Bringing *the political* back in
Call for critical inter- and transdisciplinary perspectives on urban sustainable development

Christoph Clar

In this article, it is argued that recent experiences with urban sustainable development call for urban researchers to integrate the knowledge of various scientific disciplines as well as of non-scientific actors. Referring to the phenomenon green gentrification, which describes the displacement of particular social groups as a result of greening initiatives, the article discusses the contribution of political science for developing critical inter- and transdisciplinary perspectives. It addresses the particular relevance of cities for political science and illustrates how sustainable development is not only a question of technical solutions, but a deeply political issue with the potential to seriously affect social equality. It concludes that acknowledging the political dimensions of urban sustainable development would improve urban researchers' understanding of the complex interrelations between social, economic, and environmental developments. As a further consequence, it could help to develop policy and planning solutions that do not improve the ecological sustainability of cities at the cost of social justice.[1]

Urban sustainable development; Green gentrification; Socio-ecological systems; Political science; Critical urban studies.

1 The research project *The social equality of Nature-based Solutions to urban heat stress (SENSUS)* that led to this article is funded by the Vienna Science and Technology Fund (WWTF) within the Environmental Systems Research Call `Urban Regions' 2020.

Introduction: The governance of wicked problems

Urban politics is increasingly confronted with so-called *wicked problems* that resist clear definitions and predetermined solutions (Abreu/Andrade 2019). The characteristics of this type of problems are their inadequate formulation, particularly complex and often confusing information, and the multitude of actors with conflicting values and interests that are affected. A major part of urban sustainable development, the adaptation to impacts of climate change, can be regarded as wicked problem. Its long-term character, the associated uncertainties, and the large variety of affected stakeholders defies "traditional governance approaches based on issuing policies, specifying procedures and consulting stakeholders" (Dewulf/Termeer 2015: 759). This does not only challenge decision-makers and their institutional setting, but also calls for new approaches in research dealing with the governance of socio-ecological systems. Of course, political science plays a key role in understanding phenomena that entail political reactions to ecological developments. However, a thorough understanding of how urban socio-ecological systems can be governed includes much more than that, other disciplines, approaches and perspectives.

In this article, I argue that research on urban sustainable development calls for a critical perspective that combines social, economic, environmental, and political dimensions. At the beginning, the article addresses the particular relevance of cities for political science. Then, it illustrates how the adaptation to impacts of climate change through the implementation of Nature-based Solutions (NbS), such as parks, green roofs, green facades, trees, and urban forests, is a deeply political issue – which means that it is not 'simply' a question of technical solutions, but heavily determined by social and political power relations. The phenomenon of *green gentrification*, which describes the displacement of particular social groups as a result of implementing NbS, is used as example to discuss the potential contribution of critical inter- and transdisciplinary perspectives onto urban politics. In my understanding, such approaches question the status quo, examine underlying power relations within their particular historical, social and political context, and, consequently, provide inputs for a transformation of existing inequalities. The article concludes that the introduction of such perspectives could help to acknowledge the political dimensions of urban sustainable development, improve the understanding of current trends in urban sustainable development as part of broader social developments, and facilitate the develop-

ment of solutions that do not improve the ecological sustainability of cities at the cost of social justice.

Cities at the center of political science

Cities have always been of crucial interest to political science. They are the centers of political power, they bring together conflicts over the distribution of power and resources in a confined physical space, they are the breeding ground of political innovations and revolutions (Harvey 2012; Wiegand 2017). Furthermore, they can be considered as birthplace of the capitalist organization of society and the division of the earth's surface into exclusive territories, which is still the fundament of the global system of nation states (Clar 2013; Sassen 2006). All of this might suggest the importance of research on urban politics for dealing with some of *the* major questions of political science, questions regarding power relations, the distribution of resources, and social justice. Nonetheless, the study of urban politics has largely been disconnected from broader political phenomena and political science debates (Trounstine 2009: 611). For instance, in German-speaking political science, for a long time the focus remained on public policy at communities' level, so to say on what happened in the city hall. Accordingly, research on urban politics was heavily dominated by its close ties to administrative science or so-called 'Staatsrechtslehre' (Heinelt 2013). Only when the focus shifted towards systems of interactions that are bound to a specific physical and social space in general, scholars were able to include a much broader set of issues, such as struggles over the distribution of power and resources, the enforcement of interests, and social exclusion. In addition to improving the understanding of urban centers' unique set-up and position as opposed to smaller communities, this conceptual shift introduced a more inclusive perspective onto the variety of politically relevant actors and their interactions. To some extent, the latter anticipated debates regarding the governance of urban spaces. Furthermore, intersections to other disciplines became much more obvious, which led to increasing connections to various social sciences dealing with space, such as sociology, urban planning, or architecture (Heinelt 2013: 188f).

The introduction of the concept of governance can probably be regarded as one of the most crucial recent inputs to the study of urban politics:

> Broadly speaking, the term *governance* indicates "a new mode of governing that is distinct from the hierarchical control model, a more co-operative mode where state and non-state actors participate in mixed public/private networks" (Mayntz 2003: 27).

Regarding the study of urban politics, above all, it mitigated the danger of separating the analysis of policy-making from questions of power, interests, and legitimacy, inter alia through facilitating the development of the *urban regime theory* in the mid- and late-1990s (Dowding 2001; Mossberger/Stoker 2001). According research focused on an increasing variety of potentially relevant actors, changing modes of governance, and differing institutional abilities and capacities to act. Also, research dealing with metropolitan governance (Blatter 2008; Zimmermann/Heinelt 2011) and the role of cities in the context of globalization or European integration received increasing attention (Eltges 2005; Münch 2006). Finally, studies of social movements added questions of social (in-)equality and participation and, thus, a critical perspective on the seemingly apolitical development of urban spaces (Heinelt 2013; Naegler 2012). Overall, the attachment to particular traditions of political science, such as public policy analysis or comparative politics, became less relevant or at least less visible. The political implications of broader social developments did not only get increasing attention, but they also became the starting point for research on urban politics borrowing concepts and methods from various disciplines.

With respective conceptual and methodological expansions in mind, the relevance of cities for political science can be faced from two angles: The first is the focus on *the local*, this somehow politically autonomous, very particularly constituted entity, characterized by both the delimitation from and connection to its periphery (Heinelt 2013), a relatively small space, in which social relationships are exceptionally condensed and fundamental questions regarding the production, appropriation, and circulation of the social product are negotiated, a space that provides an environment for social and political experiments (Harvey 2012). Although political boundaries separating communities from each other remain a defining factor for this space, they are neither limiting local politics nor the focus of political science research (Heinelt 2013: 193). Although it is still *the local* that is at the center of attention, the underlying understanding of urban space is much more flexible and fluid. Cities take over different roles within regionally as well as globally shifting geome-

tries of power (Swyngedouw et al. 2002). Consequent shifts of competencies and responsibilities do not necessarily result in handicaps for the local level. In fact, they might even open new opportunities. This has been emphasized by studies concerning cities' role as central nodes in the networked global economy (Pain et al. 2015) or as part of world city networks (Taylor 2005), as well as scholars dealing with rescaling processes or so-called politics of scale (Brenner 2019; Bulkeley 2005; Swyngedouw 1997). This conceptualization of the urban "less as a bounded areal unit […] than as a sociospatial relation within a broader, dynamically evolving whole" (Brenner 2019: 3) leads directly to the second angle: Again, the city appears as driver of new developments, but in this case as critical part of *the global*. Urban spaces are understood as centers of the capitalist organization of society (Clar 2013; Pain et al. 2015), the places where neo-liberal capitalism and unequal development are reproduced (Harvey 2012; Naegler 2012), and the focal points of globalization and global governance – the so-called *global cities* (Michel 2017; Sassen 1991; Taylor 2005). In no way, the second angle can or should be separated from the first one. Social dynamics, power relations, and conflicts in urban spaces are both result and driver of global developments. Rather, the differentiation points to two sides of the same coin and enables us to understand a broad variety of ongoing social dynamics and the dynamic position of urban spaces therein.[2]

From the local to the global to the political

There remains no doubt that urban studies must place cities within their broader context and consider dynamics from the local right up to the global scale – and back. This dynamic and fluid approach very clearly illustrates the critical role of urban politics for political science. The most prominent attempt to develop an understanding of how the role of cities is changing in between and across these scales has been provided by Saskia Sassen. In her book *The Global City* (1991), she discusses local processes of urbanization within the context of globalization, which she specified only three years later

2 As Brenner (2000) summarizes, several urban researchers have begun to conceptualize this dynamic link between the local and the global level and everything in between. Prominent examples are Jamie Peck and Adam Tickell (1994) who examine the *local-global nexus*, Erik Swyngedouw (1992) who introduces *glocalization*, or Bob Jessop (1998) who refers to *glurbanization*.

in another book called *Cities in a World Economy* (Sassen 1994). Notwithstanding the widespread critique questioning the contribution to urban studies[3], her approach is indispensable for today's understanding of the relation between the city and globalization as part of more general transformations of space and time. Though she definitely did *not* aim at developing a new urban theory, her effort was crucial. First, it provides us with another perfect example of how to integrate perspectives from different disciplines, mainly sociology, economics, political science, and philosophy. Secondly, and even more important, it brought questions to the forefront that connect economic developments, political phenomena, and social inequality. In doing so, Sassen goes further on the path that was started by David Harvey's *Social justice and the City* (2009 [1973]; Wiegand 2017). She facilitated the development of critical urban studies, which can be regarded as major contribution of urban studies to answering *the* major questions of political science, as mentioned at the beginning of this article.

In conclusion, there are a whole lot of good reasons for integrating urban studies in political science and vice versa. Accordingly, recent inspiring approaches suggest 'to see like a city' as key to understanding modern politics (Magnusson 2011). They point out that the order of a city is always temporary and localized, and requires a political infrastructure that manages and reacts to constantly developing social patterns. Political science needs to be similarly flexible. Even the scale at which these patterns emerge are highly variable: It is not necessarily developments on a wider scale, such as the global or the national, that determine what happens locally – it might well be the other way round. To understand these developments and underlying power relations, political science needs to pay attention to the principles of transformation implicit in urbanism, which, consequently, helps to recognize that "the form of the political […] is always in transformation" (Magnusson 2011: 9). As Theresa Enright (2019: 29) argues, such a broader and more fluid understanding of urban spaces brings political science beyond its "emphasis on discrete territories, nested federal institutions, fixed political entities, formal authorities, and sovereign power" (ibid.), and allows to be more attentive to the ungovernable and the unpredictable, attune to deep uncertainty, and be aware that "the relevant political actors are not necessarily the ones we have in mind" (Magnusson 2011: 9). This expands the perspective on issues of power, sovereignty, democracy, citizenship, subjectivity, and belonging, which often

3 For an overview see: Michel (2017: 40ff.)

reaches its conceptual and analytical limits when examining challenges that ignore nation-state borders, like mass migration, climate change, or gross inequality (Boudreau 2009; Enright 2019).

Climate change impacts on urban areas – A deeply political issue

Also from an ecological and climatological perspective cities are special. Due to their population density as well as complex and interdependent infrastructures, urban population, decision-makers, and planners are and will be confronted with specific challenges (Markolf et al. 2019). For instance, recent climate observations clearly show an increasing risk of extreme weather events related to climate change, at least two of them particularly affecting urban areas. First, climate change is expected to lead to an increased frequency and intensity of extreme precipitation events (IPCC 2013). As their sewer systems are not designed to deal with that amount of water discharged, urban areas will be and already are more frequently flooded (Nilsen et al. 2011). Second, heat waves and extreme temperatures are very likely to occur more frequently in the future (IPCC 2013). Due to cities' dense building structure, high share of sealed surfaces and low share of green and blue areas, urban areas absorb and store more heat than their natural surroundings, which results in the so-called Urban Heat Island (UHI) effect (Oke 1995). Both urban flooding and UHIs are causing serious problems for urban infrastructure, health and well-being of urban citizens, and, consequently, the cities' budgets. The situation gets even more pressing as the trend to urbanization further concentrates risk in cities (Coaffee et al. 2018: 403). By 2050, 68 % of the world's population is expected to live in urban areas, compared to today's 55 % (United Nations 2018).

To deal with the increasing risk, city planners have introduced the concept of infrastructure resilience to the agenda of urban risk management (Sharifi/Yamagata 2018). A more resilient urban infrastructure is supposed to improve the anticipation of, recovery from, and adaptation to climate change-related shocks and stresses. However, the relief from impacts of climate change these adaptations are promising does not apply to all populations equally. Impacts of climate change already disproportionately affect populations who are more vulnerable (Schlosberg/Collins 2014), which is often (co-)determined by demographic factors, such as socioeconomic status, age, migratory background, gender, and education (Clar 2019). If urban sustainable development

aims at increasing resilience without considering questions of *social justice* (Coaffee et al. 2018; Ziervogel et al. 2017) and *climate justice* (Patterson et al. 2018; Schlosberg/Collins 2014; Thaler/Hartmann 2016), it threatens to exacerbate this problem instead of mitigating it. Residents who already are more vulnerable are forced into even more ecologically and socially vulnerable circumstances.

Blind spots of urban resilience and sustainability research

Urban resilience scholars are supposed to examine those interactions of social, ecological, and physical systems, and their findings are supposed to be translated into action agendas for cities (Connolly 2018). As long as they fail to capture preexisting inequities within society (Coaffee et al. 2018: 403), their contribution to urban sustainable development only strengthens the present focus on environmental aspects, which often covers social issues, such as social vulnerabilities (Pearsall/Pierce 2010), affordability issues (Checker 2011), and the possible displacement or exclusion of economically vulnerable populations (Anguelovski et al. 2018a; Dooling 2009).

In recent years, sustainability initiatives are thriving especially in urban areas in North America and Europe (Anguelovski et al. 2018b; Pearsall 2018). Besides their obvious goal to increase resilience, they are primarily market-driven (Connolly 2018) and often push lower income populations to the margins of metropolitan regions (Haase et al. 2017). As a result, we see an increase of already existing social inequalities without an increase of resilience for the most vulnerable groups. Political efforts in support of these initiatives may serve to manifest or even exacerbate those inequalities, no matter if intentionally or not (Anguelovski et al. 2018a; Blok 2020; Dooling 2009; Goosens et al. 2019; Haase et al. 2017). This makes the planning, development, and implementation of sustainability initiatives a deeply political issue and, thus, a subject of key interest for political science.

A growing number of studies has investigated impacts of climate change on urban regions and how Nature-based Solutions (NbS) as part of urban sustainable development support climate resilience. However, research that aims to improve the understanding of social implications, such as gentrification tendencies resulting from the implementation of NbS, must connect and integrate social and ecological dimensions. This calls for a systemic perspective on the urban environment in both theory and practice that is currently still underdeveloped (Virapongse et al. 2016).

Based on a brief overview of the phenomenon *green gentrification*, with the goal of carving out its politically relevant dimensions, the following paragraphs illustrate the potential benefits of an interdisciplinary perspective in this regard, followed by a few thoughts on the potential contribution of transdisciplinary approaches.

Green gentrification and its political dimensions

In many ways, the implementation of NbS, such as parks, green roofs, green facades, trees, and urban forests, is presented as ideal for the sustainable development of cities that are confronted with various impacts of climate change. NbS hold many advantages over technical approaches. They address various impacts of climate change at once, including urban heat islands (Berardi et al. 2014; Rizwan et al. 2008), urban floods (Frantzeskaki 2019; Zölch et al. 2017), and loss of biodiversity (MacKinnon et al. 2019; Xie/Bulkeley 2020), improve physical and psychological health of urban residents (Anguelovski et al. 2018a: 458; Cole et al. 2017, 2019; MacKinnon et al. 2019) and increase the attractiveness of cities (Haase et al. 2017; Raymond et al. 2017). In addition, several political and economic characteristics as well as their public appeal make them appear as attractive solutions (Clar/Steurer 2021). However, it might be exactly this merely positive perception of NbS as win-win- or no-regret-adaptation measures that hides the fact that their development and implementation often neglect questions of social equality (Kabisch et al. 2016; Swyngedouw 2007a) and might even result in non-intended side effects and trade-offs, such as *green gentrification* (Checker 2011; Meishar 2018; Rigolon/Németh 2019).

As David Harvey (2008: 34) puts it, gentrification can be defined as the capitalist "accumulation by dispossession [… of] low-income populations" (ibid). In a nutshell, this means that lower income residents are displaced, and the neighborhood undergoes a major socio-cultural transition (Meishar 2018). A few studies have already proven that urban greening agendas and interventions can result in these dynamics (Anguelovski et al. 2018b; Rigolon/Németh 2018). Already marginalized groups, people with a lower socio-economic background, inhabitants with a migratory background, residents with disabilities or at older age, are supposed to be the beneficiaries of NbS, because they are often particularly vulnerable to impacts of climate change, such as urban heat (Hansen et al. 2013). Almost ironically,

the implementation of NbS causes their displacement and, thus, costs them the chance to benefit from them (Dooling 2009; Ernstson 2013).

Many scholars argue that green interventions in the urban space are usually "accompanied by a clearly articulated strategy for attracting commercial and residential investments and bringing in more socially- and ethnically privileged residents" (Anguelovski et al. 2018b: 1065). However, even if gentrification happens accidentally in the wake of espousing an environmental ethic or agenda (Alkon/Cadji 2018; Checker 2011; Dooling 2009), it is a deeply political issue because it reflects and reproduces social inequalities. In addition to exacerbating existing economic conflicts and social exclusion, this raises the question of who can influence and benefit from the re-design of urban space (Groffman et al. 2017). In this regard, studies that identified gentrification not only as economic phenomenon, but also as a question of racialization, show that green interventions create enclaves of environmental privilege, which poses serious problems for already marginalized groups (Alkon/Cadji 2018; Anguelovski et al. 2018b).

However, in "an urban post-political arrangement […] that has replaced debate, disagreement and dissensus with a series of technologies of governing that fuse around consensus, agreement, and technocratic management" (Swyngedouw 2007b: 58) political dimensions like these are largely ignored. Usually, interrelations between social and ecological dynamics do not even make it onto the agenda of policymaking processes. Social equity remains subordinate to greening, the provision of NbS is presented as part of politically neutral sustainability policies. The term *sustainability* is understood in a purely ecological sense and "reduced to a vehicle for promoting a green lifestyle that appeals only to wealthy, eco-conscious residents and adopts a technocratic approach to environmental problems" (Anguelovski et al. 2018a: 462). Consequently, it is one major task of critical urban scholars to highlight the social-ecological underpinnings of green infrastructure planning and to bring *the political* back into environmental urban studies to avoid or reverse an a- or post-political approach to urban sustainability (Checker 2011; Keil/Whitehead 2012; Swyngedouw 2007a, 2010). According to Anguelovski et al. (2018b: 1072) this would include a demystification of greening as public good that is equally accessible for all, uncovering dispossession, green accumulation, and financialized urban development, as well as a diversified examination of health and wellbeing outcomes – in relation to differences in terms of demographic background (Cole et al. 2019). In this way, sustainability-discourses would be less successful in sidelining "questions of real

political inclusion and justice in the name of technocratic, community-based deliberation" (Checker 2011: 225). Or even better, it would help to open doors for the imagination of, fight over and construction of new urban space(s), integrating socio-economic and ecological thoughts in long-term oriented planning and research perspectives (Checker 2011; Swyngedouw 2009).

As Swyngedouw (2007a) mentions, discourses and practices framing NbS as win-win-solutions and sustainable development as purely ecologic endeavor "erode possibilities for real politics [the consideration of social impacts, the integration of social differences etc.; note] through postpolitical and postdemocratic tendencies" (Anguelovski 2015: 31). Consequently, in addition to uncovering those tendencies theoretically, a critical perspective on the decision-making processes surrounding the development and implementation of NbS brings back in *the political* also because it provides inputs for actors who are politically responsible for urban development. These inputs address not exclusively but in particular governmental actors who are encouraged to consider both the environmental and social consequences of greening initiatives, simply because they "are the only ones within these (opaque) ensembles who are elected and thus have a responsibility to the wider public" (Goosens et al. 2019: 19f). Political science is best equipped to introduce this critical perspective onto the social consequences of greening initiatives to urban studies.

Interdisciplinary and transdisciplinary perspectives on nature-based solutions for the adaptation to climate change

However, research about political efforts to implement NbS in urban areas must consider a wide range of contexts and dynamics. Without a deeper understanding of ecological phenomena, the technical functionality of possible solutions as well as the political economy of drivers in the background, it is impossible to assess the different perceptions of risk, vulnerability, and resilience among the involved actors and examine decision-making within the complex inter-agency and planning configurations of a city (Shokry et al. 2020). This requires a perspective that is open to knowledge and expertise from various disciplines inside and outside of academia. Accordingly, the following paragraphs suggest entry points for different scientific disciplines and interdisciplinary cooperation, before the additional benefits of transdisciplinary approaches are discussed.

First, political science enables urban studies to critically look at the different consequences of urban greening for different groups and actors, to identify related dynamics of exclusion, oppression, marginalization, and, overall, to uncover the socio-political context of framing urban greening as being "good for everyone" (Anguelovski et al. 2018b: 1081). However, to understand how the implementation of green solutions impact socially vulnerable neighborhoods and their residents requires an understanding of how the whole setting, including the built environment, is perceived and used differently (Anguelovski et al. 2018a). This calls for an input of *urban planning* scholars, sometimes also *architects* and *technicians* regarding the specific effects of constructions, buildings, and their design. Second, the call for the consideration of economic dynamics suggests the integration of *economic sciences*. According to Haase et al. (2017: 46), "even when the focus is on environmental issues, research should explicitly look at the political and economic context and related power constellations to avoid underestimating the embeddedness of greening into market-oriented strategies and pay more attention to ambivalences and trade-offs". However, it is not only soaring costs following greening initiatives that increase displacement pressures. This also applies to social and cultural changes, for instance through a loss of a sense of place for particular groups of residents (Goosens et al. 2019; Shokry et al. 2020). This suggests a cooperation with *social and* in particular *environmental psychology, sociology* (urban sociology, sociology of social inequalities, sociology of space), and also *critical geography*, which helps to understand and expose practices that transform urban environments, produce new forms of socio-spatial control, and, in this way, contribute to the (re)production of social inequalities (Anguelovski 2015). On a micro level, sociology and social psychology might additionally help to pay attention to individual strategies and adaptation behavior of residents to resist impacts of gentrification (ibid.). This brings us directly to the input of *social movement studies*, which improve the understanding of how individuals and actors organize with the same intent, namely of resisting impacts of gentrification (Anguelovski et al. 2018b). Another important option for interdisciplinary cooperation is pointed out by Cole et al. (2017: 1118), who argue that "the health benefits of greening can only be fully understood relative to the social and political environments in which inequities persist." Accordingly, political science scholars deal with NbS policies and how they are supposed to improve the health of residents in an equitable and sustainable way, while *medicine and health studies* are in the position to assess their actual outcome and impact on different groups.

Following these spotlights on various collaborations, it is necessary to mention that a critical perspective on NbS, informed by those and other disciplines, is not only meant to identify and criticize (potential) negative impacts. It also directs the attention to often neglected windows of opportunity, which open up in the process of fighting for and negotiating new forms and functions of public space (Checker 2011; Swyngedouw 2009).

However, if new ideas are supposed to oppose adverse effects of NbS on marginalized groups, urban sustainable development must seriously discuss how to reflect and integrate those groups' demands and interests. In this regard, advocates of participatory research argue in favor of a transdisciplinary perspective, in which the involvement of local and non-scientific knowledge leads to better informed decisions, enables social learning, and, thus, fosters more "ecologically rational" and sustainable decisions (Newig/Fritsch 2009: 205). In addition, it is supposed to increase the acceptance and decrease societal opposition, which improves the compliance with the final decisions and, thus, leads to better outcomes and impacts (ibid.: 200). A transdisciplinary approach includes practitioners or extra-scientific actors in the joint generation of knowledge by different academic disciplines – with the goal of solving societal (Jahn et al. 2012) or "real-world" problems (Klein et al. 2001: 4). In sustainability or climate change adaptation planning, this includes the identification of vulnerabilities, refinement of research questions, design of the research approach, collection of data, and formulation of conclusions and following recommendations (Scherhaufer/Grüneis 2014). Ideally, this would reduce sustainability initiatives' risk of being used to couch the provision of NbS as politically neutral goal (Anguelovski et al. 2018a) while increasing the chance of social inequalities being considered (Anguelovski 2018b). However, urban researchers have to acknowledge that the knowledge and especially the decision of *who is integrated how* into the generation of knowledge is a political act: It is connected with societal values and runs the risk of reproducing existing social inequalities, which applies in particular to the integration of marginalized groups who often lack access to those processes – while in addition scholars often lack access to marginalized groups.

Conclusion: Critical inter- and transdisciplinary perspectives on urban sustainable development

The increasing presence of wicked problems in urban politics also increases the demand of research on urban sustainable development to deal with complex interconnections of social and ecological developments, such as the rapidly growing population of cities and impacts of climate change. Green gentrification, a result of attempts to respond to these developments, is a perfect example for a phenomenon, in which a variety of aspects are interconnected. To unveil those interconnections and understand, inter alia, the displacement of economically vulnerable populations, the exclusion of marginalized groups, or the loss of social and cultural diversity as a result of greening initiatives, this article suggests the development of inter- and transdisciplinary research perspectives. It concludes that the equal integration of various disciplinary angels as well as non-scientific knowledge is indispensable for uncovering *the political* of seemingly apolitical environmental policies (Meishar 2018: 65; Checker 2011).

Greening initiatives are a deeply political issue because they reproduce social inequalities while political efforts in support do not seem to oppose those tendencies. Political science theories and methods help to understand underlying power relations and grasp the political dimensions. However, the identification of political dynamics is impossible without an understanding of interrelations between natural, technical, and social dynamics. For instance, if the actual distribution of hot spots, in the true sense of the word, across the city suggests focusing on other areas than major greening projects are located in, or if spatial planning experts would prioritize different types of measures (e.g. space for urban wildlife instead of an upgrade of sports facilities), it is worth questioning the status quo of underlying decision-making procedures. It raises questions when a city government frames a new green space as major contribution to adapting the city to urban heat islands, while in fact its development, first, does not target one of the areas that have been identified as the city's most vulnerable, second, channels resources away from more pressing hot spots, third, only relocates the problem within the city's boundaries, and fourth, does not consider the demands of the directly affected residents. The questions concern the democratic quality of the decision-making process (e.g., Who has been involved in the decision-making? What groups are represented in decision-making? How are they represented? Who decides about their involvement?), political priorities and responsibili-

ties (e.g., Who has made the decision? Based on what knowledge? How is the decision justified?), economic interests (e.g., Who benefits from an upgrade of the neighborhood? Who benefits from an associated increase in real estate values in the area?), to name just a few.

The fact that green gentrification happens in urban regions allows to grasp as many details as possible of these complex situations within the constantly developing, fluid space of a city and nonetheless embed them within their global context and broader social developments (Blok 2020), above all the neo-liberalization of urban policy (Brenner/Theodore 2002; Peck/Tickell 2002). Only in close cooperation with other disciplines and non-scientific knowledge, political science can inform a more just sustainable development of urban regions – a development that aims at a balance of social and ecological sustainability.

References

Abreu, Mônica Cavalcanti Sá de/Andrade, Raphael de Jesus Campos de (2019): Dealing with wicked problems in socio-ecological systems affected by industrial disasters: A framework for collaborative and adaptive governance, in: Science of the Total Environment 694, p. 133700.

Alkon, Alison Hope/Cadji, Josh (2018): Sowing seeds of displacement: Gentrification and food justice in Oakland, CA, in: International Journal of Urban and Regional Research 44/1, pp. 108-123.

Anguelovski, Isabelle (2015): From Toxic Sites to Parks as (Green) LULUs? New Challenges of Inequity, Privilege, Gentrification, and Exclusion for Urban Environmental Justice, in: Journal of Planning Literature 31/1, pp. 23-36.

Anguelovski, Isabelle/Connolly, James J.T./Masip, Laia/Pearsall, Hamil (2018a): Assessing green gentrification in historically disenfranchised neighborhoods: a longitudinal and spatial analysis of Barcelona, in: Urban Geography 39/3, pp. 458-491.

Anguelovski, Isabelle/Connolly, James J.T./Garcia-Lamarca, Melissa/Cole, Helen/Persall, Hamil (2018b): New scholarly pathways on green gentrification: What does the urban 'green turn' mean and where is it going?, in: Progress in Human Geography 43/6, pp. 1064-1086

Berardi, Umberto/GhaffarianHoseini, AmirHosein/GhaffarianHoseini, Amir (2014): State-of-the-art analysis of the environmental benefits of green roofs, in: Applied Energy 115, pp. 411-428.

Blatter, Joachim (2008): Metropolitan Governance. Theoretische Formen, vielfältige Reformen und der aktuelle Nivellierungsdruck in deutschen Großstadtregione, in: Hubert Heinelt/Angelika Vetter (Eds.), Lokale Politikforschung heute, Wiesbaden: VS Verlag für Sozialforschung, pp. 127-164.

Blok, Anders (2020): Urban green gentrification in an unequal world of climate change, in: Urban Studies 57/14, pp. 2803-2816.

Boudreau, Julie-Anne/Nathalie Boucher/Marilena Liguori (2009): Taking the bus daily and demonstrating on Sunday: Reflections on the formation of political subjectivity in an urban world, in: City 13/2-3, pp. 336-346.

Brenner, Neil (2000): The urban question as a scale question: Reflections on Henri Lefebvre, Urban Theory, and the Politics of Scale, in: International Journal of Urban and Regional Research 24/2, pp. 361-378.

Brenner, Neil (2019): New urban spaces. Urban theory and the scale question, New York: Oxford University Press.

Brenner, Neil/Theodore, Nik (Eds.) (2002): Spaces of Neoliberalism. Urban Restructuring in North America and Western Europe, Oxford: Blackwell.

Bulkeley, Harriet (2005): Reconfiguring environmental governance: Towards a politics of scales and networks, in: Political Geography 24, pp. 875-902.

Checker, Melissa (2011): Wiped out by the "Greenwave": Environmental gentrification and the paradoxical politics of urban sustainability, in: City & Society 23/2, pp. 210-229.

Clar, Christoph (2013): Kapitalismus und Raum. Die Territorialität kapitalistischer Gesellschaft, Wien: Wiener Verlag für Sozialforschung.

Clar, Christoph (2019): How demographic developments determine the management of hydro-meteorological hazard risks in rural communities: The linkages between demographic and natural hazards research, in: WIREs Water 6/6, e1378.

Clar, Christoph/Steurer, Reinhard (2021): Climate change adaptation with green roofs: Instrument choice and facilitating factors in urban areas, in: Journal of Urban Affairs, pp. 1-18.

Coaffee, Jon/Therrien, Marie-Christine/Chelleri Lorenzo/Henstra, Daniel/Aldrich, Daniel P./Mitchell, Carrie L./Tsenkova, Sasha/Rigaud, Éric (2018): Urban resilience implementation: A policy challenge and research agenda for the 21st century, in: Journal of Contingencies and Crisis Management 26/3, pp. 403-410.

Cole, Helen V. S./Lamarca, Melisa Garcia/Connolly, James J. T./Anguelovski, Isabelle (2017): Are green cities healthy and equitable? Unpacking the re-

lationship between health, green space and gentrification, in: Journal of Epidemology & Community Health 71/11, pp. 1118-1121.

Cole, Helen V. S./Triguero-Masa, Margarita/Connolly, James J. T./Anguelovski, Isabelle (2019): Determining the health benefits of green space: Does gentrification matter?, in: Health & Place 57, pp. 1-11.

Connolly, James J. T. (2018): From Systems Thinking to Systemic Action: Social Vulnerability and the Institutional Challenge of Urban Resilience, in: City & Community 17/1, pp. 8-11.

Dewulf, Art/Termeer, Catrien (2015): Governing the future? The potential of adaptive delta management to contribute to governance capabilities for dealing with the wicked problem of climate change adaptation, in: Journal of Water and Climate Change 6/4, pp. 759-771.

Dooling, Sarah (2009): Ecological gentrification: A research agenda exploring justice in the city, in: International Journal of Urban and Regional Research 33/3, pp. 621-639.

Dowding, Keith (2001): Explaining Urban Regimes, in: International Journal of Urban and Regional Research 25/1, pp. 7-18.

Eltges, Markus (2005): Städte und Europäische Strukturpolitik, in: Raumforschung und Raumordnung 2, pp. 135-141.

Enright, Theresa (2019): Beyond Comparison in Urban Politics and Policy Analysis, in: Political Science & Politics 53/1, pp. 29-32.

Ernstson, Henrik (2013): The social production of ecosystem services: A framework for studying environmental justice and ecological complexity in urbanized landscapes, in: Landscape and Urban Planning 109/1, pp. 7-17.

Frantzeskaki, Niki (2019): Seven lessons for planning nature-based solutions in cities, in: Environmental Science & Policy 93, pp. 101-111.

Goosens, Cedric/Oosterlynck, Stijn/Bradt, Lieve (2019): Livable streets? Green gentrification and the displacement of longtime residents in Ghent, Belgium, in: Urban Geography 41/4, pp. 550-572.

Groffman, Peter M./Avolio, Meghan/Cavender-Bares, Jeannine/Bettez, Neil D./Grove, J. Morgan/Hall, Sharon J./Hobbie, Sarah E./Larson, Kelli L./Lerman, Susannah B./Locke, Dexter H./Heffernan, James B./Morse, Jennifer L./Neill, Christopher/Nelson, Kristen C./O'Neil-Dunne, Jarlath/Pataki, Diane E./Polsky, Colin/Chowdhury, Rinku Roy/Trammell Tara L. E. (2017): Ecological homogenization of residential macrosystems, in: Nature Ecology & Evolution 1, 0191.

Haase, Dagmar/Kabisch, Sigrun/Haase, Annegret/Andersson, Erik/Banzhaf, Ellen/Bar, Francesc/Brenck, Miriam/Fischer, Leonie K./Frantzeskaki,

Niki/Kabisch, Nadja/Krellenberg Kerstin/Kremer, Peleg/Kronenberg, Jakub/ Larondelle, Neele/Mathey, Juliane/Pauleit, Stephan/Ring, Irene/ Rink, Dieter/Schwarz, Nina/Wolff, Manuel (2017): Greening cities – To be socially inclusive? About the alleged paradox of society and ecology in cities, in: Habitat International 64, pp. 41-48.

Hansen, Alana/Bi, Linda/Saniotis, Arthur/Nitschke, Monika (2013): Vulnerability to extreme heat and climate change: is ethnicity a factor?, in: Global Health Action 6/1, 21364.

Harvey, David (2008). The Right to the City, in: New Left Review 53, pp. 23-40.

Harvey, David (2009[1973]): Social Justice and the City, Revised Edition, Athens/London: The University of Georgia Press.

Harvey, David (2012): Rebel cities. From the right to the city to the urban revolution, London/New York: Verso.

Heinelt, Hubert (2013): Stadt in der lokalen Politikforschung, in: Harald A. Mieg/Christoph Heyl (Eds.), Stadt. Ein interdisziplinäres Handbuch, Stuttgart/Weimar: Verlag J.B. Metzler, pp. 185-198.

IPCC, Intergovernmental Panel on Climate Change (2013): Climate change 2013. The physical science basis, Working Group I contribution to the Fifth Assessment Report of the IPCC, Cambridge: Cambridge University Press, https://www.ipcc.ch/report/ar5/wg1/ [2/16/2021].

Jahn, Thomas/Bergmann, Matthias/Keil, Florian (2012): Transdisciplinarity, in: Ecological Economics 79, pp. 1-10.

Jessop, Bob (1998): Globalization and its (il)logic(s), in: Kris Olds (Ed.), Globalization and the Asia-Pacific, London: Routledge, pp. 35-54.

Kabisch, Nadja/Frantzeskaki, Niki/Pauleit, Stephan/Naumann, Sandra/ Davis, McKenna/Artmann, Martina/Haase, Dagmar/Knapp, Sonja/Korn, Horst/Stadler, Jutta/Zaunberger, Karin/Bonn, Aletta (2016): Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action, in: Ecology and Society 21/2, pp. 39.

Keil, Roger/Whitehead, Mark (2012): Urban politics and sustainability, in: Peter John/Karen Mossberger/Susan E. Clarke (Eds.), Oxford Handbook of Urban Politics, Oxford: Oxford University Press, pp. 520-540.

Klein, Julie Thompson/Häberli, Rudolf/Scholz, Roland W./Grossenbacher-Mansuy, Walter/Bill, Alain/Welti, Myrtha (2001): Transdisciplinarity: Joint Problem Solving among science, technology, and society. An effective way for managing complexity, Basel: Birkhäuser Verlag.

MacKinnon, Kathy/Ham, Chantal van/Reilly, Kate/Hopkins, Jo (2019): Nature-Based Solutions and Protected Areas to Improve Urban Biodiversity and Health, in: Melissa R. Marselle/Jutta Stadler/Horst Korn/Katherine N. Irvine/Aletta Bonn (Eds.), Biodiversity and health in the face of climate change, Cham, Switzerland: Springer Open, pp. 363-380.

Magnusson, Warren (2011): Politics of urbanism. Seeing like a city, London/New York: Routledge.

Markolf, Samuel A./Hoehne, Christopher/Fraser, Andrew/Chester, Mikhail V./Underwood, B. Shane (2019): Transportation resilience to climate change and extreme weather events – Beyond risk and robustness, in: Transport Policy 74, pp. 174-186.

Mayntz, Renate (2003): New challenges to governance theory, in: Henrik P. Bang (Ed.), Governance as social and political communication, Manchester, UK: Manchester University Press, pp. 27-40.

Meishar, Naama (2018): The social aftermaths of landscape architecture: Urban parks and green gentrification, SPOOL 5/2, pp. 63-76.

Michel, Boris (2017): Saskia Sassen; The Global City, in: Frank Eckhardt (Ed.), Schlüsselwerke der Stadtforschung, Wiesbaden: Springer VS, pp. 31-45.

Mossberger, Karen/Stoker, Gerry (2001): The Evolution of Urban Regime Theory. The Challenge of Conceptualization, in: Urban Affairs Review 36/6, pp. 810-835.

Münch, Claudia (2006): Emanzipation der lokalen Ebene? Kommunen auf dem Weg nach Europa, Wiesbaden: VS Verlag.

Naegler, Laura (2012): Urbanität und Protest. Neue Herausforderungen der Stadt- und Bewegungsforschung, in: Forschungsjournal Soziale Bewegungen 25/3, pp. 121-126.

Newig, Jens/Fritsch, Olvier (2009): Environmental Governance: Participatory, Multi-Level – and Effective?, in: Environmental Policy and Governance 19, pp. 197-214.

Nilsen, Vegard/Lier, Janet A./Bjerkholt, Jarle/Lindholm, Oddvar (2011): Analysing urban floods and combined sewer overflows in a changing climate, in: Journal of Water and Climate Change 2/4, pp. 260-271.

Oke, Tim R. (1995): The heat island of the urban boundary layer: Characteristics, causes and effects, in: Jack E. Cermak/Alan G. Davenport/Erich J. Plate/Comingos X. Viegas (Eds.), Wind climate in cities, Dordrecht: Springer, pp. 81-107.

Pain, Kathy/Van Hamme, Gilles/Vinciguerra, Sandra/David, Quentin (2015): Global networks, cities and economic performance: Observations from

an analysis of cities in Europe and the USA, in: Urban Studies 53/6, pp. 1137-1161.

Patterson, James J./Thaler, Thomas/Hoffmann, Matthew/Hughes, Sara/Oels, Angela/Chu, Eric/Mert, Aysem/Huitema, Dave/Burch, Sarah/Jordan, Andrew (2018): Political feasibility of 1.5°C societal transformations: the role of social justice, in: Current Opinion in Environmental Sustainability 31, pp. 1-9.

Pearsall, Hamil (2018): New directions in urban environmental/green gentrification research, in: Loretta Lees/Marting Philips (Eds.), Handbook of gentrification studies, Cheltenham/Northhampton: Edward Elgar Publishing, pp. 329-345.

Pearsall, Hamil/Pierce, Joseph (2010): Urban sustainability and environmental justice: Evaluating the linkages in public planning/policy discourse, in: Local Environment 15/6, pp. 569-580.

Peck, Jamie/Tickell, Adam (1994): Searching for a new institutional fix: the after-Fordist crisis and the global-local disorder, in: Ash Amin (Ed.), Post-Fordism: A reader, Oxford, UK/Malden, Massachusetts: Blackwell, pp. 280-315.

Peck, Jamie/Tickell, Adam (2002): Neoliberalizing Space, in: Antipode 34/3, pp. 380-404.

Raymond, Christopher M./Frantzeskaki, Niki/Kabisch, Nadja/Berry, Pam/Breil Margaretha/Nita, Mihai Razvan/Geneletti, Davide/Calfapietra, Carlo (2017): A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas, in: Environmental Science and Policy 77, pp. 15-24.

Rigolon, Alessandro/Németh, Jeremy (2018): Toward a socioecological model of gentrification: How people, place, and policy shape neighborhood Change, in: Journal of Urban Affairs 41/7, pp. 887-909.

Rigolon, Alessandro/Németh, Jeremy (2019): Green gentrification or 'just green enough': Do park location, size and function affect whether a place gentrifies or not?, in: Urban Studies 57/2, pp. 402-420.

Rizwan, Ahmed Memon/Dennis, Leung Y.C./Liu, Chunho (2008): A review on the generation, determination and mitigation of urban heat island, in: Journal of Environmental Sciences 20/1, pp. 120-128.

Sassen, Saskia (1991): The global city: New York/London/Tokyo, Princeton: Princeton University Press.

Sassen, Saskia (1994): Cities in a world economy, Thousand Oaks: Pine Forge Press.

Sassen, Saskia (2006): Territory, authority, rights: From medieval to global assemblages, Princeton: Princeton University Press.

Scherhaufer, Patrick/Grüneis, Heideline (2014): Herausforderungen und Grenzen partizipativer Projektarbeit – Zwei Beispiele aus der transdisziplinären Klimawandelanpassungsforschung und erste Lösungsansätze, in: Umweltpsychologie 18/2, pp. 189-210.

Schlosberg, David/Collins, Lisette B. (2014): From environmental to climate justice: climate change and the discourse of environmental justice, in: WIREs Climate Change 5, pp. 359-374.

Shokry, Galia/Connolly, James J. T./Anguelovski, Isabelle (2020): Understanding climate gentrification and shifting landscapes of protection and vulnerability in green resilient Philadelphia, in: Urban Climate 31, p. 100539.

Sharifi, Ayyoob/Yamagata, Yoshiki (2018): Resilience-Oriented Urban Planning, in: Yoshiki Yamagata/Ayyoob Sharifi (Eds), Resilience-Oriented Urban Planning. Theoretical and Empirical Insights, Cham: Springer, pp. 3-27.

Swyngedouw, Erik (1992): The Mammon quest: 'glocalisation', interspatial competition and the monetary order: the construction of new scales, in: Mick Dunford/Griforio Kafkalas (Eds.), Cities and regions in the new Europe, London: Belhaven Press, pp. 39-67.

Swyngedouw, Erik (1997): Neither Global nor Local: 'Glocalization' and the Politics of Scale, in: Kevin Cox (Ed.), Spaces of Globalization, New York: Guilford Press, p. 137-166.

Swyngedouw, Erik (2007a): Impossible sustainability and the postpolitical condition, in: Rob Krueger/David C. Gibbs (Eds.), The Sustainable Development Paradox: Urban Political Economy in the United States and Europe, New York: Guilford Press, pp. 13-40.

Swyngedouw, Erik (2007b): The Post-Political City, in: BAVO (Ed.), Urban Politics Now: re-imagining democracy in the neoliberal city, Reflect Series #06, Rotterdam: Netherland Architecture Institute (NAi)-Publishers: pp. 58-77.

Swyngedouw, Erik (2009): The antinomies of the postpolitical city:In search of a democratic politics of environmental production, in: International Journal of Urban and Regional Research 33/3, pp. 601-620.

Swyngedouw, Erik/Page, Ben/Kaïka, Maria (2002): Sustainability and Policy Innovation in a Multi-level Context: Crosscutting Issues in the Water Sector, in: Hubert Heinelt/Panagiotis Getimis/Grigoris Kafkalas/Randall

Smith/Erik Swyngedouw (Eds.): Participatory Governance in Multilevel Context. Wiesbaden: VS Verlag, pp. 107-131.

Taylor, Peter J. (2005): New political geographies: Global civil society and global governance through world city networks, in: Political Geography 24/6, pp. 703-730.

Thaler, Thomas/Hartmann, Thomas (2016): Justice and flood risk management: reflecting on different approaches to distribute and allocate flood risk management in Europe, in: Natural Hazards 83/1, pp. 129-147.

Trounstine, Jessica (2009): All Politics Is Local: The Reemergence of the Study of City Politics, in: Perspectives on Politics 7/3, pp. 611-618.

United Nations (2018): 68 % of the world population projected to live in urban areas by 2050, says UN, https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html [12/16/2020].

Virapongse, Arika/Brooks, Samantha/Metcalf, Elizabeth Covelli/Zedalis, Morgan/Gosz, Jim/Kliskey, Andrew/Alessa, Lilian (2016): A social-ecological systems approach for environmental management, Journal of Environmental Management 178, pp. 83-91.

Wiegand, Felix (2017): David Harvey: Social Justice and the City, in: Frank Eckhardt (Ed.), Schlüsselwerke der Stadtforschung, Wiesbaden: Springer VS, pp. 221-237.

Xie, Linjun/Bulkeley, Harriet (2020): Nature-based solutions for urban biodiversity governance, in: Environmental Science & Policy 110, pp. 77-87.

Ziervogel, Gina/Pelling, Mark/Cartwright, Anton/Chu, Eric/Deshpande, Tanvi/Harris, Leila/Hyams, Keith/Kaunda, Jean/Klaus, Benjamin/Michael, Kavya/Pasquini, Lorena/Pharoah, Robyn/Rodina, Lucy/Scott, Dianne/Zwe, Patricia (2017): Inserting rights and justice into urban resilience: a focus on everyday risk, in: Environment and Urbanization 29/1, pp. 123-138.

Zimmermann, Karsten/Heinelt, Hubert (2011): Metropolitan Governance in Deutschland. Regieren in Ballungsräumen und neue Formen politischer Steuerung, Wiesbaden: VS Verlag für Sozialwissenschaften.

Zölch, Teresa/Henze, Lisa/Keilholz, Patrick/Pauleit, Stephan (2017): Regulating urban surface runoff through nature-based solutions – An assessment at the micro-scale, in: Environmental Research 157, pp. 135-144.