BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T18

Governing ecosystem services and biodiversity in socio-ecological systems

Hosts:

	Title	Name	Organization	E-mail
Host:	Dr.	Lasse Loft	Leibniz Centre for Agricultural Landscape Research	lasse.loft@zalf.de
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	Dr.	Marcin Spyra	Dept. Sustainable Landscape Development, Martin-Luther University Halle-Wittenberg	marcin.spyra@geo.unihalle.de
Co-host(s):	Dr.	Améline Vallet	Laboratoire Écologie, Systématique et Évolution, AgroParisTech	ameline.vallet@agroparistech.fr
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	Dr.	Chiara Cortinovis	Centre for Environmental and Climate Research, Lund University	chiara.cortinovis@cec.lu.se
	Dr.	Sabrina Lai	Department of Civil, Environmental and Architectural Engineering, Università degli studi di Cagliari	sabrinalai@unica.it
	Dr.	Nils Droste	Department of Political Sciences, Lund University	nils.droste@svet.lu.se
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Abstract:

The management of multiple ES requires governance systems that can accommodate the complexity of socio-ecological contexts, diversity of institutions, actors, levels and scales, values, and needs. Decision-makers have a range of different policy instruments at their disposal. On

one side are state-centered interventions, such as land use regulations, planning and zoning, binding instruments, the reallocation of property rights, or economic instruments, such as taxes, subsidies, or fiscal transfers. On the other hand, there are more self-regulatory options with less government involvement, such as conditional payment schemes or voluntary agreements. Beyond market and state, the governance and management of ES can also involve actors from the associative sector, NGOs', the civil society, often in a more bottom-up fashion that enhances participation and inclusion. In this session, we focus on (combinations of) governance approaches and tools that support and safeguard ES and biodiversity, covering the whole range from regulatory (such as protected areas, land use planning, biodiversity offsets), to incentive-based (such as payments for ecosystem services and tradable permits).

Within this broad theme, we focus on three main challenges for ES and biodiversity governance:

1) equity and environmental justice of governance mechanisms.
2) governance mixes for peri-urban landscapes.
3) integration of ES in spatial planning.

Goals and objectives of the session:

With the three identified thematic streams, we aim to:

1) map (current) governance approaches of conservation measures with regard to equity considerations from a three-fold angle: empirical, conceptual, and philosophical. Thereby, we aim to advance the mechanism design for biodiversity offsetting and payments for ecosystem services with regard to socio-ecological trade-offs from an environmental justice perspective. Guiding questions:
    a) How is equity being considered in the design and implementation of these mechanisms?
    b) How equity is being assessed in the outcomes of these mechanisms?
2) discuss spatial planning-oriented governance mixes aimed at securing and enhancing the provision of ES in peri-urban landscapes. We encourage contributions that address case studies, exemplary applications, theoretical frameworks and perspectives, as well as proposals of innovative planning processes, methods, and tools oriented towards more sustainable development of peri-urban landscapes. Guiding questions:
    a) How should future peri-urban development patterns be governed to secure and enhance ES provision in peri-urban landscapes? What governance mixes could be implemented, and how?
    b) What are the good practices related to the successful implementation of governance mixes that secure and enhance ES provision in peri-urban landscapes?

c) What are the challenges for implementing such governance mixes?

3) collect experiences and case studies showcasing innovative approaches, exemplary applications, theoretical frameworks, perspectives or methods that have facilitated ES integration in spatial planning at various levels. We also encourage contributions that look at green-blue infrastructure as a planning tool to implement ES delivery, possibly through planning strategies and rules or implementation codes, depending on the planning system. Guiding questions:

   a) What are the bottlenecks that limit ES integration in planning, and how can they be overcome?
   b) What are the aspects and methods that facilitate ES integration?
   c) How, and to what extent, does GBI support ES integration in planning?
   d) What are the good practices related to the successful implementation of ES in planning?
   e) What are the challenges for this implementation?

Planned output / Deliverables:

For the paper focused on the first stream, we aim to organize and publish a Special issue on the topic of "Equitable governance of incentive-based mechanisms // PES and biodiversity offsets" in one of the ESP target journals.

Papers focusing on the second stream (governance mixes in peri-urban landscapes) are invited to contribute to a Special Issue on this topic in Sustainability (MDPI) (deadline for paper submission: December 2020.
ttps://www.mdpi.com/journal/sustainability/special_issues/governance_urbanization

For the third and last stream we evaluate a shared research publication (paper or manuscript) collecting the different experiences and comparing them aiming to identify opportunities and bottlenecks in ES integration in Spatial planning

Related to ESP Working Group/National Network:

Thematic working group: TWG 18 – Governance & Institutional aspects

II. SESSION PROGRAM

Date of session: Wednesday, 9 June 2021

Time of session: 11:00 – 17:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
11:00 11:05	Lasse Marcin Silvia	Loft Spyra Ronchi	ZALF MLU POLIMI	Introduction and Settings
11:05 11:20	Ibone	Ametzaga-Arregi	University of the Basque Country	Practical guide for the design of spatial planning plans from the perspective of Ecosystem Service
11:20 11:35	Giampiero	Lombardini	University of Genoa	Ecosystem services as an opportunity for innovation in spatial planning: The case of Ligurian Alps
11:35 11:50	Sabrina	Lai	University of Cagliari	Green infrastructure as a tool to ground planning policies to ward off hydro-geological hazard: Suggestions from a Sardinian case study
11:50 12:05	Johanna Alkan	Olsson	Lund University	Mainstreaming biodiversity offsetting into Swedish municipal planning through the lens of Ecosystem Services
13:30 13:35	Lasse Marcin Silvia	Loft Spyra Ronchi	ZALF MLU POLIMI	Introduction and Settings
13:35 13:50	Matteo	Giacomelli	University of Camerino	The integration of ecosystem services in landscape planning: a systematic literature review
13:50 14:05	Marcin	Spyra	Martin Luther University Halle-Wittenberg	Protection of peri-urban open spaces at the level of regional policy-making: examples from six European regions
14:05 14:20	Maria	Haensel	University of Bayreuth	Policy instruments and their success of preserving permanent grassland in Bavaria
14:20 14:35	Kinga	Krauze	European Regional Centre for Ecohydrology PAS	Dealing with the wicked problems of urban environment – is the way out paved with ecosystem services? The case of the City of Lodz' Long-Term Socio-Ecological Research Platform

Time	First name	Surname	Organization	Title of presentation
14:35 14:50	Ana-Maria	Popa	University of Bucharest	Assessing the ecosystem services and disservices provided by green spaces in care facilities for elderly people
14:50 15:00	Lasse Marcin Silvia	Loft Spyra Ronchi	ZALF MLU POLIMI	Online survey
15:30 15:35	Lasse Marcin Silvia	Loft Spyra Ronchi	ZALF MLU POLIMI	Introduction and Settings
15:35 15:50	Theresa	Eichhorn	University of Natural Resources and Life Sciences	The success of contractual solutions for the provision of public goods and ecosystem services from agriculture and forestry – A qualitative analysis of 120 case studies in- and outside Europe
15:50 16:05	Charles	Claron	AgroParisTech, Cirad, CNRS, EHESS, Ecole des Ponts ParisTech, Université Paris-Saclay	Mapping ecosystem services to design cost-effective private land conservation
16:05 16:20	Roman	Isaac	Leuphana University Lüneburg	Governance pluralism to manage the complexity of ecosystem services co-production
16:20 16:35	Tommaso	Pacetti	University of Urbino	Evaluating Environmental and Resource Costs in water tariffs through an ecosystem services approach: a case for Italy
16:35 16:50	Zhilong	Wu	Jiangxi University of Finance and Economics	Sustainable Livelihood Security (SLS) in the Poyang Lake Ecological Economic Zone: Spatial-temporal evolution and constraints identification
16:50 17:00	Erica	Bruno	Università degli Studi di Trento	Market-based instruments to enhance Urban Ecosystem Services: a review
17:00 17:15	Felipe	Benra	German Centre for Integrative Biodiversity Research	Context matters - designing equitable and balanced PES strategies
17:15 17:30	Cheng	Chen	Leibniz Centre for Agricultural Landscape Research	Incentive based policy instruments guiding towards sustainable use of peatlands in EU

III. ABSTRACTS

Abstracts are ordered based on the session program. The first author is the presenting author unless indicated otherwise.

1. Type of submission: Abstract

T. Thematic Working Group sessions: T18 – Governing ecosystem services and biodiversity in socio-ecological systems

Practical guide for the design of spatial planning plans from the perspective of Ecosystem Service

First author: Ibone Ametzaga-Arregi
Other author(s): Lorena Peña, Beatriz Fernández de Manuel
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The Evaluation of the Ecosystem Services of the Basque Country is included within the Subglobal Assessment Network. One of its main objectives is to define criteria and generate tools for decision-making related to the planning and integrated management of the territory. In this sense, different tools have been developed, including the practical guide for the design of spatial planning plans from the perspective of ecosystem services. This guide was created with the commitment to provide a series of clear and coherent technical, methodological and conceptual guidelines that help to integrate ecosystem services in the formulation of plans and programs in the area of spatial planning, urban planning and natural resource management. The use of the guide will facilitate that considerations related to natural heritage, ecosystems and their services, and, therefore, the quality of life of citizens, are taken into account from the design phases of said plans and programs. The guide presents specialized content and proven methodologies that will help local and regional administrations: 1) to understand the value of the services that ecosystems provide to society; 2) promote synergies and establish lines of collaboration between different areas of work thanks to the use of a common language; 3) promote a change in planning and management (urban, territorial, ...) by prioritizing more sustainable alternatives; 4) allow the

evaluation of the consequences of management decisions or changes in policy and have an integrated view of the supply and demand of ecosystem services in the territory; 5) promote the multifunctionality of landscapes; 6) identify priority areas that provide multiple ecosystem services; and to know the perception of society about the services that ecosystems offer us. This guide is available to download at www.ehu.eus/cdsea/web/.

Keywords: Basque Country, mapping, multifunctionality, perception, tools

2. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Ecosystem services as an opportunity for innovation in spatial planning The case of Ligurian Alps

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The area on which we focus our attention is that of the Ligurian Alps, an area on the border between the two Italian regions of Piedmont and Liguria and the French region of the Maritime Alps. This is a cross-border area of extraordinary ecological interest, since it represents the southernmost and closest to the Mediterranean area of the Alps mountain range. The proximity to the sea and the rapid ascent up to over 2000 meters above sea level. distance from the coast line, make this area particularly rich in landscapes, passing from a Mediterranean climate to an alpine climate within a space of a few kilometers. Our area of interest is the Ligurian Alps zone, where spatial planning faces various problems: the abandonment of mountain villages, the crisis of traditional agricultural activities, the uncontrolled advance of the forest and natural areas to the detriment of grazing areas, the presence, however, of a ski resort which entails a strong anthropogenic pressure on the territory. To these problems is added that of administrative fragmentation which makes governance particularly difficult. The research that we present here

starts from an analysis of the conditions of use of the territory, taking into consideration the forms of settlement present and their state of conservation, accessibility, land use patterns (analyzed from a historical perspective). Based on these contextual elements, the research conducted a study on ecosystem services concerning potential agricultural productivity and habitat quality (using the Invest platform) to assess their potential inclusion in the context of spatial planning by the area. The consideration of ecosystem services values within an ongoing spatial planning framework suggests how they can be integrated into land management processes, especially if this area is considered in a unitary way, as an eco-region (according to an bioregionalist approach), i.e. a complex socio-ecological system.

Keywords: ecosystem services, invest, eco-region, bioregionalist approach

3. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Green infrastructure as a tool to ground planning policies to ward off hydro-geological hazard: Suggestions from a Sardinian case study

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Green infrastructures (GIs) are spatial networks of natural and seminatural areas that supply a range of ecosystem services (ESs). In this contribution, a GI is considered as a provider of ESs related to the following aspects: biodiversity capacity to support multiple ESs; conservation of protected habitats; landscape features; recreation; agricultural and forestry production; local climate regulation; climate change impact mitigation through capture and storage of carbon dioxide. Connected to the latter item, climate change negatively impacts on the hydrological cycle of the Earth and, consequently, on probability and magnitude of both landslide and flooding

events; therefore, GI implementation can be quite effective in mitigating the impacts of such disasters. This study aims at understanding what role GIs play as regards control of environmental hazard, so as to ground planning and policy recommendations that can mitigate the associated risks. Hence, it focuses on the relations between the spatial layout of a regional GI and hydro-geological hazard (i.e. flooding and landslide hazard), with the underlying assumption that landscape and environmental protection can be strengthened by integrating GI within planning policies. A methodological framework is defined and applied to a case study in the coastal zone of Eastern Sardinia: after modeling and spatially identifying seven ESs, regarded as the most significant in our case study among the many that a GI can provide, through a dichotomous-choice Logit model we assess the relation between, on the one hand, the chosen ESs and two control variables, and, on the other hand, landslide and flood hazard. Results show that: i) landslides are more likely to occur in areas characterized by high natural values, ii) in floodplains, agriculture and forestry land should be re-allocated to mitigate flood hazard, and, iii) favoring carbon capture and storage has positive effects on flood hazard, but not on landslide hazard.

Keywords: green infrastructure, ecosystem services, environmental hazard, spatial planning, logit models

4. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Mainstreaming biodiversity offsetting into Swedish municipal planning through the lens of Ecosystem Services

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Biodiversity offsetting has been promoted as a way of ensuring that protected areas/species receives proper attention when threatened in relation to development projects. In Sweden, such

legal structures and policies have been in place since the 1990s in relation to protected nature. As urban areas grow and become more densified increased attention have been given on how to develop structures to balance the loss of green space in relation to urban development. However, in contrast biodiversity offsetting as practiced in relation to protected nature, municipal offsetting is often practiced in relation to ecosystem services (ES). This paper, aim to describe the uptake and use of the biodiversity offsetting idea in Swedish municipal planning and discuss the potential advantages as well as disadvantages of mainstreaming the idea though the lens of urban ES provision. The analysis is based on document analysis, and semi-structured interviews with 40 front-runner municipalities in relation to their offsetting work. The result shows a diverse picture of methodological approaches used to account for lost and gained ES. There is also a diversity of organizational processes for the implementation of this policy, seem to be influenced by many factors; development pressure, type of nature, but also municipal employees' interest and knowledge. Another important factor is the general lack of a proper follow-up mechanism for the offsetting. We conclude that many municipalities have implemented these types of policies aiming to balance green space availability and development without having an underlying municipal strategy for ES management. This leads to a policy that is able to engage developers in a discussion about what is lost and what is gained in terms of ES provision, but fails to assess to which extent the offsetting is successful and to which extent it provides benefits for the municipality as a whole.

Keywords: biodiversity offsetting, municipalities, ecosystem services, spatial planning

5. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

The integration of ecosystem services in landscape planning: a systematic literature review

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3rd ESP EUROPE CONFERENCE Tartu, Estonia 2021 7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

A growing academic interest from both scientists and policymakers focuses on how applications of ecosystem services (ES) concepts and indicators can support sustainable landscape development. Many authors underline the ability of the ES framework to integrate different planning sectors, making the services explicit and thus fostering the discussion about trade-offs between ecological and socio-economic aspects. However, while many approaches exist to account for the value of nature, new tools are needed to interpret the vast quantity of information in an integrated assessment to support landscape planning. The body of studies focusing on the integration of ES in landscape planning is growing, but published evidence of actual applications is lacking. In the light of this gap, the current study aims to develop a review of theoretical and practical contributions for the integration of the ES framework in landscape planning. Through systematic and explicit methods, the study identifies and critically appraise relevant research, organizing it in specific fields of applications. Data are then collected and analyzed through statistical methods (meta-analysis) in order to identify main research trends. Preliminary results reveal a vibrant research ground, with a great diversity of application fields. Over 200 studies are included in the database, organized into 20 categories of application. The diversity of application fields addresses multiple disciplines of landscape planning, and the exercise proved useful in assessing the interdisciplinary approach characterizing ES research. Co-citation networks reveal distinct research trends in planning and suggest future challenges related to the intersections between ecological and socio-economic attributes of landscapes.

Keywords: es-in-planning, literature review, landscape planning, regional governance

6. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Protection of peri-urban open spaces at the level of regional policy-making: examples from six European regions

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Peri-urbanisation is a dynamic process consisting primarily of the expansion of artificial areas into natural, semi-natural, and agricultural areas. This process is the backbone of diminishing of peri-urban open spaces, thus it is threatening peri-urban biodiversity and hampers the provision of ecosystem services. In this manuscript, we introduced the concept of peri-urban open spaces and exemplified it on the level of regional policy-making in the following six European case study regions: Basque Country (Spain), Flanders (Belgium), Gorenjska (Slovenia), Hajdú-Bihar (Hungary), Mazovia (Poland), and Saxony-Anhalt (Germany). Our study aimed (1) to analyse land cover changes related to peri-urban open spaces in the case study regions, (2) to identify and classify policy improvements that are useful to protect peri-urban open spaces, and (3) to provide recommendations for regional policy instruments to improve the protection of peri-urban open spaces. We designed a mixed-method approach combining Geographical Information Systems, an explorative questionnaire, and a semi-quantitative survey to fulfil our research aims. Our results showed that peri-urban open spaces are decreasing in all case study regions but with different scale and dynamics over time. Mostly (non-irrigated) arable land was transformed into non-peri-urban open space. Moreover, we identify 15 policy improvements that are suitable to support the protection of peri-urban open spaces at the level of regional policy-making. Our results indicated a potential for improving the regulatory instruments and showed the usefulness of multi-level governance that better address the protection of peri-urban open spaces at regional level. Using our research results, we provided recommendations for regional policy-makers who are willing to pay more attention to the protection of peri-urban open spaces.

Keywords: peri-urban landscapes, open spaces, policymaking

7. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Policy instruments and their success of preserving permanent grassland in Bavaria

First author: Maria Haensel
Other author(s): Luzie Scheinpflug, Eva Lohse, Thomas Koellner

3rd ESP EUROPE CONFERENCE 2021
Tartu, Estonia
7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

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Grasslands are key for ecosystem service provision supply in agricultural landscapes. Especially in sensitive areas, grassland supports regulating services, like on steep slopes, flood plains or on peatlands. In Europe, grassland areas have been drastically reduced over the last decades, but the declining trend could be halted in some countries, for example in Germany. Different regulatory and incentive-based measures have been taken to protect grasslands, however their relative benefit has been controversially debated. On the European Union level, requirements were included in the common agricultural policy. Additional national regulations are in place. In Germany, single states – like Bavaria – have a high degree of freedom in shaping polices, making them an interesting showcase. The goal of this research was to determine the impact of grassland related policies in Bavaria, the temporal development of (temporary) conversion of permanent grassland to cropland between 2010-2020 in areas with different protection status (e.g. flood plains, peatlands, Natura 2000 areas, water protection areas, protected biotopes) was analyzed. The basis are different spatially explicit datasets, most importantly the data from the Integrated Administration and Control System. This includes the parcel-specific information (~ 2 million) on use (crop/grassland type) as well as participation in agri-environmental schemes. First analyses have shown that although overall conversion rates leveled off with increasingly strict regulation of grassland conversion, certain environmentally sensitive areas, like peatlands have shown over-proportional conversion rates. It will be further investigated how participation in agri-environmental-schemes compared in areas with different protection status and if a positive effect on grassland preservation can be asserted. Comparing the timeline of policy development with the actual implementation offers the opportunity to come up with helpful recommendations for future policies. Especially the very high spatial and temporal resolution makes it possible to evaluate the success of regulations and incentive-based measures.

Keywords: permanent grassland, regulating ecosystem services, policy instruments, agri-environmental-schemes

3rd ESP EUROPE CONFERENCE Tartu, Estonia 2021 7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

8. Type of submission: Abstract

T. Thematic Working Group sessions: T18 – Governing ecosystem services and biodiversity in socio-ecological systems

Dealing with the wicked problems of urban environment – is the way out paved with ecosystem services? The case of the City of Lodz' Long-Term Socio-Ecological Research Platform

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Urban systems are particularly prone to the nexus type of socio-ecological problems, where space, time and range of perceptions make management choices challenging and usually unsatisfactory to at least some users of the place. Cities attract people with promise of wealth, but simultaneously their unstoppable growth accompanied with rigid conventional management system, and often discordant policies, threatens well-being of inhabitants. Uneasy economic choices and societal and environmental compromises look even more problematic in new democracies tempted with global markets and dream of unlimited growth. One of the promising approaches has become building of natural capital of cities to strengthen an adaptable component and combine multiple space functionalities and hence range of benefits. However building ecosystem services into city planning requires patience (time), space (ad hoc vs long-term approach), water (as a driver of services) and finally consensus over stakeholders' needs which are to be satisfied. Last couple of years raised awareness of bad and continuously deteriorating living conditions among inhabitants of Polish cities. It was triggered by EU statistics which listed Polish cities among the top most polluted with smog in the world, and deepen by the climate change adaptation plans accomplished last years. That brought to the debate an issue of low emission, unsustainable transportation, but also urban greenery and vulnerability of people being i.e. an effect of poverty or aging. In the City of Lodz, being LTSER platform of the European Long-Term Ecosystem Research Network since 2005, we have analysed the readiness of the elements of socio-ecological system to adjust to new conditions and to adopt the

environmental stewardship model at different functional and operational levels of city management.

Keywords: blue-green infrastructure, city planning, ecosystem services, ecohydrology, socio-ecological research

9. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Assessing the ecosystem services and disservices provided by green spaces in care facilities for elderly people

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Environmental justice became a key topic both in scientifical literature and urban planning in the context of sustainable development of human settlements. Green spaces are one of the main elements taken into account when analyzing social equity and justice in urban environments, having an important role in the quality of urban life. In this light identifying and quantifying the ecosystem services provided by different elements of the urban green infrastructure and understanding the way in which different vulnerable groups benefit from them can constitute valuable insights for environmental planning. The present study focuses on assessing the ecosystem services and disservices provided to elders, as vulnerable group, by a category of small urban green spaces – the gardens of care facilities for elderly people. The paper used as case study around 600 care facilities in Romania, located both in urban and rural areas. We built a spatial database containing the spatial distribution of care facilities and elements related with their gardens and the surrounding urban green areas. We applied a questionnaire regarding the characteristics and use of green spaces inside care facilities for elders wit a response rate of 17%. The results showed that many care facilities for elderly people have gardens but they usually lack

specific designed elements for elderly people because of the costs they imply. The large range of cultural ecosystem services this category of green area provide to a vulnerable group of population makes it a very valuable part of the urban green infrastructure. Moreover, the gardens also provide other categories of ecosystem services which contribute in increasing the quality of life of the residents. Besides the services, administrators of care facilities identify a variety of disservices generated by the gardens which could limit their use by residents with health problems.

Keywords: green spaces, ecosystem services, elderly

10. Type of submission: Abstract

T. Thematic Working Group sessions: T18 – Governing ecosystem services and biodiversity in socio-ecological systems

The success of contractual solutions for the provision of public goods and ecosystem services from agriculture and forestry – A qualitative analysis of 120 case studies in- and outside Europe

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The EU promotes the provision of ecosystem services (ES) and public goods from agricultural land through dedicated policies. Despite long-term efforts and earmarking of significant financial resources for voluntary agri-environmental schemes, the provision of environmental public goods and services from Europe's agro-ecosystems is continuing to decline. New governance mechanisms and instruments are sought to revert this process. Pathways are seen in innovative contractual solutions promoting result-based payments, collective implementation, value-chain approaches, and environmental related land-tenure contracts. The EU H2020 project CONSOLE investigated 120 case studies within and outside Europe to better understand the drivers of

success of such solutions, covering public, private, and civil society approaches with different contractual characterisation. For half of the case studies, data were collected by means of a uniform expert-based protocol, while another ~60 case studies were assessed via literature review. Based on a qualitative analysis, drivers for success have been determined, and general design principles and policy recommendations were derived. Results show that successful contract solutions often represent combinations of contract types (e.g. result-based approach with collaborative elements). The targeting to specific regions, addressing local ES specificities, promotes the understanding and interest of farmers, forest owners, and other local actors to engage. Involving land managers in the setting of objectives and the development of measures leads to better compatibility with their businesses and facilitates the identification of win-win solutions. Promoting bottom-up approaches and involving key regional actors as coordinating units increases commitment and motivation, particularly evident in collective approaches. The study shows that successful solutions are not necessarily publicly, but au contraire privately funded, often activating the value chain. However, we also show that innovative result-based and collective solutions demand high levels of knowledge, openness for collaborative action and a general awareness towards environmental issues and therefore can't replace practice-based contracts in all contexts.

Keywords: agri-environmental-climate public goods, agri-environmental schemes, agriculture, forestry, private and public approaches

11. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Mapping ecosystem services to design cost-effective private land conservation

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As the largest driver of biodiversity loss land degradation impairs the health of terrestrial ecosystems and impacts, in turn, human well-being trough the erosion of ecosystem services. A significant part of land degradation accrues on private lands not directly targeted by usual conservation instruments, especially in urban and periurban areas (gardens, private parks). Thus, Private land conservation is increasingly acknowledged as a needed complement to protected areas. This strategy may involve a variety of policy instruments, conservation easements have attracted the most attention though. Conservation easements are voluntary legal agreements between a landowner and a qualified entity that restricts uses of the land for conservation purpose for a long period of time – sometimes permanently. However, many concerns have arisen about the extent to which these private and decentralised initiatives align with conservation goals and needs, particularly when they are financed by public money. In this study, we show that cost-effective private land conservation policies can be designed with ecosystem service mapping techniques. We use geographical models (including InVEST) to rank each land 100*100 m cell (1 ha) in the Paris metropolitan area according to an irreplaceability index. For each cell, this index measures the average variations in supply of three ecosystem services, in the event of complete soil sealing of the area. We then combine these results with the zoning scheme of the metropolis and identify which irreplaceable cells have the highest risk of degradation. Finally, we assess the cost of a conservation easement program to protect these cells from soil sealing. Our results suggest that these layers of data create a better understanding of conservation needs and costs thus improving potential conservation outputs relative to a budget constraint. We believe this methodology offers a starting point for designing more cost-effective tools in private land conservation.

Keywords: private land conservation, conservation easement, urban ecosystem services mapping, conservation planning, cost effectivenes

12. Type of submission: Abstract

T. Thematic Working Group sessions: T18 – Governing ecosystem services and biodiversity in socio-ecological systems

Governance pluralism to manage the complexity of ecosystem services co-production

3rd ESP EUROPE CONFERENCE Tartu, Estonia 2021 7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

First author: Roman Isaac

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Ecosystem services support people's quality of life and are generated by an interplay of both natural and anthropogenic capitals, known as ecosystem services co-production. A governance system of formal and informal institutions on different yet interlinked spatial, administrative and temporal scales influences the management of these capitals underpinning the co-production of ecosystem services. Whilst the field of ecosystem service governance is well established, the role of governance of natural and anthropogenic capitals in ecosystem service co-production is under-researched, which undermines its integration into decision-making. Here, we identify relevant indicators to analyse the governance of natural as well as anthropogenic capitals and their influence on ecosystem service co-production. Based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow-diagram, we conduct a systematic literature review of articles on the governance of ecosystem service co-production. We distinguish indicators for formal and informal governance and build on the classification of ecosystem service governance described by Primmer et al. (2015) – hierarchical, scientific-technical, adaptive-collaborative governance and the governing of strategic behaviour – at the respective administrative, spatial and temporal scales. Then, we classify governance indicators according to the capital type (natural, human, social, physical or financial). Our preliminary results show that formal governance is overrepresented in the literature on ecosystem service co-production. Yet only a fraction of the literature refers to a specific form of governance or ways this governance is executed. Based on further analysis we will discuss potential knowledge gaps regarding the role of governance of natural as well as anthropogenic capitals in ecosystem service co-production and its implications for sustainable decision making.

Keywords: ecosystem services, co-production, governance, systematic review

13. Type of submission: Abstract

T. Thematic Working Group sessions: T18 – Governing ecosystem services and biodiversity in socio-ecological systems

3rd ESP EUROPE CONFERENCE Tartu, Estonia 2021 7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

Evaluating Environmental and Resource Costs in water tariffs through an ecosystem services approach: a case for Italy

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The full cost recovery is a central target of the Water Framework Directive 2000/60 (WFD, Article 9) and represents a fundamental tool to promote sustainable and equitable water use. However, as shown by the European Commission's fifth report on WFD implementation, Member States have difficulties in applying the economic analysis and assessing both environmental and resource costs (ERC) when calculating the cost recovery amounts for water services. According to the WATECO definitions "environmental costs" are defined as the cost of damage caused by water uses over the environment and the ecosystems as well as to their beneficiaries, while the "resource costs" represent the foregone opportunities which other uses suffer due to the depletion of the resource beyond its natural rate of recharge or recovery. The achievement of more harmonized approaches to estimate and integrate ERC into economic analysis is crucial to implement effective policy measures aimed at efficiently manage freshwater resources. This research aims at estimating ERC through an ecosystem services approach based on the evaluation of economic benefits associated with water quality improvement and ecosystem services flow. The proposed evaluation framework is applied to 3 pilot catchments in Emilia Romagna Region, aiming at setting up water tariffs accounting for ERC. Starting from the identification of the relevant ecosystem services, environmental and socio-economic indicators were developed for the study area in order to assess the functionality of those ecosystems having direct interconnections with freshwater provisioning. Results provides a comprehensive picture about the value of the water to society in the study area and allows the recognition of those activities that preserve water resources (territorial equalization). Indeed, the valuation of ERC offers policy makers a valuable tool to integrate payments for ES in the water tariffs, thus empowering the "polluter/user pays" principle.

Keywords: ecosystem services, water provision, environmental and resource cost, water framework directive

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14. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Sustainable Livelihood Security (SLS) in the Poyang Lake Ecological Economic Zone: Spatial-temporal evolution and constraints identification

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Sustainable Livelihood Security (SLS) remains a barely tried yet important issue for rural sustainability and natural resource management. Particularly in China, rural SLS research in typical area is urgent but insufficient under the background of National Rural Revitalization and Fishing Ban of Yangtze River. Focusing on the policy-targeted great lake area, this study constructed an adaptive indicator system and integrated multiple econometrical and geographical methods to evaluate rural SLS from 2010 to 2018, analyze the spatial-temporal pattern and geographical regularity, identify influential factors and main constraints. Results showed that, 1) since the establishment of Poyang Lake Ecological Economic Zone in 2009, livelihood security of local farmers has been on a continuous decline due to multiple soci-ecological reasons, such as the declining agricultural productivity, the widening urban-rural gap, and the rising ecological pressure. Spatial auto-correlation of SLS is significant and shows obvious geographical regularity that hot spots mainly concentrated in Nanchang City and Jingdezhen City have evolved into two polar cores, waning and waxing with time. 2) Dominating factors including proportion of fish farming area, rural per capita electricity consumption, urbanization rate, farmers' per capita disposable income, and rural population dependency ratio possessed the highest power determinant value in shaping the spatial pattern of rural SLS. 3)With the rapid economic development and emerging ecological problems, the constraints limiting rural SLS has transformed from backward economic efficiency to social inequality and ecological pressure. Therefore, future policy should emphasize more on ecological protection and social construction, for example organic fertilizer popularization and farmer/fisherman's livelihood transition to non-

agricultural sector, aiming to reduce ecological pressure, boost urban-rural integration and narrow the income gap. Meanwhile, it is still necessary to activate rural economy by reinforcing rural power infrastructure, promoting rural mechanization, and improving agricultural social service.

Keywords: sustainable livelihood security, spatial-temporal pattern, influential factors, constraints, poyang lake eco-economic zone

15. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Market-based instruments to enhance Urban Ecosystem Services: a review

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Traditional urban planning in the form of land use and zoning regulations has failed over time to deliver sustainable settlements and place the environment at its core. However, urban governance can play a key role in the provision of Ecosystem Services and to safeguard biodiversity through the implementation of sustainable policies and the realization of Nature-based Solutions. The most relevant challenges in achieving these goals are the lack of available areas belonging to municipalities and their limited financial resources to implement land expropriation policies. In order to overcome these barriers, urban planning has moved towards the use of markets-based solutions, which are driven by private interest and free market mechanisms. Among them, the Transfer of Developed Rights (TDR) has been increasingly used across the globe, thanks to its ability to achieve a wide range of environmental targets, both as a regulatory tool for land uses and as in the form of rewarding measure. Through an in-depth literature review, the aim of this research is to understand the potential of TDR to function in urban contexts by enhancing Nature-based Solutions implementation and Ecosystem Services supply. This is because TDR allows for the acquisition free of charge, by public administration,

of those areas that are essential for the protection of green spaces and for the implementation of innovative sustainable solutions. Based on the results, we present a conceptual framework to act as a starting point for new research in practical translation of the Ecosystem Service concept within TDR programmes.

Keywords: urban ecosystem services, transfer of development rights, market-based instruments, nature-based solutions

16. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Governing ecosystem services and biodiversity in socio-ecological systems

Context matters - designing equitable and balanced PES strategies

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Payments for ecosystem services (PES) are key instruments to foster both conservation and social goals. Often high expectations for socio-ecological benefits are raised with establishing PES schemes, while the strategies are rarely tested for their outcomes. Here, we evaluate a set of spatial ecological and social criteria for PES targeting. The evaluation process involved selection of PES design criteria, validation by experts, and exploration of three PES strategies. The evaluation criteria were: (a) level of ecosystem service (ES) productivity, (b) threats to ES supply, (c) property size, (d) social vulnerability, (e) indigenous status of land, and (f) landscape connectivity. We juxtaposed two commonly used single ecological criteria strategies with an integrative socio-ecological strategy: (1) native forest cover conservation strategy, (2) ES productivity strategy, and (3) mixed socio-ecological strategy, using a Surface Measure Overall Performance (SMOP) analysis for evaluation. Strategies 1 and 2 resulted in higher scores for ecological criteria while strategy 3 achieved a better balance between ecological and social

criteria. However, the selection of the most balanced strategy is not straightforward as it depends on PES aims and local contexts. Selecting sound PES targeting criteria is key to achieve balanced spatial targeting that addresses both ecological and social goals.

17. Type of submission: Abstract

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Incentive based policy instruments guiding towards sustainable use of peatlands in EU

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In the EU, peatlands cover only 7.7% of the land surface, yet the EU is globally the second largest emitter of greenhouse gases from drained peatlands. As the EU affirmed the core goal of the Paris Agreement which set zero net CO2 emissions by 2050, reducing emissions from peatlands deserves an important place in Europe's climate policies. Conservation of peatlands, such as the cultivation of wet-adapted crops or the restoration of natural conditions, or raising the water levels are widely accepted as cost-effective measures for climate change mitigation. However, as they often imply high costs of conversion and management, farmers need economic incentives sufficiently attractive to initiate the transition. In this paper, we aim to make assessments of policies steering mitigation measures on peatlands at different governance levels and sectors. Incentive based policy instruments, such as Agri-Environment-Climate Measures (AECM) under the EU Common Agricultural Policy (CAP) are the policy in our focus. Build on the concept of Multi-Level Governance (MLG), our study follows a case study approach in three peatland rich countries in the EU: Finland, Germany and the Netherlands. We reviewed relevant scientific literature and policy documents on sustainable peatland management and conducted 36 semi-structured expert interviews with policy makers, scientists, civil society representatives and farmer representatives. The documents and interviews were analysed through a qualitative

content analysis, focusing on factors influencing the implementation of incentive-based policy to support sustainable peatland management. We highlight trade-offs and synergies between different governmental and sectoral policies regarding peatland use. We reveal the importance of economic incentives in steering farmer's land use complementary by certain regulations. This calls for a cross-sector alignment of incentive schemes.

Keywords: climate mitigation, policy instrument, peatlands, PES, governance