BOOK OF ABSTRACT

I. SESSION DESCRIPTION

ID: B10c

Advancing urban ecosystem service assessments for more inclusive and just cities

	Title	Name	Organisation	E-mail
Host(s):	Dr.	Francesc Baró	ICTA-UAB	Francesc.baro@uab.cat
	Dr.	Johannes Langemeyer	ICTA-UAB	Johannes.langemeyer@uab.cat
	Dr.	Edyta Łaszkiewicz	University of Lodz	edyta.laszkiewicz@uni.lodz.pl
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Abstract:

The ecosystem service (ES) concept is mainstreaming and is increasingly taken up by urban policy-makers striving for safer, more resilient and sustainable cities as stated under UN Sustainable Development Goal (SDG) 11. In particular, it is used as a conceptual basis for the implementation of green infrastructure projects and nature-based solutions (NbS). However, considerations of environmental justice, i.e., who benefits most and who may remain excluded from receiving the benefits of green infrastructure or NbS in terms of ES supply (such as air purification, runoff control, urban temperature regulation or opportunities for outdoor recreation) is, so far, less included in urban ES assessments. The current lack of a comprehensive urban ES-based framework that recognises plural values and demands of different population groups such as children, elderly or historically marginalized groups and the effective inclusion of them in urban greening decision makingprocesses may result in less fair urban green space planning and management outcomes in our rapidly urbanizing planet. This is especially critical as the purpose of urban ES assessments is currently changing from 'awareness raising' towards 'priority setting' in the planning and management contexts of many cities worldwide.

Goals and objectives of the session:

This session aims to address the environmental justice gap in urban ES research and to advance both conceptually and practically, the three main dimensions of justice in urban ES implementation and assessments, namely:

1) distributive justice (i.e., fair allocation/access of ES for all social groups);
2) procedural/participatory justice (i.e., fair integration of all affected groups into ES-related decision-making processes);
3) interactional/recognition justice (i.e., recognizing the needs, values, and preferences of all stakeholders in relation to ES in a safe, fair and non-discriminant environment).

Contributions will encompass new conceptual and theoretical approaches, empirical case studies, and methodological and analytical developments critical for providing new models, tools and approaches for the integration of these three dimensions of justice in urban ES implementation and assessments. Contributions will also come up with particular recommendations for urban planning and policy.

Planned output / Deliverables:

This session will focus on the presentation of papers for a special issue addressing the scope of the session (special issue already in process).

This session is also meant to further establish a community of researchers who are addressing justice in (urban) ecosystem services research. It will take up and continue important discussions from sessions T6 “Green Justice – Considering equity, conflicts and disservices in ecosystem service research and practice” that took place in the 2017 ESP World Conference (Shenzhen, 2017) and “B10a Just green cities – Adding dimensions of justice to urban ecosystem service assessments” held in the last 2018 ESP EU Conference (San Sebastian, 2018).

Related to ESP Working Group/National Network:

Biome working group: BWG 10 – Urban systems

II. SESSION PROGRAM

Date of session: Thursday, 24 October 2019
Time of session: 13:30 – 18:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
13:30-13:35	Francesc Edyta	Baró Łaszkiewicz	ICTA-UAB Univ. of Lodz	SESSION INTRODUCTION PART I
13:35-13:50	Johannes	Langemeyer	ICTA-UAB	Just urban transitions and the need to understand the dynamic generation of ecosystem services in cities
13:50-14:05	Jarumi	Kato Huerta	University of Trento	Environmental justice and nature-based solutions in cities: A conceptual framework
14:05-14:20	Amalia	Calderón-Argelich	ICTA-UAB	Urban ecosystem services from an environmental justice perspective: A systematic review
14:20-14:35	Charlotte	Liotta	Ministère de la Transition Ecologique et Solidaire / CIRED	Ecosystem services and socioeconomic inequalities in the Paris metropolitan region
14:35-14:50	Francesc	Baró	ICTA-UAB	Who needs urban ecosystem services and who gets them? A spatial analysis of socio-environmental inequalities in Barcelona
14:50-15:05	Manuel	Wolff	Humboldt Universität zu Berlin	Enabling an equal accessibility to green spaces? – an example of multiple barriers Halle, Germany
15:05-16:15				**COFFEE BREAK**
16:15-16:20	Johannes Nadja	Langemeyer Kabisch	ICTA-UAB Humboldt Universität zu Berlin	SESSION INTRODUCTION PART II
16:20-16:35	Edyta	Laszkiewicz	University of Lodz	Green walk of children to school: evaluation of welfare-related disparities in availability of green routes among children

16:35–16:50	Megan	Nowell	Norwegian Institute for Nature Research	One tree for one citizen: linking green infrastructure to the mitigation of urban heat island and human health risk in Oslo, Norway
16:50–17:05	Daria	Sikorska	European Regional Centre for Ecohydrology	Reconceptualising formal and informal urban green spaces – classification, ecosystem services and availability to residents
17:05–17:20	Marija	Bockarjova	Utrecht University School of Economics	Green interventions in cities: adding to value generation or green segregation?
17:20–17:35	Johanna	Alkan Olsson	Lund University	Socially just urban ecosystem service governance – Perspectives from the super local scale Sofielund, Malmö, Sweden
17:35–18:00	All session hosts			FINAL WRAP-UP – Q/A

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***

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Who needs urban ecosystem services and who gets them? A spatial analysis of socio-environmental inequalities in Barcelona

First author: Francesc Baró
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A plea to adopt a more functional approach in relation to contact with nature in cities has been raised by several authors (see Ekkel & de Vries, 2017). A key question behind this approach is directly related to the assessment of urban ecosystem service provision and demand: what is the service offered and who needs it? Despite the mounting literature on urban ecosystem

services, there are still few studies looking at the environmental justice implications of potential mismatches between ES flows and needs in cities.

This research proposes a framework to evaluate socio-environmental inequalities in the access to urban nature benefits based on the spatial analysis of four main elements: urban green infrastructure types (e.g. urban parks and gardens), ecosystem service provision (e.g., urban cooling), socioeconomic vulnerable groups (e.g., elderly residents) and environmental pressures (e.g., heat stress). The framework is applied to the case study of Barcelona, Spain, using high-resolution spatial data and a look-up table relating urban green infrastructure components (single trees, woodland, shrubland, herbaceous) with urban ecosystem service supply rates. Associations between the four elements are explored using bivariate, multivariate and cluster analyses. The latter allows the identification of several distinct ES supply-demand bundle types at the neighborhood level (n = 71) and their underlying social-ecological characteristics. Preliminary results suggest that the uneven and patchy distribution of certain green infrastructure types (e.g. private gardens, the periurban park of Collserola) clearly determines ES provision patterns in Barcelona. In general, coldspots of ES are more associated to neighborhoods whose residents have a higher share of socially vulnerable groups and/or are more exposed to environmental and climate pressures.

References: Ekkel, E.D., de Vries, S., 2017. Nearby green space and human health: Evaluating accessibility metrics. Landsc. Urban Plan. 157, 214–220.

Keywords: environmental justice, urban ecosystem services, socio-spatial inequalities, green infrastructure

2. *Type of submission:* ***Abstract***

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Green interventions in cities: adding to value generation or green segregation?

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This study aims at estimating relationships between property prices and different types of urban nature, and illustrates the applicability of the derived value transfer functions. While green interventions contribute to more resilient and sustainable urban environments and bring about multiple benefits to urban populations, some impacts are not well understood, in particular impacts in the social domain such as gentrification. If in a process of green urban renewal property prices and rents increase causing an influx of affluent people displacing poorer residents, potential of green gentrification needs to be considered. Thus a better understanding of how housing prices relate with different types of urban nature is useful.

This study takes a meta-analysis approach which is based on 36 primary hedonic pricing studies and estimates value transfer functions relating different nature types to property price developments in various urban settings. Besides, we apply the estimated functions to a set of natural interventions in three Dutch cities, and illustrate the obtained effects with maps.

The results show that urban nature has a positive impact on housing prices in the areas surrounding it. This impacts depend on population density, distance to and the type of urban nature. For example, the presence of a park in the city of Amsterdam is estimated to have 2% higher prices of properties located directly at the park side compared with properties 100m away, translating into the 8.900 euro difference for average property prices.

Despite some limitations, the analysis showed that the presence of urban nature has a distinct positive impact on housing prices in the areas surrounding it. This insight is useful to monitor potential societal impacts that green interventions can create, tailor policy and help stakeholders understanding of the environmental, economic, and social impact that green urban interventions can bring.

Keywords: meta-analysis, value transfer, property prices, green segregation, intervention impact

3. *Type of submission:* ***Abstract***

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Urban ecosystem services from an environmental justice perspective: A systematic review

First author: Amalia Calderón-Argelich

Other author(s): Francesc Baró, Isabelle Anguelovski, James Connolly, Johannes Langemeyer, Stefania Benetti

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The concept of ecosystem services (ES) has mainstreamed as an interdisciplinary framework at the interface between natural and social sciences, and it is gaining momentum in the urban sustainable development agenda. The provision of ES has a direct impact on health and well-being of urban residents and yet, with urban sustainability at the forefront, planning and management must not ignore justice implications and inclusion of urban transitions.

ES assessments in urban areas lack a comprehensive and systematic approach to justice. Thus, this article presents a systematic literature review to examine the incorporation of justice and equity in urban ES studies. More specifically, the study assessed how different dimensions of environmental justice were addressed, considering distributional, procedural and interactional/recognition justice. We have screened 150 published articles addressing ES and justice/equity, in urban and peri-urban areas. Our results reveal that most research in urban areas focus on distributional justice and green spaces. We further identify common methodologies used in such assessments, frequent types of ES examined (i.e., provisioning, regulating, supporting and cultural), main elements of the green infrastructure that have been the focus of research, and stakeholders and social groups involved in the (in)justices.

In the light of the review findings, we contend that further research and new approaches are needed in order to consider trade-offs between urban ES and potential disservices that can

have environmental justice implications. The developed review further helps to parse out the inter-connected dimensions of justice in urban ES studies and eventually to elucidate what can be the contribution of ES in the urban environmental justice scholarship.

Keywords: ecosystem services, urban, green infrastructure, environmental justice, systematic review

4. *Type of submission:* ***Abstract***

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Environmental justice and nature-based solutions in cities: A conceptual framework

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Environmental justice is an overarching concept that encompasses three broader dimensions: recognition, procedure, and distribution. It has become one of the highest aspirations in urban management, and it serves as one of the arguments to promote and justify interventions such as Nature-based solutions (NbS). These solutions are recognised for having the potential to increase the living standards of citizens while creating habitable, safer, and fairer cities through the provision of urban ecosystem services. Furthermore, environmental justice can constitute a framework to analyse the patterns that affect those who live at higher risks of environmental hazards. However, the extent to which the three environmental justice dimensions are addressed through NbS is still unknown. To address this knowledge gap, this study proposes a conceptual framework to assess how justice is conceptualised and evaluated in different typologies of NbS in cities. By using structured research and a review process, we synthesised scientific evidence on definitions and means for linking justice with NbS. To do so, first we developed a thematic coding based on four underlying themes which are a) type of solution b) the processes by which the parameters of justice are set such as context, goal, and temporal and spatial scales c) the justice criteria and their respective attributes, and finally d) how related indicators are measured and applied. Second, the proposed framework was filled with the information of the systematic review on how NbS scientific research, either explicitly or implicitly, define and examine the broader conceptualisation of justice. The results

from this study can be used to identify gaps and to suggest ways to forward improve urban planning and environmental assessment processes, by better capturing the implications for the well-being of citizens living in the present and those who will be the inhabitants of the future.

Keywords: environmental justice, nature-based solutions, human well-being

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

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Just urban transitions and the need to understand the dynamic generation of ecosystem services in cities

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In a rising urban age greening has been become one of the leading paradigms in urban planning, shaping cities around the globe. While ecosystem services assessments are becoming an important tool accompanying this process enhanced considerations of ecosystem service justice seem critically important. However, notions of justice remain widely marginal to ecosystem services informed urban planning, A major cause for the 'blind spot' on justice in ecosystem service research can be traced back to the ecological and economic legacies of the ecosystem service concept itself (Díaz et al., 2018); reproducing the normative idea to maintain natural capital as a guarantee to sustain a constant flow of ecosystem services for future generations (MA, 2005). This normative legacy prioritizes intergenerational justice over intra-generational justice (Gómez-Baggethun et al., 2010) and hampers thus a comprehensive understanding of urban greening related inequalities. Furthermore, the common (rural) conceptualization of ecosystem service flows from nature to humans insufficiently reflects the urban realm. More precisely, it overlooks the fundamental character of urban ecosystem services being co-produced by natural and human assets, and the dynamic and interlinked character of infrastructures, institutions and individual perceptions to realize those benefits (Andersson et al., 2019). Consequently, it over-emphasizes on assessing flows of ecosystem service benefits (cf. Haase et al., 2014), with an insufficient consideration of the dynamics of service providing socio-ecological structures and institutions, as well as changing

needs and wants among urban citizens with shifting priorities for ecosystem services. This conceptual paper aims at broadening the foundation for just urban transitions. The paper argues for the need of a dynamic understanding of ecosystem service generation in order to allow for just urban transitions and outlines concrete pathways for a stronger integration of justice into urban ecosystem service research and practice.

Keywords: Ecosystem Services, urban transitions, resilience, environmental justice, plural values

6. *Type of submission:* ***Abstract***

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Green walk of children to school: evaluation of welfare-related disparities in availability of green routes among children

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Promoting an active school commute in cities has become a common way to limit the negative effects of school drop off such as air pollution, noise level or traffic jams and fight the sedentary lifestyles. Especially, when it comes to children's health, the daily walk to school could be used as a basic source of physical activity. This paper aims to address the questions regarding equal possibilities of a walk to school in green surrounding by examining the welfare-related disparities in availability of green routes among children. We hypothesize that children who are members of less privileged households have less green routes to school available than other children. We concentrated on the distributive environmental justice understood as unequal availability of green surroundings during a daily walk to school among primary school pupils who live in Lodz (Poland). Instead of the commonly used approach to quantify inequalities in UGS availability, which refers to the proximity of green spaces for inhabitant locations, we propose to measure inequalities in green routes used in a daily routines such as a school-home walk. We addressed to the multiple ecosystem services, such as air purification or noise reduction, provided by the green surroundings of routes during a daily walk of children to school.

Keywords: Environmental justice; urban green spaces; children; green routes to school; GIS-based analysis

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

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Ecosystem services and socioeconomic inequalities in the Paris metropolitan region

First author: Charlotte Liotta
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While most studies on environmental justice have focused on homogenous cities, few have considered the case of a whole metropolitan region. In the case of the Paris metropolitan region, there is a huge heterogeneity in terms of economic activity between the very dense and urbanized city of Paris and the furthest suburbs, with consequences in terms of citizens' access to different Ecosystem Services (ES) provided by green spaces. In this study, we investigate the question: what are the socioeconomic characteristics of the most disadvantaged populations in terms of access to ES? We first focus on the recreational service to show how its supply is spatially related to socioeconomic characteristics of individuals. We use a spatial representation and Lorenz curves to examine the degree of spatial inequality, distinguishing between public and private green spaces. There is an overall negative correlation between median income and green spaces access, mostly due to the fact that the city of Paris, poorly endowed in green spaces, is also concentrating the richest population of the region. Some areas however, especially the northeast suburbs, combines low levels of income and a deficit of access to green spaces. It has been shown that the recreational service is closely related to mental and physical health issues, thus these populations face (at least) a double sentence. The analysis will be extended in four ways i) by considering other socio-demographic characteristics such as unemployment (imperfectly correlated to income), education or occupation ii) by analyzing other ES such as urban cooling by vegetation; iii) by estimating spatial econometric models to account for spatial autocorrelation iv) by defining a classification characterizing different groups of individuals related to their characteristics and access to different ES.

Keywords: Environmental justice, inequality, recreation service, ecosystem services

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

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Socially just urban ecosystem service governance – Perspectives from the super local scale Sofielund, Malmö, Sweden

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With climate change, the occurrence of cloudbursts will increase. It is therefore crucial that cities adapt to protect people, buildings and infrastructure. Simultaneously, the global urban population is increasing, which in many areas is combined with an ongoing densification, creating a strain on both urban water management as well as availability of urban green space. One way for cities to adapt is to work with nature-based solutions (NBS). From a municipal perspective, implementing NBS in an already developed area is challenging due to; lack of unbuilt land, private land ownership, lock-ins in relation to available ES and well as social injustice (unemployment and criminality). This paper aims to investigate different aspects of justice in relation to the perception of and attitudes to the provisions of ES, among small and large property owners in the district of Sofielund, Malmö, Sweden. The paper is based on semi-structured interviews with 20 small and large property owners, and 20 civil servants covering different sectors in the municipal administration, studies of municipal as well as locally developed plans and strategies and observation of municipal meetings. The study shows that stakeholder involvement at the super locale scale could play a key role in urban ES assessments, which could serve as a basis for the transition to both a social and climate resilient city. However, several barriers exist both within the local community as well as in the city of Malmö. Existing collaborative methods need to be strengthened by including super local perspectives into the decision-making processes to ensure fair integration of all affected groups and future strategies ES strategies have to be based on clear ethical ideas as to the distributional aspects of all types of ES, throughout the city. Based on these findings we suggest how municipalities could develop a socially just ES governance.

Keywords: Social Justice, Urban Areas, Ecosystem Service governance, Malmö, Sweden

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

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Reconceptualising formal and informal urban green spaces – classification, ecosystem services and availability to residents

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Urban green spaces (UGS) offer a variety of ecosystem services to city residents, especially recreation. Recently more attention has been given to insufficient resources of formally designated UGS, such as parks and urban forests to allow equal access to green. Also the role of neglected other forms of green – vacant lots, wastelands, brownfields and other areas referred to, as informal green spaces – has been observed. Those areas can complement the existing UGS and act as a reserve that can potentially extend the existing green infrastructure. Are the resources of informal UGS however worth the attention? We performed an analysis for two case study cities – Warsaw and Łódź, both characterized by well-developed system of UGS but of different spatial composition and configuration of the informal UGS. We reviewed classifications and nomenclature of green areas beyond the formal UGS to identify categories of both formal and informal UGS. We also analysed their features from remotely-sensed data and NDVI values which was followed by calculating the availability of formal and informal UGS in the service area of 400 m for each residential building. The results showed that Warsaw and Łódź are characterized by spatially diversified UGS availability, informal UGS being more available to the residents, especially in newly built-up areas, filling in the gaps among the formal UGS. We proposed criteria to identify the informal UGS as an outcome of the formal status, management intensity, land cover and availability to the residents. We found the division between the categories to be blurry and presenting an informal-formal gradient rather than separate UGS types. We linked our results to selected ecosystem services provided by UGS, highlighting that the informal UGS can be equally important to the formal ones and can contribute to a better access to ecosystem services from UGS.

Keywords: green infrastructure, recreation, vacant land, wastelands, service area

10. Type of submission: ***Abstract***

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

One tree for one citizen: linking green infrastructure to the mitigation of urban heat island and human health risk in Oslo, Norway

First author: Zander Venter
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The potential human health effects of global warming are magnified in cities due to the urban heat island (UHI) effect, whereby air temperatures are enhanced due to human modification of land surfaces. We hypothesized that green infrastructure such as tree canopy cover substantially reduces heat in cities, and thus health risk among elderly, who are regarded especially at risk of heat associated illness. To do this we assessed how the cover and structure of urban landscape elements impacts satellite-derived surface temperatures across Oslo, Norway, and related this to demographic data for heat-sensitive citizens. On one of the hottest days during the summer of 2018, landscape units composed of paved, midrise or lowrise buildings gave off the most heat (39ºC), whereas units composted of pure tree canopy cover, or a mixture of trees, shrubs and grasses maintained temperatures of between 29 to 32ºC. Land surface temperatures were negatively correlated to tree canopy cover (R2 = 0.45) and vegetation greenness (R2 = 0.41). In a scenario in which each city tree was replaced by the most common non-tree cover in its neighbourhood, the area of Oslo exceeding a 30ºC health risk threshold during the summer would increase from 23 to 29%. Oslo municipality has 30,581 elderly persons >75 years old (5% of population) considered at high risk for heat associated illnesses. Currently, the average city landscape exceeds the 30ºC health risk threshold on 50 days of the year. Combining modelling results with population at risk at census tract level we estimated that each tree in the city mitigates the potential risk of heat exposure for ca. one heat-sensitive person by one day. In light of climate change, the municipal accounting of UHI-mitigation services of trees for public health provides an additional argument for maintaining and restoring green infrastructure in urban planning.

Keywords: ecosystem services, heat-associated illness, landsat, remote sensing, surface temperature

11. Type of submission: ***Abstract***

B. Biome Working Group sessions B10c Advancing urban ecosystem service assessment for more inclusive and just cities

Enabling an equal accessibility to green spaces? – an example of multiple barriers Halle, Germany

First author: Manuel Wolff
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Fair distribution of the access to Green Infrastructure (GI) is a key target of green space planning in European cities as green spaces provide important benefits for local residents including air temperature cooling, public physical and mental health effects, and social cohesion as a place for encounter. However, a number of barriers hampers this accessibility. Next to size and spatial distribution of the GI, there are different physical, mental and institutional barriers, which prevent green-based Ecosystem Services (ES) from unleashing its full potential. Physical borders such as fences or streets, large distances, institutional regulations and mental (tacit) barriers impact the accessibility of GI enormously. All the listed barriers are in turn impacted by key socio-economic drivers and environmental factors but have been rarely considered when assessing the role of cultural and regulatory ES for residents.

Against this background, this paper develops a systematic approach for barriers to GIs with ES which allows to illuminate the interrelation between the actual use of green spaces, perception, institutional frame and the spatial (e.g., location and distance) and non-spatial accessibility (e.g., income, age, gender, and education). We use the city of Halle as showcase, in which we find regrowth and smart population regrowth since 2011, an increasing densification and land consumption within the inner city along with a trend towards increasing privatization of green spaces and a negative perception of public parks among residents. We will demonstrate different kinds and intensities of barriers preventing fair access to ES within GI, which are highly relevant for policy interventions, neighbourhood development and local planning solutions for building a barrier-poor or barrier-free GI.

Keywords: Ecosystem Services, Green Infrastructure, barriers, accessibility, green space planning