



# BOOK OF ABSTRACT

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## I. SESSION DESCRIPTION

ID: B9b/T18c

Governance of ecosystem services for rural–urban synergies: bridging science and decision-making

	Title	Name	Organisation	E-mail
<b>Host:</b>		Maria Partidario	Instituto Superior Tecnico – Universidade de Lisboa	mariapartidario@tecnico.u lisboa.pt
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**Abstract:**

Research and discussions around Ecosystem Services (ESS) have been evolving rapidly within the scientific and academic arenas. Literature and practice abounds in relation to ESS spatial modelling, the quantification and mapping of ESS and the payment for ESS, often looking at each ESS separately rather than in an integrated way. Discussions look into how nature can be reintegrated in cities, into urban farming and the role of ESS in adaptation to climate change, into economic mechanisms for ESS provision and the assessment of ESS, synergies and trade-offs, among other issues. The need to address ESS within the science–policy debate is relatively recent and deserves further exploration, moving the centre of the debate from analytic to policy spheres, thereby encouraging policy and decision-makers to recognize ESS and its role in the connection and balance between rural and urban territories, as well as between nature, science and people.

In this proposed session we invite contributions from academia, from practitioners, as well as from policy related actors to enrich a discussion around the governance of ESS in urban and rural territorial contexts, encompassing multi-actor and multi-scale approaches. Recognizing



that perspectives and expectations vary in relation to the role and value of ESS in transitions towards sustainability, the purpose of this session is to explore and learn about governance of ESS, as well as policy and planning needs to enhance the potential role of ESS in generating, and stimulating, rural–urban functional synergies within and between (adjacent and dispersed) territories. Institutional arrangements and collaborative practices, stakeholders’ perspectives and engagement, policy and planning instruments are among the various tools and processes proposed for discussion. This session will explore and understand how to better integrate ESS in policy and planning, enhancing the strategic role of ESS in improving rural–urban synergies and territorial connectivity.

#### Goals and objectives of the session:

To share concepts and experiences concerning the potential role of ecosystem services in generating, and stimulating, rural–urban functional synergies within and between (adjacent and dispersed) territories, and learn about models of governance and policy needs.

#### Planned output / Deliverables:

Knowledge of the strategic role of ESS in improving urban–rural synergies and territorial connectivity through governance of ESS in policy and planning.  
Series of papers for a special issue of the Ecosystem Services journal, including the synthesis of the collective discussions undertaken.

#### Related to ESP Working Group/National Network:

[Biome working group: BWG 9 – Rural landscapes](#)

## II. SESSION PROGRAM

**Date of session:** Tuesday, 22 October 2019

**Time of session:** 10:30 – 18:00

### Timetable speakers

Time	First name	Surname	Organization	Title of presentation
<b>Block 1: General methods/concepts focus (including reviews and payment for ESS)</b>				
10:30–10:35 INTRODUCTION				
10:35–10:45	Claudia	Dworczyk	Institute of Physical Geography & Landscape Ecology, Leibniz Universität Hannover, Germany	Stakeholders' Perspectives on Ecosystem Services: Lessons on Addressing the Demand Side of Ecosystem Services within Urban and Regional Planning
10:45–10:55	Niklas Werner	Weins	Center for Environmental Studies and Research NEPAM, University of Campinas, Brazil	Payments for Ecosystem Services in peri-urban areas: the case of the Chinese megacity Chongqing's eco-compensation mechanisms
10:55–11:05	Malukhanye Mbopha		Conservation Ecology & Entomology, Faculty of AgriSciences, Stellenbosch University, South Africa	Unlocking and Securing Ecological Infrastructure Investments: the needs and willingness for investments and institutional support mechanisms
11:05–11:15	Markus	Meyer	Research Group on Agricultural and Regional Development, Netherland	Impacts of land use (governance) on ecosystem services in the urban-rural nexus
11:15–11:25	Améline	Vallet	AgroParisTech, France	Power asymmetries in ecosystem services governance: insights from social network analysis
11:25–11:35	Massimo	Rovai	University of Pisa, Italy	Spatial analysis of ESS as a tool for understanding and promoting rural-urban synergies in planning
11:35–12:00 DISCUSSION				
<b>Block 2: Governance focus</b>				





13:30–13:35		INTRODUCTION		
13:35–13:45	Klara	Winkler	McGill University, Canada	Governance of ecosystem services: a review of the empirical literature
13:45–13:55	Dieter	Mortelmans	INBO, Belgium	Policy Coherence in Green Infrastructure management: insights from six European case studies
13:55–14:05	Alessandra	La Notte	Joint Research Centre, Italy	Assessing the economic impact of invasive species by bridging ecosystem services accounts to economic models
14:05–14:15	Henk	Oostindie	Wageningen University, Rural Sociology Department, Netherlands	Circular Farming as Guiding Principle for ESS Delivery
14:15–14:25	Günden	Savasci	Ifuplan, Germany	Urban and Regional Planning – Integration Capability of the Ecosystem Service Approach in Governance Structures
14:25–14:35	Matthias	Riedel	ifuplan – Institute for Environmental Planning and Spatial Development, Germany	Instruments for Implementing Ecosystem Services – Analysis of national instruments suitable to integrate ES in environmental governance / decision making
14:35–14:45	Daniel	Keech	University of Gloucestershire, United Kingdom	Rural catchment management for urban flood security? Governance of Natural Flood Management in Gloucestershire, UK
14:45–15:00		DISCUSSION		

### Block 3: Empirical/ territorial management focus

16:30–16:35		INTRODUCTION	
16:35–16:45	Carlos	Pina	Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo, Portugal Multi-scale planning for ESS and enhancement
16:45–16:55	Reinhard	Henke	Regional Authority FrankfurtRheinMain Staff, Germany Planning from Outer Space: Assessing the limits to growth
16:55–17:05	Marta	Sylla	Faculty of Environmental Engineering and Geodesy, Department of Spatial Economy, Wroclaw University of Environmental and Life Sciences Analysing peri-urban agricultural related ecosystem services' interactions
17:05–17:15	Kinga	Krauze	ERCE PAS, Poland Seeing beyond the own fence – what makes integrated thinking and management of the city THE MISSION and can it be the mission possible?
17:15–17:25	Hilly Ann	Quiaoit	CDO Riverbasin Management Council, Philippines Advancing ecosystem services through multi-sectoral approach in the landscape continuum of the CDO Riverbasin, Mindanao, Philippines
17:25–17:35	Jiří	Schneider	Department of Environmentalistics and Natural Resources, Faculty of Regional Development and International Studies, Mendel University in Brno, Czech Republic Ecosystem services perceived by rural and urban dwellers in the Carazo region (Nicaragua)
17:35–18:00		DISCUSSION	



### III. ABSTRACTS

*The abstracts appear in alphabetic order based on the last name of the first author. The first author is the presenting author unless indicated otherwise.*

#### 1. Type of submission: **Abstract**

T. Thematic Working Group sessions: T18c Governance of ecosystem services contributing to rural-urban synergies, bridging science and decision-making

## Stakeholders' Perspectives on Ecosystem Services: Lessons on Addressing the Demand Side of Ecosystem Services within Urban and Regional Planning

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Within the Ecosystem Services (ES) approach, it has so far proved particularly difficult to assess the demand side of ES delivery. Firstly, there is still a lack of conceptual understanding and, secondly, knowledge about how ES demand can be quantified, evaluated, mapped and communicated remains in short supply.

In Germany, urban and regional planners are becoming more and more aware of the concept of ES itself, but detailed knowledge about ES demand remains scarce. In particular, the transmission of knowledge and understanding is hampered by the persistence of conceptual uncertainties and ambiguities. Depending on the ES classes used, ES demand can be expressed as: (1) benefitting from goods and services and/or the direct or indirect use or consumption of said goods and services; (2) required needs and wishes; (3) preferences; or (4) risk mitigation. For many ES classes, more than one expression can be used to assess ES demand, depending on the temporal and/or spatial scales used and the particular stakeholder groups focused upon.

In two stakeholder workshops organised by the ÖSKKIP research project for the rural-urban areas of Rostock and Munich in 2018, we gained new insights into how ES demand can become interesting and applicable for urban and regional planners. The workshops indicated how assessment of ES demand – especially of cultural and regulating ES classes – can support





efforts to improve public welfare and human well-being in cities. Those who participated in the workshops requested clear application-orientated examples, guidance and methods for urban and regional areas, including different ES demand perspectives from society, specific stakeholder groups and individuals. This presentation will summarise selected findings from the workshops and the project, together with recommendations for the further development of ES demand assessments.

*Keywords:* urban ecosystem services, ecosystem service demand, stakeholder, urban planning, regional planning

2. *Type of submission: Abstract*

B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural-urban synergies, bridging science and decision-making

## Planning from Outer Space: Assessing the limits to growth

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The German Building Law (Baugesetzbuch, BauGB) treats the Outer Space as the reservoir for land take for development. Within the procedure to draft the new edition of the Regional Land Use Plan the Regional Authority FrankfurtRheinMain we developed a GIS based quantification approach to reproduce the differentiation between Inner Space and Outer Space imposed by the BauGB. Eco systems present in the Outer Space are grouped by the 6 BauGB Schutzgüter (subjects of protection: water; soil; air, climate and energy; landscape and recreation; cultural and material goods; and flora, fauna and biodiversity). The services they provide are grouped according to the Millennium Ecosystem Assessment (provisioning, regulating, cultural and supporting services).

Inner Space land use induces demands for ecosystem services (and expansion of the Inner Space reduces Outer Space, obviously).



The challenge now is to find, among various existing approaches, a consistent system which is able to quantify the eco systems services, against a quantification of the ecosystem services demand.

As the advisors to our decision makers, we wonder: 1. Is the supply of ecosystem services in the Outer Space able to meet the demand? 2. How much Outer Space do we need to maintain functioning ecosystems? 3. How much “growth” can Outer Space tolerate, or is there a threshold? 4. Can ecosystem services be relocated to rural areas outside our jurisdiction?

These research questions are politically led because the answers should inform the formal planning procedure. This is of relevance as a role model for the science–policy debate because the Regional Authority’s Regional Land Use Plan, as an exception from the German rule, covers the territories of 75 towns and cities in one of the growth engines of the EU.

This approach is a paradigm shift in the Regional Land Use Planning practice because it puts Outer Space first.

*Keywords:* Regional Land Use Plan, Spatial Planning, Reducing land take, Limits to growth, German Building Law (Baugesetzbuch)

3. *Type of submission: Abstract*

[B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural–urban synergies, bridging science and decision–making](#)

## **Rural catchment management for urban flood security? Governance of Natural Flood Management in Gloucestershire, UK**

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Gloucestershire is a rural county in south–west England (population 605,000). Half its area is designated within ‘Areas of Outstanding Natural Beauty’. Outside these, Gloucestershire is low–lying, adjacent to the estuary of England’s longest river, and carries important transport





networks to regional cities – Cardiff, Birmingham and Bristol. Developments for substantially more homes and businesses are planned. Questions emerge about how economic and mobility advantages of building in the flood plain can be balanced with environmental challenges: rising sea levels, soil erosion and water pollution including from agricultural run-off in higher-lying areas, flood risk policies that allocate limited resources to urban areas for expensive ‘hard’ interventions. Such challenges follow two recent, catastrophic floods that affected thousands of mainly urban residents.

Improving the governance of eco-systems synergies between rural and urban places is a key objective of the H2020 project ROBUST ([www.rural-urban.eu](http://www.rural-urban.eu)). ROBUST’s structure includes Living Labs, designed to test new models of governance and policy development, raising questions such as:

- How can successful but localised catchment-based natural flood management (ie. mimicking natural processes in flow control) be expanded and linked to urban sustainable urban drainage systems (SuDS)?
- How viable is it to restrict development in rural landscape character areas that also reveal water pollution and flood risks linked to rural land management practices?
- What governance methods other than direct PES (e.g. development levies or agricultural tenancy contracts) could be effective to incentivise land management in favour of natural capital and reduce urban flood risks?
- How can local authorities with fixed borders and associated democratic mandates develop ESS solutions when (in this case) local watercourses start or end far away?

This presentation will share experiences of how Gloucestershire’s Living Lab has tried to create an experimental space to allow ESS innovations and governance.

*Keywords:* Natural flood management, rural-urban synergies, Living Labs, governance experiments



4. *Type of submission: Abstract*

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## Seeing beyond the own fence – what makes integrated thinking and management of the city THE MISSION and can it be the mission possible?

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Current push for increasing resilience to climate change of both urban and rural systems, achieved at low–cost and with reduced footprint, thus through strengthening natural feedbacks, should have already brought us – the users of the space – back to the idea of nature connectivity and urgency of truly integrated environmental management. In the case of the city this integrated and systemic approach means sustaining urban – rural gradients, linkages and synergies.

Indeed there are efforts to protect cities green rings, maintain rural landscape functionalities within urban fabrics and raise appreciation for services eliminated from the cities some when in their history (e.g. pest regulation). Simultaneously however rural landscape undergoes simplification and resemble more and more city settings so both systems meet each other in the suburbs. There are also two other questionable aspects of respecting ecosystem synergies and integrity: water management and biodiversity. In both cases cities become rather entities cut off from their background, while citizens and decision makers keep discussing how much uncertainty and wildness should be allowed in the proximity.

The hereby presentation tackles some mechanisms standing behind the ambiguity of our perceptions of (un)desirable urban–rural synergies and emerging drivers of landscape changes. It presents two socio–ecological studies of the Central Poland – the City of Łódź and the Pilica River catchment. Despite being 60 km distant, both sites act as donors of water related ecosystem services to each other. The series of surveys, stakeholder mappings and finally cascading threshold model by Kinzig et al. (2006) were applied in order to reveal how much landscape elements and related services are going to be preserved for the future due to



human appropriation, and how policy, decision makers' attitudes and management approaches influence ecosystem service trends.

*Keywords:* rural–urban synergies, ecosystem service transfer, integrated water management, people attitudes

5. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural–urban synergies, bridging science and decision–making

## **Assessing the economic impact of invasive species by bridging ecosystem services accounts to economic models**

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Ecosystem services underpin the functioning of societies and their economies. In the last decades, humankind has experienced great increases of economic prosperity, at the expense of the quality of ecosystems and their capacity to provide services. A way to account for the economic consequences generated by changes in ecosystem services flow is to bridge ecosystem services (ES) accounts with macroeconomic models. Integrated accounting systems offers this concrete possibility by employing for ES, the same framework and mechanism used in building economic accounts. ES accounts are in fact built as satellite accounts of the core System of National Accounts. The bridging procedure we would like to propose has been tested for a case study concerning the presence of an invasive species (*vespa vellutina*). This alien wasp generates a decrease in the pollination service actual flow that in turn affect the available production of pollinator–dependent crops. The availability of pollination accounts allow to estimate the missed gain and hypothetical loss generated by the wasp and as a consequence the shocks in the production of specific crops in specific regions of Europe. For the ES side, we used the Integrated system for natural Capital Accounts (INCA). For the economic side, we used the Global Trade Analysis Project (GTAP). Results at national and international levels are shown and analyzed for different sets of economic variables. This case





study represents a first simple application of an promising approach that for different ES might require different levels of complexity.

*Keywords:* Invasive species, crop pollination, economic impact, ecosystem services accounting, general equilibrium models

6. *Type of submission: Abstract*

B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural–urban synergies, bridging science and decision–making

## **Unlocking and Securing Ecological Infrastructure Investments: the needs and willingness for investments and institutional support mechanisms**

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Ecological Infrastructure (EI) is a natural and near–natural functioning ecosystem that delivers a range of essential services to humankind, such as mountain catchments, wetlands, coastal dunes, fynbos and riparian corridors. In a world where Ecological Infrastructure is underinvested, rapid degradation and threats such as unsustainable veld fire regimes, droughts, climate change, and invasive alien plants persist to dominate the ecological landscape. Government restoration programmes have been introduced to encourage protection of Ecological Infrastructure, biodiversity, and natural resources. However, the realisation of inadequate funding currently dedicated to the maintenance and restoration of Ecological Infrastructure nationwide has led to the need to scale up and unlock public and private sector investments in order to augment ecosystem–based management interventions. This study conducts a systematic literature review at a global scale to (1) understand the drivers behind decisions to invest in Ecological Infrastructure, (2) understand the willingness of private landowners to participate and contribute to investments and the (3) institutional support mechanisms in place to encourage investments. Results suggest that the need to invest is driven by degradation of Ecological Infrastructure and the urgency to meet environmental sustainability goals. The willingness to invest and to participate is stimulated



by the use of economic-based policies and compensatory mechanisms. Public-private partnerships, public policy, and market-based conservation instruments are institutional arrangements executed to protect Ecological Infrastructure. The study contributes to the EI investment research agenda by recommending coordinated efforts to encourage EI investment from both public and private partners. These measures will help to secure financial resources, mobilise investments and reform policies.

*Keywords:* Ecological Infrastructure, Investments, Funding mechanisms, Partnerships

7. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural-urban synergies, bridging science and decision-making

## **Impacts of land use (governance) on ecosystem services in the urban-rural nexus**

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Land consumption for traffic and settlement areas considerably increases globally. An additional side-effect, which is less in focus, is the associated decline of agricultural land (e.g., in Germany and other parts of Europe). This trend is countered by an increasing demand for regional agricultural products in urban agglomerations. However, in rural areas of several countries (e.g., Germany) the agricultural space is increasingly required for purposes of urban areas other than food production (e.g., ecological compensation). Rural areas partly provide land for the legally required ecological compensation of settlement development in urban agglomerations. Impacts of these settlement-driven land-use changes on equal living conditions and ecosystem service provision are hardly assessed in a spatially explicit manner and in the urban-rural nexus.

Using the metropolitan region of Nuremberg as an example, we analyze (i) the drivers of land-use change on previous agricultural land, (ii) how impacts on the spatial configuration of



ecosystem services can be measured, and (iii) which governance instruments could increase land–use efficiency.

First results for the last three decades show a decline in agricultural land predominately in rather remote rural areas. Main drivers for the loss due to settlements are population growth, biophysical conditions but also farm structure related parameters such as the likeliness of farm succession. Main drivers for the loss due to ecological compensation (e.g., forest regrowth) are mostly biophysical drivers and lease prices, i.e., the value of the land. Existing governance instruments such as regional planning show a rather weak impact on agricultural land–use change.

*Keywords:* urban–rural nexus, land–use change, ecosystem services, ecological compensation, land consumption

8. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural–urban synergies, bridging science and decision–making

## Policy Coherence in Green Infrastructure management: insights from six European case studies

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Policy assessment has traditionally been studied by assessing how well single policy instruments are achieving their respective objectives. Interaction between policy instruments is often not taken into account or very succinctly. This creates potentially flawed results since a given policy instrument might be performing very well but also negatively influence the objectives and results of several other policy objectives.

It seems there is no tool available to analyse policy coherence at territorial level in an easy and coherent manner. In practice such analysis is often done based on lengthy qualitative reviews





listing relevant policy instruments and their impacts. Such methods however fail to produce clear overviews and as a result are often too complex for policymakers to be readily used. Also they fail to address synergies and conflicts between policy instruments in a comparable manner.

To address this, we developed a Policy Coherence Analysis (PolCoA) tool and tested it in six European case studies from the Biodiversa project (IMAGINE) on Green Infrastructure (GI). We used a participatory approach with matrices to carry out an expert based PolCoA. For each case study we collaboratively determined (i) the GI challenge faced by stakeholders and identified (ii) key policy instruments, (iii) GI elements (e.g. hedges, grasslands) and (iv) ecosystem services and socio-ecological functions (e.g. erosion prevention, economic viability of farms, etc) associated with this challenge. Local policy experts scored (on a 7 item Likert scale) the impact of each policy instrument on each of these GI elements and functions. Then, they scored also the synergies and conflicts between the policy instruments. The result is a concise overview of policy coherence at case study level creating a shared knowledge basis and allowing policymakers to quickly pin-point issues and opportunities, and supporting focused deliberation. Additionally it provides the foundation for a policy coherence indicator on given issues (e.g. GI policy).

*Keywords:* policy coherence, green infrastructure, ecosystem services, policy assessment, biodiversity

9. *Type of submission:* **Abstract**

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## **Circular Farming as Guiding Principle for ESS Delivery**

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Recently Dutch Ministry of Agriculture and Food launched Circular Farming as a novel guiding principle to sustain national food system, including its wider ESS delivery performances. Already a few year earlier, as part of various national policy bodies, the same ministry



participated in national decentralization of spatial planning and environmental policy with the introduction of the so-called Environment and Planning Act (EPA). EPA aspires to contribute to more tailor-made, integrative and participatory policy making in the Netherlands. Especially based on empirical material from Ede Municipality, located in the heart of the Netherlands, this paper will give an impression of the regional characteristics and outcomes of these partly overlapping policy dynamics with major implications of Dutch governance of rural ESS delivery. Overall this will result in following principle conclusions: 1) Viewpoints on how to operationalize Circular Farming may differentiate, going along with more or less substantial improvement of agriculture's ESS performances; 2) Circular Farming may impact in different ways on rural-urban relations; 3) Particularly rural business models that combine circularity with multifunctionality succeed to improve ESS performances in Ede's setting; 4) Intra-regional differences in rural business models make it a challenging task to incorporate Circular Farming Ideas in municipal EPA implementation; 5) Novel governance arrangements and space for policy experimentation are critical components in making Circular Farming a guiding notion that indeed may be helpful to improve agriculture's ESS performances and to realize wider municipal policy ambition to preserve, maintain and actively re-create mutual beneficial rural-urban relations.

*Keywords:* Circular Farming, Eco-System Services, Governance, Rural-Urban Relations

*10. Type of submission: Abstract*

[T. Thematic Working Group sessions: T18c Governance of ecosystem services for rural-urban synergies: bridging science and decision-making](#)

## Multi-scale planning for ESS enhancement

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Multi-scale planning plays a potential role in enhancing EcoSystem Services (ESS). Through spatial planning connecting multiple scales (regional and local), and multiple territories (urban and rural), ecosystems can be spatialized in ecological networks or green infra-structures,



interpreted in relation to services effectively or potentially provided, and integrated in policy decisions. Regional strategic directions incorporating natural capital and ESS priorities unfold at local levels, with ESS inherently part of spatial decisions for land use, using the green infrastructures as the multiple level interacting element.

This process is however quite complex and raises methodological and political challenges. Multi-level decision-making opens up to a multitude of interactions influenced, or determined, by various agents, sectors, values and priorities. In addition, converting priorities represented at 1:100.000 to a 1:25.000 scale (or more) entails more than simple spatial design, as it requires an understanding and adaptation of the national or regional priority values, often in conflict with local development ambitions.

This presentation will show that decisions at local level do not necessarily use ESS as the multiple level interface platform between decision-making levels, possibly because ESS is often seen from its delivery and not, also, from its demand side. In the context of the ROBUST European research project several living labs are looking into the use of ESS to enhance rural and urban synergies. The experience of the Lisbon Metropolitan Area, one of the 11 living labs, is used to address the following questions: 1. How does decision-making at local scale enable strategic objectives defined at regional scale? 2. Should ESS be defined at regional level and be specified at local level, or should it be identified at local level and then be aggregated at regional level? and 3. How to consider ecosystem services framework into local planning practice as a backbone in urban-rural synergies.

*Keywords:* Multi-scale planning, Eco-System Services, Governance, Rural-Urban Relations





11. *Type of submission: Abstract*

B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural–urban synergies, bridging science and decision–making

## **Advancing ecosystem services through multi–sectoral approach in the landscape continuum of the CDO Riverbasin, Mindanao, Philippines**

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With the increasing role and relevance of multi–actors on landscape management, the Cagayan de Oro River Basin Management Council (CDORBMC) is a model of a multi–stakeholder platform in environmental governance encompassing rural uplands to downstream urban areas in the CDO Riverbasin, Mindanao, Philippines.

This paper highlights the integrated role of ecosystem services on provision of water and regulating flooding in connecting the upland local government units (Libona, Baungon and Talakag) with the downstream city (Cagayan de Oro). It recognizes the importance of protecting the source using different models of restoration (rainforestation, slope and riparian buffer restoration, Calliandra forest succession).

The emerging financial tool for environmental restoration in the riverbasin adopts Payment for Ecosystem Services (PES) using various modalities in the interconnected landscape. The upland indigenous tribe Miarayon–Lapok–Lirongan–Tinaytayan Tribal Association covers restoration in their ancestral domains to prevent soil erosion and flooding downstream. The Talama Fund is an insurance fund for the headwater Kitanglad Guard Volunteers. A Sacred Customary Compact of the Unifrutti Philippines partners the Talaandig Tribe in the use of their ancestral lands for planting banana and pineapple. In the policy advocacy, the local government units provide ordinances in safeguarding ecosystem. In Cagayan de Oro, PES is in its final stages on ensuring the sustainability of water supply for the restoration of the watersheds within city and in the riverbasin. The adjacent Libona has revised its PES ordinance to ensure watershed protection and restoration. Talakag has put its PES ordinance on water protection on hold until its waterworks are complete. Baungon is still in a quagmire on what ecosystem service to push.



This paper shows that even with diversity of interest and players, if there is a shared common vision for the environment using an integrated lens, all are committed working for the interdependence of nature and people.

*Keywords:* payments ecosystem services, riverbasin, multisectoral approach, interconnectivity

*12. Type of submission: Abstract*

*B. Biome Working Group sessions: B9 Governance of ecosystem services contributing to rural-urban synergies, bridging science and decision-making*

## **Instruments for Implementing Ecosystem Services – Analysis of national instruments suitable to integrate ES in environmental governance / decision making**

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Ecosystem Services (ES) are one of the main pillars of a Green Economy in the Alps and a key driver of Alpine development. The main objective of the AlpES project (Mapping, Maintenance and Management of Alpine Ecosystem Services) was to implement the ES concept in practical issues, such as management and planning. A part of the project was to elaborate a common understanding of ES to be transformed into environmental governance models.

With the ES concept being largely developed and discussed in a scientific realm, the transfer of this knowledge into governance instruments is deficient.

Within the transnational project partnership AlpES examined this disparity through the identification and assessment of existing instruments already implementing or being appropriate for the implementation of the ES concept. Instruments can be a variety of tools required by legislation or motivated by economic or societal impetus.



Next to the collection and characterisation of suitable instruments, the project partners from all Alpine EU-Member states and Liechtenstein were asked to provide information on public awareness towards ecosystems services and human well-being. Both formal and informal instruments were collected, reflecting a broad range of economic burdens and incentives via laws and regulations to voluntary cooperation commitments. The instruments were qualitatively evaluated according to the chances and limitations arising through the implementation as well as the added value generated through the ES concept. Furthermore conflicts and requirements for a transnational implementation of the instruments were assessed.

From the collected 125 instruments 59 were found to have at least a partly integration of the ES approach. The generated database provides a substantial insight into the different existing national and transnational instruments collected by ES researchers and ES management practitioners with a high potential of integrating and using the ES concept in governance and management decisions.

*Keywords:* instrument, governance, environmental management, database, Alpine Space

*13. Type of submission: **Abstract***

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## **Spatial analysis of ESs as a tool for understanding and promoting rural-urban synergies in planning**

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Population growth, urbanization and global trade currently threaten sustainability and resilience of territories. In this framework, the challenge is to identify settlement patterns able to reduce their ecological footprint through the development of virtuous interactions between urban spaces and both peri-urban and rural outer spaces.





In Italy, outer spaces are undergoing land consumption, degradation and abandonment phenomena as a consequence of expectations about urban land rent and growing difficulties in carrying out agricultural activities. Meanwhile, there is a growing citizen demand for new environmental, recreational and even rural-related services (e.g. the possibility of consuming local food, leisure, etc.).

Ecosystem Service (ES) approach is valuable for assessing current quality of life for urban settlement planning since it is able to highlight the key role of green open spaces and relationships between urban, peri-urban and rural areas in the provision of Ecosystem Services (ESs) to urbanised areas.

Within the context of the EU project ROBUST (<http://rural-urban.eu/>), the authors develop a reflection on the role that ESs can play in generating “new localities”, where physical spaces assume the configuration of relational spaces that allow the creation of new values, perceptions and identities based on a strong synergy between urban and rural contexts.

The creation of these new “relational spaces” is based on the identification of the ESs that are most appropriate for enhancing the multifunctional role of rural, peri-urban and intra-urban areas. This requires: i) a preliminary definition of the territorial scale within which to explore and understand the phenomena of coexistence, overlap and competition between urban and rural functions; ii) a suitable mapping strategy.

The authors propose an integrated AMC-GIS approach, aiming to support urban planning by providing a three-dimensional spatial analysis of productive, protective and cultural-recreational ESs.

*Keywords:* Rural-urban synergies. ESs mapping, ESs planning



14. *Type of submission: Abstract*

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## Urban and Regional Planning – Integration Capability of the Ecosystem Service Approach in Governance Structures

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The ÖSKKIP–project examines the capability for integration of ecosystem services (ES) in urban and regional planning. The study is carried out in two German test regions, the cities Munich and Rostock, and the surrounding urban hinterland. Presently the outstanding importance of ES is sometimes insufficiently taken into account in planning decisions. The project therefore focuses on the communication and integration of the ES approach into formal and informal planning procedures of urban and regional development.

In the project, formal and informal planning documents have been evaluated according to their integration capability of the ES approach. In a next step, the results of this investigation will be discussed with decision–makers and stakeholders in order to test the integration capability of the ES approach and to delineate formal and informal planning processes and governance structures.

Guiding questions of the project are: How do planning processes work? Where do they take place, who participates and how are decisions made? Can the ES approach be integrated into planning processes? Can a governance process be influenced by the integration of the ES approach or is the approach even able to establish new governance structures? Can governance processes be interconnected through the integration of the ES approach in favour of better integrated environmental planning?

The purpose of this project is not to look at ES separately but in an integrated way. It aims to identify the role and value of the ES approach in planning processes and to explore governance structures. Furthermore it examines if the ES approach can be a chance to bridge and connect different planning processes and establish new synergies.



*Keywords:* ecosystem service approach, governance, urban planning, regional planning

*15. Type of submission: Abstract*

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## **Ecosystem services perceived by rural and urban dwellers in the Carazo region (Nicaragua)**

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Nicaragua has long been one of the poorest countries in Central America and across the whole America. This is reflected in ecosystem service (ES) requirements. These are mostly basic necessities, which are affected partly by poverty, technology unavailability, lack of education and awareness. The aim of this abstract is to analyse the need, exploitation and ES awareness in the Pacific Carazo region (Nicaragua).

The research was conducted in the Jinotepe and Diriamba municipalities, the methodology was interview survey. After excluding irrelevant questionnaires, we obtained 268 questionnaires (specifically urban 177; rural 111). The questions were answered on a scale by choosing 1 to 5 (1 is low bond; 5 strong bond), to explain the intensity of the relationship.

The linkage between the dwellers' use of nature near their residence is strong. The question of ES perception was examined by living in rural areas especially. Rural dwellers perceive more their surroundings, which they use. Especially provisioning ES are the most important for them. The monitored items were land use for livestock farming and plant cultivation, drinking water source, water of consumption source and timber resource. Rural dwellers are undoubtedly more influenced by the environment and also the regulating ES. The most important regulating ES was flood protection.





Still more important are cultural ES which were perceived by about 85 % of dwellers. There is a very small difference between the perception of cultural services between rural and urban dwellers (90 % and 82 %).

In conclusion, rural dwellers in the Carazo region, who are sparsely diffused across the landscape, are more sensitive to ecosystem services and disservices; especially provisioning and regulating ES, which are mutually linked, because of the human existence. Cultural ES are perceived substantially in the same way in both rural and urban areas.

*Keywords:* Rural areas, Latin America, Poverty reduction, Public awareness, Ecosystem services

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## **Analysing peri–urban agricultural related ecosystem services’ interactions**

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Agricultural lands in the peri–urban areas provide a broad range of different ecosystem services (ESS) (Foley et al. 2005) that remain under intense pressure from different stakeholders, e.g. private housing investors, farmers, nature protection authorities and urban recreational visitors. Moreover, various increasing demands for food, biomass and housing have resulted in trade–offs related to the provision of ESS provided by agricultural lands, such as water regulation or nutrient cycling and aesthetic landscapes, which are often less recognised and as such are degrading.

The aim of the paper is to analyse relationships between ecosystem services at the peri–urban areas at the very fine scale including interlinkages between ecosystem service provision and



soil types in a spatial analysis. We analyse strategic documents and governance frameworks to understand how the identified trade-off and synergies are perceived and managed. Based on that we provide the governance recommendation to secure the ES provision in the long-run. Wroclaw and its surrounding municipalities in Poland are taken as a case study to analyse relationships between food provision and biomass production, water regulation and nutrient cycling, physical recreation and aesthetic features of the agricultural landscapes in peri-urban areas. The results show the trade-off relations occur between the food provision, biomass production and the aesthetic features of landscapes, while the synergies are between recreational potential and water regulation. Co-produced regional development strategies are required for setting medium-term development priorities that take account of local and regional spatial specificities. They need to be flexible to allow policy learning and at the same time have to be well defined to be effectively implemented.

*Keywords:* trade-offs, synergy, Wroclaw, governance, biophysical assessment

*17. Type of submission: Abstract*

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## **Power asymmetries in ecosystem services governance: insights from social network analysis**

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Understanding how power asymmetries arise and how they can affect policy outcomes are crucial questions for ecosystem services (ES) research. In political sciences and sociology, the distribution of power among individuals has been widely studied with social network analysis (SNA). SNA have also been used to understand natural resource governance, for example in the context of fisheries, REDD+ or urban green areas. In this paper, we propose to analyze the structure of social networks of influence and domination related with ES governance in the Mariño watershed (Peru). The objectives of this paper are (1) to propose a framework for analyzing power asymmetries in relation with ES governance and (2) to apply it to the study case to highlight power differentials between selected stakeholders from different sectors and



scales. We conducted face-to-face semi-structured interviews with representatives of 52 stakeholders of the watershed to understand how they relate with each other. For the influence network, we specifically asked them to identify the stakeholders with whom they exchange information, collaborate for projects, have regular and unregular meetings, do business with. In contrast, for the network of domination, we asked them to identify the stakeholders they restrict, punish, advice, or supervise, as well as the stakeholders that have such control over them. We assessed degree, closeness and betweenness centralities of the two networks. Four categories of stakeholders were distinguished depending on stakeholder's levels of influence and domination. Stakeholders from local scale, business and civil society showed significantly lower levels of both influence and domination than other stakeholders. Power was significantly correlated with the benefits received and participation to ES management: ES managers showed higher levels of power, and were found in the core of the two networks. These power asymmetries raise issues of equity and might reduce the adaptive capacity of the social-ecological system.

*Keywords:* Social network analysis, power asymmetries, ES management

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## **Payments for Ecosystem Services in peri-urban areas: the case of the Chinese megacity Chongqing's eco-compensation mechanisms**

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In an increasingly urbanized world, global environmental change affects human societies differently, and ecosystem-based adaptation strategies exemplify this especially in unequal societies and in cities of the Global South. For decades there have been fruitful theoretical debates and efforts to reintegrate nature and cities, while practical applications that address differences and possible synergies of rural and urban territories in complex ways have been





quite recent. Economic mechanisms like Payments for Ecosystem Services (PES) or broader eco-compensation schemes have shown to be useful policy and planning instruments to guide such an integration. Within China's recently proclaimed "Ecological Civilization" doctrine, the science-policy interface plays an important role. However, the radical economic changes in China in recent decades have also drastically changed peoples' relation to nature, as well as their consumption patterns. We look at unintended consequences and environmental risk (Beck, 1986) in the institutional arrangements of the megacity Chongqing, a provincial-status municipality of 33 million inhabitants in Western China 80% of whom still hold rural household registrations or migrant status. PES, in combination with the city's 2007 master plan and other policy tools could help forge new types of institutional arrangements between farmers, consumers, businesses, research institutions, and the policy sphere, as long as social factors, local knowledge and dimensions like power relations are considered. This research project is part of the discussions that entail a three-year cooperative project on the human dimensions of global environmental change in Brazil, China and Mozambique financed by the São Paulo state research foundation. The sociological perspective on risk adopted for contextualizing climate change issues has confirmed the importance of multi-actor and multi-scale approaches for adaptation strategies to show effect. Adopted institutional arrangements in conservation policies often lack stakeholder perspectives and engagement, which has been shown by a broad body of research to hinder their effectiveness.

*Keywords:* Environmental Sociology, peri-urban, risk, watershed protection

19. Type of submission: **Abstract**

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## Governance of ecosystem services: a review of the empirical literature

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Ecosystems support human wellbeing through ecosystem services. Yet, the ways ecosystem services are governed have gained little attention from ecosystem services research. In a



conceptual paper, Primmer et al. (2015) proposed four modes of ecosystem service governance: scientific–technical, hierarchical, strategic behavior, and (adaptive) collaborative governance. However, the empirical evidence to support these governance modes has been anecdotal so far, lacking a scientific replicable approach. Here, we review 235 publications on ecosystem service governance and synthesize a subset of 116 empirical publications. We show that the modes of ecosystem service governance proposed by Primmer et al. (2015) are suitable to be used in ecosystem services research. This means that the governance modes incorporate well the diversity of governance arrangements reported in the scientific empirical literature. Furthermore, our results also show that there is not a predominant discourse on the governance of ecosystem services. Rather, different governance modes are studied in different combinations, which possibly reflects the existing reality of multiple and overlapping governance arrangements affecting ecosystem services. We propose more concrete definitions for these four modes of ecosystem services governance to help interdisciplinary researchers better navigate and orient their research.

*Keywords:* systematic literature review, scientific–technical governance, hierarchical governance, strategic behavior governance, collaborative governance