Nature Restoration Law, especially as for articles 8 and 14.4, and, concurrently, a national-level urban ecosystem accounting pilot useful for other countries, especially from Mediterranean Europe.

[1] Vaidya, Chatterji, 2020. DOI: 10.1007/978-981-32-9927-6_12

[2] Blasi et al., 2018. DOI: 10.1080/11263504.2018.1492996

[3] Cimini et al., 2023. DOI: 10.3390/land12010155xxx

[4] Istat, 2017. Forme, livelli e dinamiche dell'urbanizzazione. ISBN: 978-88-458-1916-2

Keywords: interdisciplinary approach, urban ecosystem typification, condition assessment, SEEA-EA thematic accountings, Nature Restoration Law

9. The dependence of of urban microclimate regulation on ecosystem characteristics – a qualitative evidence synthesis

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Ecosystem characteristics and ecosystem services are both boundary objects with diverse (and often incompatible) interpretations and operationalisations in the different disciplines working with them. A good understanding of the relationships between ecosystem characteristics and services is necessary for the identification of ecosystem condition variables, which can support meaningful ecosystem management. Nevertheless, while there is a lot of primary research addressing relationships between particular ecosystem characteristics and services, the heterogeneity of basic concepts, indicators, and assessment methods make traditional quantitative (aggregative) synthesis methods challenging. Therefore, we explored the applicability of qualitative knowledge synthesis methods to assess the relationships between indicators of ecosystem condition and services. In this presentation, we present the first results of our work in the case of urban microclimate regulation. More concretely, we applied Critical Interpretive Synthesis, which can be characterised with an iterative approach in refining the research question, selecting from the literature and in making the synthesis. The pool of analysed papers was collected from Web of Science, and the set of search terms was optimised iteratively, with the help of preselected benchmark studies. Then a predefined set of information was collected from each paper (e.g. spatial scale of the analysis, cascade level of ES indicator, etc.). During the review we identified groups of similar indicators, methods, etc into "synthetic constructs", connecting them with "synthesising arguments" based on the studies reviewed. The research gaps we identified (e.g. developing and testing ES indicators, which have strong well-being relevance) can help the orientation of further analyses in the topic.

Keywords: ecosystem condition, urban ecosystems, condition indicators, qualitative methods, Critical Interpretive Synthesis

10. Policy and Planning Relevance of Oslo's City's Biodiversity Index

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Urban areas have rich biodiversity and play a crucial role in its conservation. Given that green spaces and natural areas support a variety of species and habitats, it is important to monitor the progress of biodiversity conservation through urban biodiversity accounts. The development of urban biodiversity accounts is similar to those initiated for other ecosystems.

This study aims to uncover the policy and planning relevance of the City Biodiversity Index. Using the Singapore Index framework, we assessed its applicability in urban planning and policy in Oslo, Norway. By employing the methods outlined in the Singapore Index guidelines, we evaluated a comprehensive range of 12 city-wide indicators that cover biodiversity and ecosystem services within the urban environment. Based on feedback from municipal planners, we adapted the Singapore Index for Oslo City. We evaluated its effectiveness as a tool to monitor the implementation of Oslo's new Biodiversity Action Plan. We conducted a mapping analysis to show the biodiversity indicators and illustrate the CBI in Oslo. Lastly, we further discussed the potentiality for integration with urban ecosystem accounting being developed in Oslo. The quantitative analyses found that Oslo scores 34 points (out of 48) on the City's Biodiversity Index. The municipal planners' feedback showcased the potentiality and usefulness of that measurement.

Overall, our study provides critical insights into integrating biodiversity into urban policy and planning.

Keywords: urban, ecosystem, Biodiversity Index, policy, spatial planning

11. Assessing Urban Ecosystems in Germany: Extent, Condition, and Services

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The German Ecosystem Accounts are based on the United Nations International Statistical Standard for Ecosystem Accounting (SEEA-EA) and the amended Regulation on Environmental Accounts by the European Union (691/2011). The Extent and Condition Accounts for Germany have already been published, and the accounting system shall be both standardized and consistent over time, yet adaptable to different ecosystems.

Urban ecosystems are crucial, as they are the most altered landscapes and hotspots of ecosystem services (ES) as most people live there and demand ES benefits. Based on the extent and condition of urban areas, the urban accounts allow for the calculation of the ES provided. The German approach is to use only the strictly urban areas (settlements and transport infrastructure) and therefore only apply the condition to these areas, thereby e.g. excluding urban forests. This approach differs from Eurostat, which uses the more extensive concepts of the degree of urbanization (DEGURBA) or Functional Urban Areas (FUA). The latter can incorporate commuting zones situated outside of cities.

The presentation will explain the decisions made regarding urban extent, condition, and services (e.g., local climate regulation or air filtration) and examine the obstacles of accounting nationally while producing statistics in a highly diverse environment such as urban areas. Furthermore, it will analyze the implications of different urban area scales in terms of condition indicators (e.g., the proportion of green spaces) and services (e.g., which vegetation influences city cooling and what falls outside the scope).

Keywords: Urban areas, Ecosystem Accounting, SEEA-EA, Condition Account, Air Filtration

12. Quantifying the Economic Value of Ecosystem Services in Vineyards of Castilla y León, Spain: A Logic Chain Methodology

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This study focuses on the economic valuation of ecosystem services provided by vineyards in Castilla y León, Spain, employing the United Nations System of Environmental Economic Accounting (SEEA) framework. Castilla y León, with its key Appellations of Origin (AOs) such as Ribera del Duero, Rueda, and Toro, offers an optimal context for this analysis. By integrating economic and environmental data through extended logic chains, this study adapts and extends the SEEA framework to identify ecosystem services present in vineyards and the value factors influencing their availability. Furthermore, within the three main categories of ecosystem services, one provisioning service, three regulating services, and four cultural services have been economically evaluated. The applied methodology enables an economic valuation, estimating approximately 75 million euros for the three groups, with regulating services contributing the most significant monetary value. To examine the effect of local factors, a valuation was applied to 10 cases of vineyards, which have been sampled in the field, with specific data on vegetation cover presence and management practices (conventional or ecological). This analysis highlighted variations in ecosystem service values due to different local factors, emphasizing the importance of tailored management strategies. The integration of local data and the extended SEEA framework provides a robust tool for the economic valuation of ecosystem services. This approach not only enhances the accuracy of valuation but also facilitates the development of sustainable vineyard management practices by revealing the economic benefits of them. Although conservative, this valuation establishes a lower limit on value estimates and serves as a critical tool for informed decision-making in both environmental and economic policy. In conclusion, the methodology presented underscores the necessity of incorporating local environmental and management factors in the economic valuation of ecosystem services.

Keywords: Ecosystem services, vineyards, economic valuation, SEEA, Appellations of Origin