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I. SESSION DESCRIPTION

ID: O5

Disentangling equity in ecosystem services

Hosts:

	Title	Name	Organisation	E-mail
Hosts:	Dr.	Felipe Benra	UFZ/iDiv, Germany	felipe.benra@idiv.de
	Dr.	María Felipe-Lucia	UFZ/iDiv, Germany	Maria.Felipe-Lucia@idiv.de
Co-host:	Prof.	Aletta Bonn	UFZ/iDiv/FSU Jena, Germany	aletta.bonn@idiv.de

Abstract:

Most ecosystem service studies investigate the mismatch between supply and demand. However, there is little research on the distribution of these ecosystem services among different groups of stakeholders and on how inequity might hinder the access to those ecosystem services. Inequity is one of the pivotal social challenges of our epoch, with far-reaching ramifications for human well-being. It often results from unfair procedural and distributive justice systems and infiltrates many domains of social life, including income distribution, gender, education and the risks of environmental hazards or unequal access to natural capital, ecosystem services among and within countries and socio-economic groups. Inequity is also a multidimensional concept of ethical concern, used synonymously with fairness and justice. Because of the multiplicity of approaches and dimensions, clear methodologies of how to explore and assess levels of inequity are not fully developed yet. In this session we invite talks exploring the linkages between ecosystem services and equity outcomes in its three dimensions, procedural, contextual (which includes recognition), and distribution with a clear conceptual differentiation (e.g. research is looking at inequity or inequality?). In particular, we welcome, case studies, methodological research, and applied research into policy change and management.

Goals and objectives of the session:

Scientific exchange on recent scientific work, possible creation of a thematic working group

Planned output / Deliverables:

Creation of a scholars' network

II. SESSION PROGRAM

Date of session: Thursday, 10 June 2021

Time of session: 9:30 – 12:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
9:30 9:45	Branda Maria	Zoderer	University of Natural Resources and Life Sciences	Mapping recognition justice: methodological and conceptual challenges
9:45 10:00	Bruno	Locatelli	University of Montpellier & CIFOR	Social-ecological network analysis to explore equity in the management and use of ecosystem services
10:00 10:15	María	Felipe-Lucia	German Center for Integrative Biodiversity Research	Building consensus on how to conceptualize ecosystem services as social-ecological networks
10:15 10:30	Johannes	Langemeyer	Institute of Environmental Science and Technology	Weaving notions of justice into urban ecosystem services research and practice
11:00 11:15	Felipe	Benra	German Centre for Integrative Biodiversity Research	Assessing inequalities is key to understand relationship between wellbeing and ES supply
11:15 11:30	Claudia	de Luca	University of Bologna	Assessing Cultural Ecosystem Services (CES) distributional justice in cities: the case of Bologna
11:30 11:45	Jarumi	Kato Huerta	University of Trento	A spatial environmental justice index to prioritise the implementation of nature-based solutions in cities
11:45 12:00	Helena	Hanson	Centre for Environmental and Climate science	Ticking the green box: Ethical consequences of planning urban ecosystem services in a 'rational way'
12:00 12:15	Nadja	Kabisch	Humboldt-Universität zu Berlin	Environmental justice in a world of global change - considering equity, equality or justice in ecosystem services research

Time	First name	Surname	Organization	Title of presentation
12:15 12:30	Jacqueline	Loos	Leuphana University	How the ecosystem services framework may cater for environmental justice

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

O. Open sessions: O5 – Disentangling equity in ecosystem services

Mapping recognition justice: methodological and conceptual challenges

Presenting author: Brenda Maria Zoderer

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While ecosystem services and the opportunities to shape them are unequally distributed across social groups, such inequalities are rarely made visible in dominant landscape planning tools. Equally, efforts at mapping the supply and demand of ES predominantly rely on 'objective' biophysical assessments rather than the perceptions of different social groups. This presentation draws from an ongoing research programme that seeks to account for recognition justice in the mapping of ES. Using two recent studies for illustration, I discuss different ways how variations and potential conflicts can be integrated in maps and be made spatially explicit. The first study developed a novel method for mapping stakeholder variations in landscape preferences. To this end, the study integrated insights from the people's perceptions of ES supply and the socio-cultural valuation of the same services. The second study shows how potential conflicts resulting from variations in cultural understandings of a particular service, wilderness, can be visualised. Building on these studies, the presentation highlights the various aspects of recognition justice, relating to perceptions, socio-cultural valuations, and varying cultural understandings, that need to be considered in ES mapping. It concludes by discussing persisting methodological and

conceptual challenges in 'mapping recognition justice' and how a respective research agenda could look like.

Keywords: recognition justice, mapping, social groups, conflict

2. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

Social–ecological network analysis to explore equity in the management and use of ecosystem services

Presenting author: Bruno Locatelli
Other author(s): Améline Vallet, Victor Bourdeaud'hui, Yésica Quispe Conde
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Ecosystem services are produced and delivered to society by complex networks of ecological relationships (e.g., plant pollination by insects) and social relationships between actors (e.g., competition or cooperation). Social network analysis, a method based on graph theory for understanding the structure of a social system, can explore the interactions among people and institutions managing ecosystems or benefiting from ES, for example to understand who controls information flows or can facilitate action. Recent developments have combined ecological and social interactions in integrated social–ecological network analyses. Such analyses can help identify how people control or manage ecosystems and their ES and how benefits flow from ecosystems to people, which are important issues for analysing social–ecological governance, sustainability, and equity. Our research aims to explore how social–ecological interactions can be analysed with network analysis. It also aims to understand how social–ecological network analysis reveals issues of equity. We apply social–ecological network analysis to the case of water governance in a watershed in Peru, where multiple nature–based or technological measures have been recently implemented with diverse stakeholders (e.g., local communities, regional government, national institutions, NGOs). We analyse how ecological elements interact (e.g., a wetland regulating water), how people interact (e.g., through domination or influence), how people act on ecosystems (e.g. through management), and how ecosystems benefit people (e.g.,

through the provision of ecosystem services). We define of a typology of interactions, in accordance with different network patterns to explore, and we represent the interactions in a social-ecological network. Results highlight how network patterns can inform about equity and governance. They also show how the social-ecological network has evolved, following the implementation of a payment for ecosystem services.

Keywords: watershed, nature-based solution, payment for ecosystem services, equity, social-ecological network analysis

3. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

Building consensus on how to conceptualize ecosystem services as social-ecological networks

Presenting author: María Felipe-Lucia
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Scenario analysis is a useful technique to inform landscape planning of social-ecological systems by modeling future trends in ecosystem service supply and distribution. This is especially critical in floodplain agroecosystems of rural areas, which are constantly threatened with the disappearance of riparian forest corridors for increasing agricultural production or by rural abandonment. However, few studies investigating the effects of land management combine social and ecological modelling in scenario analyses. We estimated the supply of 16 ecosystem services under five alternative scenarios based on the combination of two gradients: agricultural intensification and ecological restoration of the riparian forest. We used redundancy analyses to detect ecosystem services bundles and interviews to identify societal gains and losses associated with each management scenario. Our results show how land management influences both the supply and distribution of ecosystem services. Scenarios promoting ecological restoration supplied more services and benefit a larger range of societal sectors than those scenarios focused

on provisioning services. We also found two consistent bundles across scenarios, one related to less intensive food supply and another one related to outdoors activities. Interestingly, additional services were included in these bundles in the different scenarios, reflecting land management effects. Landscape scale management promoting both the conservation of ecosystem functioning and the sustainable use of provisioning services could supply a more balanced set of ecosystem services and benefit a larger number of societal sectors, contributing to more equitable and sustainable futures in rural areas.

Keywords: agricultural system, multifunctional landscape, ecosystem management, land use planning, floodplain trajectories, plural valuation

4. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

Weaving notions of justice into urban ecosystem services research and practice

Presenting author: Johannes Langemeyer
Other author(s): James Connolly
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In a rising urban age planning for cities around the globe is increasingly based on assessments of ecosystem services, making enhanced considerations of ecosystem service justice critically important. Yet, justice remains a 'blind spot' in urban ecosystem service models and research, which can be traced back to the ecological and economic legacies of the concept itself. This legacy reproduces the normative focus on natural capital as a guarantee of sustaining ecosystem services, enforces a static understanding of nature that insufficiently considers human agency, and conceptualizes ecosystem service flows from nature to humans in a way that does not reflect the social-ecological structure and constantly shifting priorities of the urban realm. In response, this conceptual paper aims at broadening the analytical foundation for justice in urban ecosystem service assessments by presenting a model that links the co-production of urban ecosystem services (including infrastructure, institutions, and perceptions) with established lines of recognition, procedural, and distributional justice. It further highlights the need to embed these

classical dimensions of justice within both spatial (downscaled and inter-scalar approaches) and temporal (interrelated past, present, and future conditions) justice frames. Relying on urban environmental, social, spatial and temporal justice theory as well ecosystem service scholarship, we outline theoretical entry points and provide practical examples for weaving notions of justice into urban ecosystem service research and practice, while highlighting future research needs.

Keywords: ecosystem services, environmental justice, spatial justice, temporal justice, equity, plural values

5. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

Assessing inequalities is key to understand relationship between wellbeing and ES supply

Presenting author: Felipe Benra
Other author(s): Maria Felipe Lucia, Aletta Bonn, Laura Nahuelhual
Affiliation: German Centre for Integrative Biodiversity Research (iDiv), Germany
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While ecosystem services (ES) inequalities exist in nature, human interventions can increase them affecting human wellbeing. Despite that ES have been coined to achieve joint nature conservation, wellbeing and raising awareness of inequality issues, there is little systematic work to address their interlinkages. Inequality in the distribution of ES is molded by ability to access and manage ES. In turn, the potential supply or natural distribution of ES has a strong spatial element which can have important equity implications (i.e., land ownership). In regimes of private land ownership, ES management and therefore potential ES supply depends on decisions of numerous individual landowners that shape the matrix in which ES are co-produced. Here, we investigate the relationship between potential ES supply, human wellbeing and underlying inequalities, by mapping the distribution of potential ES supply for 8 ES across seven regions of southern Chile. We model inequalities in the distribution of ES by considering property rights, socio-economic (e.g., income), and environmental (e.g., altitude) variables. Our results will show how inequalities

are embedded in complex and ever-changing social-ecological systems facing challenges such as competing economic and political pressures to produce ES, lastly affecting wellbeing.

6. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

Assessing Cultural Ecosystem Services (CES) distributional justice in cities: the case of Bologna

Presenting author: Claudia de Luca
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Affiliation: University of Bologna, Italy
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Cultural Ecosystem Services (CES) and related flows of benefits – heavily influencing humans' health and personal wellbeing – are usually included under non-consumptive direct use values. However, despite the increasing recognition of their contribution to citizens' quality of life, their intangible nature makes CES to still suffer from poor quantification and lack of integration in decision making and planning processes. Being recognized as a gateway to environmental and ecosystem services stewardship, the capitalization of the societal relevance of CES would largely help to address real-world problems, improving people wellbeing and quality of life. Cultural services strongly depend not only on the characteristics and features of the urban Green and Blue Infrastructures (GBI), but also on preferences, perceptions and recognitions of the users that interact with the existing GBI, that contribute to co-produce ES related benefits and values. Nevertheless, CES benefits co-production strongly depends on different socio-cultural characteristics of the users (e.g. income, ethno-racial characteristics, age, and other axes of difference) and on the governance and procedural models in place in the urban GBI. The diverse users' needs coupled with the uneven accessibility, quality and distribution of urban greenspaces, could affect the way ES are produced and distributed and further exacerbate exiting inequalities and disparities. This study introduces a spatial approach, tested on the city of Bologna, Italy, based on a new and pluralistic notion of GBI quality related with CES co-production paths, including sport features quality and local associations' role as Green Stewards in the assessment of CES supply. CES supply quality and distribution have been then assessed against CES demand,

considering users vulnerabilities across the city. The results show a preliminary assessment of CES distributional dimension of justice in the city, touching upon recognitional and procedural values to assess it.

Keywords: cultural ecosystem services, urban planning, distributional justice, green and blue infrastructure quality, green stewardship

7. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

A spatial environmental justice index to prioritise the implementation of nature-based solutions in cities

Presenting author: Jarumi Kato Huerta
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Cities are experiencing the use of nature-based solutions (NbS) to address climate change and urban densification challenges. However, there is still a limited understanding of how to measure and respond to environmental injustice resulting from the uneven distribution of green space in urban areas. In fact, communities of concern often bear environmental hazards and receive fewer green space advantages. This study presents a flexible and spatial environmental justice index that can be applied to prioritise NbS interventions in urban areas to address this gap. The index includes three groups of variables: i) environmental stressors (e.g., in-land stormwater hazard, air pollution, noise exposure) ii) hotpots of vulnerable communities (e.g., minority groups, people facing economic constraints, elderly and children) and iii) distribution of green space benefits (e.g., opportunities for outdoor recreation, exposure to street greenery, flood hazard reduction). To test the index, we adopt a case study approach in the insular city of Las Palmas de Gran Canaria (Spain), and we computed it at different spatial scales ranging from blocks to the whole city. Moreover, the index has also been used to suggest priority areas for an equitable deployment of different types of NbS in Las Palmas. Finally, the impacts in terms of environmental justice improvement from NbS has been discussed with reference to the priority justice needs of the

study area. Based on the results, we discuss how the index could be used for urban planning and to provide a foundation for future research on the environmental justice and equity implications of NbS in urban areas.

Keywords: environmental justice, equity, nature-based solutions, environmental burdens, ecosystem services

8. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

Ticking the green box: Ethical consequences of planning urban ecosystem services in a 'rational way'

Presenting author: Helena Hanson
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Climate change and an increasing urbanisation create pressure on cities in terms of extreme weather events, deteriorated public health and wellbeing and a loss of biodiversity. Strengthening the provision of urban green and blue space (UGS) and ecosystem services (ES) is one way to reduce vulnerability and improve living conditions, and 'greening' is often highlighted as an important path to create more sustainable cities. Greening efforts have generated an increased attention from both science and practice towards using tools and frameworks that can support decisions on where, what and how much UGS to preserve or create (ranging from simple Excel calculations, to infrastructures for big data collection) to safeguard the provision of urban ES. The aim of the study was to reflect on justice issues related to the use and reliance on different UGS/ES planning tools in municipal planning processes. We used a mixed-method approach, including semi-structured interviews and stakeholder workshops with actors involved in UGS development, in Sweden; focusing on the city of Malmö and its neighbouring municipalities. We use the theoretical framework environmental justice and analyse distributive, recognition, and procedural justice issues in relation to the use of UGS/ES planning tools. We highlight that some UGS/ES planning tools can help to overcome injustices, especially in relation to stakeholder engagement,

but also that easily 'tick-able' tools, disregarding plurality in relation to nature and human needs, tend to be mainstreamed into urban green space governance, just because they are simple to work with. We argue that the current focus on tools and assessment frameworks enforce a 'rational way' of dealing with UGS; reducing the engagement in sincere deliberation needed for the development of a just, diverse (related to citizens' needs) and sustainable UGS.

Keywords: ecosystem services, municipal planning, tools, environmental justice, green space

9. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

Environmental justice in a world of global change – considering equity, equality or justice in ecosystem services reserach

Presenting author: Nadja Kabisch
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Global Changes retaliated to urbanization, climate change or demographic change are challenging urban areas today. Urban green spaces provide multiple ecosystem services to city residents and are considered to mitigate urban challenges and to be an important element of socio-environmental justice. Drawing on a selection of recent case study work on environmental justice in European cities, in this session, we discuss findings along the three dimensions of socio-environmental justice: distributive, interactional and procedural (Kabisch and Haase, 2014; Baró et al. 2021). We present a comprehensive approach that calls for an integrated view of these three justice dimensions, which all contribute to a just provision of urban ecosystem services. This comprehensive approach to ecosystem services that recognizes justice in its multiple dimensions is discussed. We argue that in assessments of ecosystem services provision, the terms equality, equity and justice should not be regarded as interchangeable and a wise use of terminology is recommended to allow for the effective inclusion and application in the governance and planning of urban green spaces.

10. Type of submission: Abstract

O. Open sessions: O5 – Disentangling equity in ecosystem services

How the ecosystem services framework may cater for environmental justice

Presenting author: Jacqueline Loos

Other author(s): Matthias Schröter, Bonnie Keeler, Marta Berbes, Benis Egoh, Lydia Olander, Leah Bremer, Kai Chan

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Ecosystem service research and practice have been criticized for insufficiently addressing justice concerns when assessing benefits derived from ecosystems. Most efforts to integrate justice within ecosystem service research and practice have been allocated towards the equitable distribution of benefits, however, often without deeper engagement with the respective community and contextual factors that moderate justice outcomes and human well-being. To better address systemic injustices which underpin management and provision of ecosystem services, the radical environmental justice framework offers a promising direction towards a more holistic understanding of contextual social factors and governance aspects. The environmental justice framework disentangles recognition, procedural and distributive aspects of ecosystem service research and management. The recognition of the value and knowledge diversity of stakeholders and a deeper understanding of the power dynamics which translate this understanding into practice are entry points towards working on an increased participation and a fairer distribution of benefits and burdens of ES management. To better cater for environmental justice in ecosystem service research and practices, we outline approaches to integrate ecosystem services within the environmental justice framework. Based on a deeper social-ecological understanding of ecosystem services, a more holistic perspective on human well-being and the systemic context that underpins injustices may offer pathways towards transformations of the way both researchers and practitioners approach ecosystem services, potentially in a setup in which institutions nourish human agency to assign, select, use and manage services for human wellbeing in a sustainable way.