BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T18b

Ecosystem services science for evidence-based transformative changes in decision-making

Hosts:

	Name	Organisation	E-mail
Host:	Benjamin Burkhard	Leibniz University Hannover	burkhard@phygeo.uni-hannover.de
Co-host(s):	Joana Seguin Davide Geneletti Martine van Weelden Kati Vierikko	Leibniz University Hannover University of Trento Capitals Coalition Finnish Environment Institute SYKE	seguin@phygeo.uni-hannover.de davide.geneletti@unitn.it Martine.vanweelden@capitalscoalition.org Kati.Vierikko@syke.fi

Abstract:

The importance of healthy ecosystems and the services they deliver has increasingly been acknowledged, most recently confirmed in the EU's Nature Restoration Law. The assessment of Ecosystem Services (ES) is a powerful approach to raise awareness on human dependence on a functioning, biodiverse environment. Hence in recent years, assessing ecosystem condition and services moved into the focus of various Strategies and Directives, such as the EU Biodiversity Strategies 2020 and 2030. The related MAES (Mapping and Assessment of Ecosystems and their Services) initiative has provided the conceptual, methodological, knowledge and data base for comprehensive assessments and accounting of ecosystem condition and services on different spatial scales, including the EU-wide assessment (2020) and assessments in all EU member states. Knowledge and data for different ecosystem types and their respective conditions are constantly improving and increasingly available.

While many research projects have already delivered a wide range of assessment results, IPBES reports indicated that uptake of it in real-world is still very limited. Quite recently, new research

emerged focusing on diagnosing challenges, barriers, and pitfalls when it comes to achieving actual uptake of ES assessments. Furthermore, the barriers for uptake may vary in scope, need, and use of terminology between the diverse sectors (public, private, finance).

In this session, we want to give the floor to presenters and studies from diverse sectors to present their challenges of ES implementation in decision-making supporting transformative change. Among others, we are interested in discussing challenges related to methods and data, science-stakeholder interfaces, science communication, and uncertainties. We want to hear stories of success as well as failure, in order to learn from them and conjointly develop best-practice guidelines to overcome barriers of ES uptake for the future.

This session aims to share experiences from real-world cases in different sectors, including public, private and finance, on how integrated ecosystem assessments can be performed and taken up in policy and decision-making contexts. The session will identify (1) possible solutions how to overcome barriers to ES uptake and (2) suitable good/best practice examples to learn from and improve uptake / progress towards real-world implementation.

Goals and objectives of the session:

We want to reflect on aspects that increase or hamper the process from ES assessments to decision-making uptake and implementation. This session facilitates sharing experiences from various sectors and creating joint knowledge among participants on how to overcome existing barriers limiting the uptake of ES assessments in the decision-making context.

Planned output / Deliverables:

We aim for a vivid discussion on the present barriers to successful implementation/policy uptake of ES assessments and how to overcome those. Expected outputs include a joint publication/policy briefs and/or special issue in an international journal, depending on participants' interests and motivation

II. SESSION PROGRAM

Room: Expert Street 8

Date of session: 18th of November 2024

Time of session: 11:00–17:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
11:00 – 11:15	Davide	Geneletti	University of Trento, Italy	Session T18b Introduction
11:15 – 11:30	Carla	Washbourne	University College London, United Kingdom	How can Early Career Researchers contribute to the science-policy interface?
11:30 – 11:45	Malte	Hinsch	Leibniz University Hannover, Germany	Bridging Science and Stakeholders: Pollination Ecosystem Service Modelling for Sustainable Landscape Management in Lower Saxony
11:45 – 12:00	Laura	De Luca Peña	Ghent University, Belgium	Assessing Blue Economy Sustainability: An Ecosystem and Life Cycle Approach for an Evidence-Informed Policy Making
12:00 – 12:15	Anindita	Debnath	Wildlife Insitute of India, India	Tracking Carbon Over Decades: Monitoring Ecosystem Services in the Askot Landscape, Indian Himalayas
12:15 – 12:30	Vince	van 't Hoff	Foundation for Sustainable Development, Wageningen, Netherlands	From dimes to decisions – Applying monetary values in local public decision making in the Netherlands
12:30 – 14:00	Lunch break			
14:00 – 14:15	Joana	Seguin	Leibniz University Hannover, Germany	How to make ecosystem services science outcomes applicable for evidence-based decision-making?
14:15 – 14:30	Katie	Wilson	UNEP-WCMC, United Kingdom	Science-Policy-Society Dialogue: Horizon Project SELINA
14:30 – 14:45	Stefano Davide	Murgese	SEAcoop STP, Turin, Italy	The Masterplan SWITCH: agriculture for active ecosystems management, at service of local communities and for climate change adaptation

Time	First name	Surname	Organization	Title of presentation
14:45 – 15:00	Jarumi	Kato-Huerta	University of Trento, Italy	Enhancing Justice Dimensions for Integrated Ecosystem Assessment: Implications for Decision-Making
15:00 – 15:15	Marija	Bockarjova	University of Twente, Netherlands	Mechanisms behind a transformative change: Nature, well-being, inclusiveness and economic performance
15:15 – 15:30	Paulo	Pereira	Mykolas Romeris University, Vilnius, Lithuania	Systematic review on mapping and assessing ecosystem services in urban and peri-urban areas
15:30 – 16:00	Coffee break			
16:00 – 16:15	Aveliina	Helm	University of Tartu, Estonia	Implementation of the results of ecosystem assessments in decision making in Estonia
16:15 – 16:30	Sigvard	Bast	KTH Royal Institute of Technology, Stockholm, Sweden	Green infrastructure and ecosystem service mapping for planning
16:30 – 16:45	Roxanne	Lorilla	Harokopio University of Athens, Greece	Integrating ecosystem services into development plans: Is there space to address and minimise the tradeoffs between nature and grey infrastructure?
16:45 – 17:00	Anna	Sperotto	Ca' Foscari University of Venice, Italy	Adopting an Ecosystem Services perspective for the Water-Energy-Food Nexus assessment: opportunities and challenges for a transformative change in the Adige river basin (Italy)
17:00 – 17:15	Mendy	van der Vliet	Planet Labs PBC, Haarlem, Netherlands	The development of satellite-based assessment of landscape restoration: reflections from a co-design approach
17:15 – 17:30	Joana	Seguin	Leibniz University Hannover, Germany	all session hosts: Wrap up and final discussion

III. ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Mechanisms behind a transformative change: Nature, well-being, inclusiveness and economic performance

First authors(s): Marija Bockarjova
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Educating a new generation of academics and practitioners on the ecosystem services (ES) and their value is essential for future nature-inclusive and well-informed societies. In this presentation, we plan to reflect on teaching the value of ES at the University of Twente, the Netherlands. We offer a dedicated elective course on ecosystem services as benefits to people to students with diverse backgrounds. Teaching ES value as part of this course, involves a range of methods to convey the economic, ecological, and intrinsic values of ES. These methods include traditional lecturing introducing multiple conceptual perspectives on value, inviting guest speakers, and organizing visits to natural sites to observe ecological interventions firsthand. These approaches help deepen understanding and articulation of how ecosystems and human society are intertwined. In addition, we use the InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs) tool, which allows students to apply theoretical knowledge to real-world scenarios. This hands-on experience helps them understand the process of identifying, mapping, quantifying and monetizing selected ecosystem services, making the learning process more tangible and relevant.

In this contribution, we aim at discussing the balance between economic valuation with broader ecological and intrinsic values, to support the broader goal of ES education of promoting responsible environmental stewardship of the students. With our approach to ES education, we aim at students developing understanding, critical thinking and problem-solving skills, preparing them for informed decision-making in their future profession and ability to articulate, visualise and quantify ES and their values.

Keywords: Value typologies, educational methods, InVEST tool

2. Assessing Blue Economy Sustainability: An Ecosystem and Life Cycle Approach for an Evidence-Informed Policy Making

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The escalating exploitation of marine resources is placing unprecedented pressure on ecosystems, potentially leading to irreversible changes. Effective management of human activities is crucial for the safeguarding of the marine environment. Policy instruments are essential for ensuring a sustainable Blue Economy. However, there are concerns about their effectiveness in guiding relevant stakeholders. This study aims to analyse the incorporation of comprehensive and quantitative environmental impact assessment tools in legislation supporting sustainable Blue Economy activities. It also highlights the importance of these tools for evidence-informed policymaking through the development and application of such a tool to a multi-use offshore case study.

This study examines the marine policy landscape and identifies key legislation promoting the sustainable growth of the Blue Economy. It also explores how well environmental impact assessment tools, such as ecosystem services and life cycle assessments, are integrated within existing legislation. The analysis of current legislation reveals a significant gap in providing guidance on which methodologies to use for measuring sustainability impacts. To address this, the study advocates for incorporating quantitative and comprehensive environmental sustainability impact assessment methodologies, based on integrating life cycle and ecosystem services assessment, into legislation. This approach could provide a systematic framework for assessing environmental sustainability within marine activities.

To demonstrate the applicability of a life cycle and ecosystem-based methodology, the environmental sustainability of co-locating offshore wind energy and a mussel farm in the Belgian North Sea was quantified. The findings reveal that the positive impacts of these activities outweigh the negative ones. Moreover, this study identifies areas for enhancing the methodology to better align with policy objectives and explains the science-policy interface as a co-learning environment.

This study highlights the importance of employing scientifically rigorous methods to inform policy decisions in marine resource management, contributing to the sustainable development of the Blue Economy.

Keywords: ecosystem services assessment, life cycle assessment, sustainable Blue Economy, evidence-informed policy, multi-use of marine space

3. Tracking Carbon Over Decades: Monitoring Ecosystem Services in the Askot Landscape, Indian Himalayas

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Forests are essential in preserving biodiversity and providing various ecosystem services (ES) that contribute to the overall ecosystem health. One of the key services includes regulating terrestrial-based carbon sequestration and storage. Globally, large-scale anthropogenic alteration of natural habitats has led to increased concentration of CO2 in the atmosphere, accelerating climate change. The Himalayas play a crucial role in the global carbon cycle, exhibiting significant influences on the Earth's climate and ecosystems. The present study was conducted in the Askot landscape (elevation 600m-6500m), in Pithoragarh district of Uttarakhand, India, encompassing a total area of approx. 4496 km2. The landscape is majorly snow-covered while the forested area holds sub-tropical, temperate, & alpine vegetation, offering a diverse habitat that supports several threatened species of conservation importance. This study aims to quantify carbon storage in the Askot landscape and assess changes over the last three decades (1990-2020) using Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST). Thirteen land-use land-cover (LULC) classes were delineated with high-resolution Satellite data and validated through field survey. For each of the LULC classes Above Ground Carbon (AGC) stock value was compiled from literature. In InVEST, the Carbon Storage & Sequestration model was used for further analysis. The result indicated a total loss of 8.24% in the past 30 years. Despite being the most diverse forest and storing a high amount of CO2, the lesser Himalaya experiences constant changes in land use patterns driven by anthropogenic activities as well as natural disasters. Such declines in AGC storage imply the carbon potentially being released into the atmosphere and may amplify far-reaching ecological consequences in Himalayan ecosystems, and regional climate patterns.

Keywords: Above-ground carbon, InVEST, Climate change, Forest health

4. Bridging Science and Stakeholders: Pollination Ecosystem Service Modelling for Sustainable Landscape Management in Lower Saxony

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Evidence-based sustainable landscape management requires linking scientific research with stakeholder perspectives. The ModBieN project has successfully illustrated this approach by adapting an existing model for pollinator habitat suitability in collaboration with wild bee experts and local stakeholders in Lower Saxony, Germany.

The ModBieN project took an interdisciplinary approach, combining ecological modelling techniques with stakeholder engagement. Initially, a habitat suitability map for pollinators was modelled using a spatial modelling framework that took into account parameters such as available floral resources, nesting sites and landscape connectivity. Through iterative consultations with wild bee experts and regional stakeholders, adjustments were made to the modelling approach to better reflect local ecosystem dynamics. Key changes included the integration of ecosystem condition parameters into the modelling process.

This interdisciplinary approach provided valuable insights into pollination ecosystem services performance and habitat suitability across Lower Saxony. By incorporating stakeholder inputs, the model was refined to better capture the complex interactions between wild bee populations and their environment. Presenting the results at a regional workshop gave stakeholders the opportunity to engage directly with the research findings and to contribute their perspectives and reservations. Through interactive discussions and hands-on activities, participants gained a deeper understanding of the challenges and opportunities for sustainable landscape management in the region.

The ModBieN project highlights the importance of science communication and stakeholder engagement in bridging the gap between research and practice. The diverse communication methods, including workshops, presentations and interactive tools facilitated meaningful dialogue and knowledge exchange among participants and reflects the different perspectives and priorities of local stakeholders. By fostering communication and collaboration, the project laid the foundation for future initiatives to promote biodiversity conservation and ecosystem management in the region.

Keywords: Sustainable landscape management, stakeholder engagement, pollinator habitat suitability mapping, interdisciplinary research, science communication

5. Enhancing Justice Dimensions for Integrated Ecosystem Assessment: Implications for Decision-Making

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The EU Horizon project SELINA (Science for evidence-based and Sustainable decisions about natural capital) aims to enhance the consideration and uptake of ecosystem services, ecosystem condition, and biodiversity information in decision-making processes. As such, a key project output is the Framework for Integrated Ecosystem Assessment (FIEA), designed to facilitate this process.

SELINA's FIEA is a comprehensive six-phase approach (frame, scope, design, assess, disclose, act) for ecosystem assessment designed to support decision-making and foster transformative societal change. This research explores how the framework could be further enhanced by incorporating diverse justice dimensions throughout the FIEA phases, for example, by examining how addressing justice might guide and inform each framework stage, from framing the assessment to acting on its results. For instance, in the 'frame' phase, justice implications could guide the identification of targeted stakeholders. In the 'assess' phase, equity indicators could be integrated to evaluate ecosystem services' benefits and distribution of burdens.

Furthermore, we investigate the potential impact of incorporating justice dimensions in SELINA's 15 public and private Demonstration Projects. These projects offer a unique opportunity to test how this approach might guide policy processes in diverse European contexts, including how equity considerations influence the assessment process and resulting decisions.

The study aims to demonstrate the transformative potential of integrating justice principles and dimensions into FIEA. It hypothesises that a justice-oriented approach could lead to more equitable, sustainable, and socially beneficial ecosystem management decisions in public and private decision-making contexts.

Keywords: ecosystem services assessment, equity, justice dimensions, decision-making

6. Implementation of the results of ecosystem assessments in decision making in Estonia

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In 2018–2023, country-wide assessment and mapping of terrestrial ecosystems was carried out in Estonia (national MAES project ELME, co-financed by the European Union Cohesion Fund). The follow-up work, including implementation and reassessments are led by the Estonian Environment Agency.

The resulting map layers of ecosystem extent, condition and ecosystem services are made publicly available, including the catalogue of map layers: https://arcg.is/WuW9.

The map layers have already been widely implemented in various fields, especially by the stakeholders dealing with spatial planning and biodiversity issues providing a valuable input for decision makers.

Among the examples of the real-world implementation is planning, justifying and zonation of the nature protection areas, and assessing the effectiveness of the protection regimes. The layers have also been used for analyzing the functionality, condition and the actual habitat connectivity of the planned green network as it has been designated in the spatial plans of different levels (local government, county, state).

The agri-environmental subsidy for enhancing ecosystem services in agro-ecosystems is in place based on the methodology worked out in ELME.

The layers have also been used to analyze how to achieve biodiversity and climate-related goals through spatial land use planning (incl. deforestation issues, afforestation, restoration, etc.), as well as in environmental impact assessments and various cross-disciplinary (human needs, nature values, technical infrastructure limits, etc.) spatial planning exercises, e.g., for choosing the locations for wind farms. The recent progress in the real-world uptake and towards transformative change is illustrated by the Supreme Court's decision which obliged the decision makers to consider better the values of nature (and explicitly ELME results) before issuing the peat extraction permissions.

The success of the uptake seems to be driven by the real world (societal) need for holistic interpretation of nature values, which has been lacking so far, but is about to change.

Keywords: ecosystem condition, ecosystem services, spatial planning, biodiversity and climate goals

7. Integrating ecosystem services into development plans: Is there space to address and minimise the tradeoffs between nature and grey infrastructure?

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The EU Green Deal (EGD) sets a series of policy objectives aiming at improving developmental policies to comply with sustainability practices. On that aspect, transportation infrastructure is one of the EGD sectors, which is addressed to support economic development and improve human well-being. Still, implementing grey infrastructure can influence the supply of multiple ecosystem services (ES) and significantly modify the aspects of well-being that can be supported by a region. In this research piece, we seek to explore the role of developmental plans in the supply of ES and aspects of human well-being under different management scenarios. As part of the GUARDEN project, we apply participatory modeling approaches, in the Narbonnaise Regional Nature (NRN) Park in France, an area rich in biodiversity and ES, where the development of a high-speed railway line is designed. Through Bayesian Belief Networks (BBNs) we mapped nature's contributions as identified by local stakeholders (e.g. access to nature and biodiversity, cultural and natural heritage value). We assessed the potential well-being aspects that can be improved or deteriorated across the agricultural, transportation, and biodiversity protection sectors. The developed BBN models consider quantitative, qualitative and spatially-explicit data, providing information on the current state and future trajectories of ES under different management and climate scenarios. We engaged a broad range of stakeholders from all sectors through a series of workshops, which allowed us to design the graphical network, identify management priorities and future visions, and understand the level of information that needs to be produced and included within the decision-making process. A series of maps were produced that identified the areas where multiple benefits can be provided and locations in which some benefits might be lost. Our experience indicated that the probabilistic nature of the results enhanced the overall transparency of the process, as well as the stakeholders' trust in the

research outputs. Ensuring that stakeholders are integrated across all stages of the modelling process, enables us to increase the uptake of ES assessments towards real-world implementation for efficient ecosystem management.

Keywords: stakeholder knowledge, probabilistic models, ecosystem benefits, European Green Deal, decision support

8. Green infrastructure and ecosystem service mapping for planning

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In rapidly growing metropolitan regions, the intensive land use changes often result in degradation and loss of nature areas, negatively affecting ecosystem services (ES) and biodiversity. In Sweden, planning decisions on new housing areas are taken by the municipalities, which affect ES capacity and demand. In growing urban regions, the need for new housing often overrules the need for ES and biodiversity, but cities also have the potential to be forerunners in planning for transformative change. In the Stockholm region, the County Administrative Board launched an action plan for green infrastructure (GI), aiming to strengthen both biodiversity and ES, targeting to support planning. The aim of this study is to map the capacity and demand for selected ES, compare with the GI plan and discuss scale problems, spatial mismatches and possibilities for multifunctionality, related to planning practice.

The study area is the southern part of Stockholm metropolitan region, embracing eight municipalities in a gradient from urban to periurban. We map ES potential and demand concerning heat mitigation, stormwater retention, nature-based recreation, and habitat quality, comparing these to each other and to the GI plan, in a planning practice perspective. The results show the spatial inconsistencies between ES capacity and demand due to the disparate conditions between highly urbanized landscapes with small nature fragments and more rural land use in the periurban landscapes. This relates to different planning instruments and needs. The existing GI plan mainly represent biodiversity and cover only to a minor extent the other ES, with the exception of NB recreation, while its status in planning remains unclear. Proportions and location of nature areas related to urban densification versus sprawl need further attention

for balancing different types of ES. Furthermore, municipal planning needs stronger coordination with other sectors affecting ES, not at least forestry and transport planning.

Keywords: Green infrastructure, ecosystem service capacity, ecosystem service demand, biodiversity, planning practice

9. The Masterplan SWITCH (Ecosystem Services and Water management for the InTegration of Climate Change adaptation and Habitat quality): agriculture for active ecosystems management, at service of local communities and for climate change adaptation.

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Climate change causes modifications of hydrological cycle at local scale, with consequences water availability and the occurrence of extreme events.

In 2022, northern Italy was affected by a serious drought, which affected ecosystems, biodiversity and local communities, such as the Chierese-Carmagnolese Food District (CCFD), an association of 27 municipalities (located south of Turin) aimed at promoting local agriculture and sustainable practices.

Following these events, the CCFD promoted the definition of the Masterplan SWITCH for the identification of Nature Based Solutions (NBS) to create water reserves for periods of water scarcity. The plan defines adaptation solutions to increase resilience by fostering ecosystem services (ES) provided by natural and agro-ecosystems.

Based on ES assessment and suitability levels for groundwater recharge processes, Nature Based Solutions (NBS) were identified in order to improve ecosystem conditions (EC), ES provision and biodiversity (BD).

NBS consist of local and areal interventions. The former are managed aquifer recharge systems (MAR), by creating new habitats for rainwater harvesting and infiltration areas, that also contribute to reduce flood risk. The latter are addressed to the agricultural sector and consist in

the adoption of practices aimed at increasing EC, BD and the provision of ES by agro-ecosystems.

Farmers are currently being involved in the activities of Horizon Europe SELINA Project to implement this second type of intervention, by developing management models that reduce dependencies and impacts on natural capital, by applying of the Natural Capital Protocol. This will allow the identification of good and economically viable practices that can be applied in other rural contexts.

This work shows how decision-making based on ES concepts is a key element in transformative changes towards sustainable agriculture models that foster synergies between farming and natural ecosystems as an adaptation strategy that maximises co-benefits for local communities and the environment.

Keywords: ecosystem services, biodiversity, agriculture, natural capital protocol, climate change adaptation, managed aquifer recharge

10. Systematic review on mapping and assessing ecosystem services in urban and peri-urban areas

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Although the health of the ecosystem in urban areas is reduced compared to forests or grasslands, it is well known that cities supply a wide range of ecosystem services (ES). From a planning point of view, mapping is crucial for better decision-making. Therefore, mapping and assessing ES is critical to improving well-being in cities. Since urbanization is a global phenomenon and the ES supplied by cities are critical, it is crucial to understand the development of mapping and assessment of ES in urban areas. This work aims to systematically review the studies focused on mapping and assessing ES in urban and peri-urban areas. We used the Preferred Reporting Items for Systematic Reviews and Meta-alpha Methods, using the combination of the words “Ecosystem services”, “urban areas”, “peri-urban”, “city”, “cities”, “forecasting”, “prediction”, “map”, “future”, and “mapping”. 2,664 articles were observed between 2000 and 2023. From these, 1,626 duplicates were identified. In the screening stage,

1,038 studies were discarded. The criteria for selecting the works were: not written in English, studies that did not map ES, non-peer-reviewed articles and literature review articles. Finally, 207 studies were selected. The results showed increased studies focused on mapping and assessing ecosystem services in urban and peri-urban areas between 2011 and 2013. Most of the work was conducted in China and Europe and focused mainly on ES supply. Regulation ES was most identified, especially the Regulation of physical, chemical, and biological conditions. The provisioning ES most studied was Biomass, and Cultural ES was direct, in-situ, and outdoor interactions with living systems that depend on the presence in the environmental setting. Quantitative methods were preferred. Social Values for Ecosystem Services and Integrated Valuation of Ecosystem Services and tradeoff methods were the most used. Very few works forecasted ES in urban areas and validated the model's results.

Keywords: Systematic review, ecosystem services, mapping, Urban and peri-urban areas, degradation

11. Adopting an Ecosystem Services perspective for the Water-Energy-Food Nexus assessment: opportunities and challenges for a transformative change in the Adige river basin (Italy)

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The Water-Energy-Food (WEF) nexus approach offers a comprehensive framework to understand the interdependencies and trade-offs among water, energy, and food security. Incorporating Ecosystem Services (ESs) into this approach ensures a more sustainable and holistic assessment. Mountain ecosystems, which provide crucial services such as water regulation, soil fertility, biodiversity, and carbon sequestration, directly influence water availability and quality, as well as energy and food production systems. Ignoring these services in WEF nexus assessments can lead to incomplete decision-making, potentially exacerbating resource conflicts and undermining sustainability goals.

An analysis of spatio-temporal relationships between multiple ESs under current and future scenarios of land use and climate change was conducted in the Adige river basin (Italy) to

investigate possible conflicts between water, energy and food security in mountain regions and to identify opportunities for a transformative change.

As a first step, single indicators representing each sector of the WEF nexus were calculated and spatially assessed at the sub-basin scale for the years 2006, 2012, and 2018. These indicators included water provisioning, crop yield, soil retention, landscape diversity, and carbon storage. A correlation analysis by means of the Geographical Weighted Regression model, was then performed to map critical areas for multiple ESs provision to the WEF nexus, identifying where synergies and trade-offs are likely to arise.

Future scenarios of climate and land use change were considered to calculate the same indicators and identify changes between the reference year (2018) and future scenarios (2050). Additionally, ESs bundles were identified using Self-Organizing Maps (SOM) to cluster sub-basins with similar ESs patterns, suggesting collective management with targeted measures. Based on these results, different types of sectorial measures were proposed, describing multiple combinations of physical, economic and climatic pathways. These measures serve as a foundation for discussing a shared management strategy to ensure long-term sustainability of the WEF nexus.

Keywords: Ecosystem Services, WEF nexus, transformative change, mountain areas, Adige river basin

12. How to make ecosystem services science outcomes applicable for evidence-based decision-making?

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Presenting author: Joana Seguin

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The EU Horizon project SELINA (Science for evidence-based and Sustainable decisions about natural capital) started in June 2022 and has been running for over 2 years now. SELINA's main aims are to review the state-of-the-art of ecosystems and their services-related science and the provision of guidance for evidence-based decision-making that supports the protection,

restoration and sustainable use of our environment. It is time for a first outlook with lessons learnt and interim conclusions.

In the project, 50 partners from all 27 EU member states and 4 other European countries collaborate to develop solutions for increasing the uptake of the Ecosystem Services concept in the public and private decision-making context. How do we need to tailor integrated ecosystem services assessments in order to make them useful and applicable in real-world contexts? What are the needs of the users and do scientists have adequate responses? Can we propose practical solutions and recommendations to improve the science/decision-making interface? How can scientists and decision-makers adapt their language and acting in order to be heard?

In this talk, we will give insights into the ongoing works of SELINA, including the creation of a comprehensive knowledge base, the establishment of Communities of Practice in the countries or our efforts on finding a common language across disciplines. Furthermore, we will share our experience from the collaboration with the 15 SELINA real-world Demonstration Projects on integrated ecosystem services assessments.

Keywords: Communities of Practice, integrated ecosystem services assessment, decision-making

13. From dimes to decisions – Applying monetary values in local public decision making in the Netherlands

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In this session, we will explore the challenges and opportunities of applying monetary valuation data in municipal decision-making, using a recent pilot project conducted for the Dutch municipality of Eindhoven.

In 2022, the Eindhoven city council decided to purchase the Wielewaal estate (142-hectares) for 30 million euros. In addition to her ecological richness and role in biodiversity conservation, the Wielewaal also aims to serve a public function in a time and place where green spaces are under pressure. Keeping this in mind, the purpose of the municipality of Eindhoven was to comprehensively illustrate the societal benefits of the Wielewaal for the broader community through the development of a social business case

Collaborating with the Dutch Bureau of Statistics (CBS) and the National Institute for Public Health and the Environment (RIVM), the Foundation for Sustainable Development (FSD) conducted an assessment to value the ecosystem services of the Wielewaal in monetary terms. This assessment compared two scenarios: a freely accessible Wielewaal versus a closed Wielewaal.

The results showed the large public benefits related to health and existence values. More importantly, the project underscored the complexities involved in applying monetary valuation in a real-world context.

Several challenges emerged during the project. Some related to aligning data flows from RIVM, CBS, and FSD. Other challenges arose in linking biodiversity to ecosystem services. Finally, after a publication in the National Newspaper on the project and several highly engaging LinkedIn discussions (here by a thought leader in the field and here by the councilor for Nature in the municipality of Eindhoven), the pilot project sparked the debate about when and how to apply monetary valuation data.

This session will delve into these challenges and debates, offering insights and lessons learned from the Eindhoven project to inform future applications of monetary valuation in municipal contexts.

Keywords: Monetary valuation, application, barriers, public decision-making

14. How can Early Career Researchers contribute to the science-policy interface?

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The interface between science and policy is a complex space, in theory and practice, that sees various actors and perspectives coming together to enable policy-relevant evidence to support decision-making. Early Career Researchers (ECRs) across disciplines are increasingly interested in working at the science-policy interface to support evidence-informed policy, with the number of opportunities to do so increasing at national and international levels. However, there are still many challenges limiting ECRs participation, not least how such a complex space can be

accessed and navigated. While recommendations for engaging at the science-policy interface already exist, a practical 'map' of the science-policy interface landscape, which would allow for ECR participation in evidence co-production and synthesis, is missing.

Setting out to facilitate the engagement and participation of ECRs producing policy-relevant evidence around biodiversity and ecosystem services, the authors, who are ECRs themselves, co-created a 'mind-map' - a tool to review the landscape of and leverage access to the science-policy interface. The mind-map was developed through reviewing published literature, collating personal experiences of the ECR authors, and validating against wider peer perspectives in an ECR workshop during the 7th Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). This co-created tool sees ECR engagement in (co-)producing evidence at the science-policy interface as an interaction of three main factors: the environment of the ECR, which mediates their acts of engagement at the science-policy interface leading to outcomes that will ultimately have a reciprocal impact on the ECR's environment. We believe it has applicability as a tool for planning and process mapping as well as self-reflection and evaluation. We hope that it will be useful for structuring and initiating discussions, experience sharing and peer-learning processes within ECR groups and in supporting discussion with colleagues and across organisations.

Keywords: Biodiversity, Boundary Organizations, Capacity Building, Ecosystem Services, Science-Policy Interface, Implementation Science

15. Science-Policy-Society Dialogue: Horizon Project SELINA

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SELINA is a Horizon Europe-funded project designed to transform decision-making processes in both the public and private sectors. By enhancing the integration of Biodiversity, Ecosystem Conditions, and Ecosystem Services information, SELINA aims to drive more informed and effective environmental strategies. The project leverages transdisciplinary knowledge-sharing to offer comprehensive guidance on protecting, restoring, and sustainably managing our environment.

SELINA recognises that successful development and implementation of environmental policy at the EU and Member State level, in part, relies on the availability of robust evidence and

information. The research community therefore has a critical role to play in improving the quality and accessibility of the knowledge, tools and methods that are required to strengthen the evidence base for informed decision-making. However, to support the use of policy-relevant research in public decision-making, it's important that there is an ongoing dialogue between science, policy and society to understand better how research and policy can inform one another to achieve better societal outcomes.

With a particular focus on the research advancements happening in the SELINA project, this Science-Policy-Society Dialogue will bring together researchers and stakeholders from the public sector to share knowledge, experiences, and perspectives on how ecosystem service information can support public decision-making. This dialogue will provide a basis for validating the policy entry points that SELINA's research and products are relevant for, collecting new insights on how the SELINA project can better tailor its products to support public decision-making needs and promote the use of SELINA's Compendium of Guidance that is being developed to support public and private decision-making needs.

Keywords: Science, Policy, Biodiversity, Decision-Making

16. The development of satellite-based assessment of landscape restoration: reflections from a co-design approach

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Monitoring of ecosystem health and ecosystem services is considered necessary to support the proposed EU Nature Restoration Law. It will enable decisions that improve the effectiveness of restoration activities. Despite the recent increase in ecosystem services (ES) assessments, their uptake by stakeholders for use in decision-support is still very limited as described in the recent Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reports. Recommendations for ES assessments from a recent review of guidance documents includes the consideration of the appropriate spatial scale and resolution, data availability, scalability, and the inclusion of ecosystem condition. Based on the IPBES Values Assessment, ES assessments are also recommended to let stakeholders participate in outlining the purpose and the design of the assessment and to communicate outcomes clearly on the specifications of the

input data. In the present study, we co-designed an approach to assess the effectiveness of landscape restoration using long-term and high resolution satellite observations. The purpose and design of this work was based on the results of user journey mapping. We investigated the potential of several satellite datasets of different spatial resolutions and data availability to detect restoration changes. For two restoration areas in Tanzania, we estimated the restoration effectiveness as the amount of water retained by the top layer of the soil (~13% average increase), a soil temperature drop (~-0.5°C) and an increase in surface greenness (~50% average increase) in 3.5 years. This approach illustrates the impact of restoration initiatives on the landscape and supports the reporting of comprehensive metrics to partners and donors.

Keywords: restoration effectiveness, ecosystem services assessment, satellite observations, co-design, impact