

The eco-social nexus in urban climate transitions

Jeroen van der Heijden

Introduction

Urbanisation has been instrumental in bringing about human prosperity (Taylor, 2013). However, there are significant challenges associated with urbanisation in general and cities in particular, including deterioration of the natural environment, growing social inequalities and declining physical and mental well-being (van der Heijden et al, 2019). To address these problems, city planners, architects, policy makers and other stakeholders have employed planning, design and state-of-the-art technologies since the early 1900s, resulting in various urban planning paradigms from the ‘sanitary city’ to ‘eco-urbanism’ (Pickett et al, 2011; Sharifi, 2016) – the former urban planning paradigm aims to create cities that maximise economic efficiency and productivity, while the latter seeks to address the challenges posed by climate change and resource constraints in urban areas.

Scholars have studied the effects of cities and urbanisation on human well-being and planetary well-being, with early urban scholarship focusing on *urban segregation* and *urban inequalities* (see, for example, Jacobs, 1961; van Eijk, 2010). Recently, scholars have shifted their attention to the role of cities and urban regions in the global climate crisis. Initially, they presented cities and urban regions as a central cause and victim of the climate crisis (see, for example, Bulkeley and Betsill, 2003). Later, they began mapping the innovative technological, economical and behavioural climate actions taken at the local, regional and global levels by cities and urban regions, as well as the regional and global collaborations cities and urban regions are involved in (see, for example, van der Heijden, 2014; Westman and Castán Broto, 2018).

More recently, scholars have turned their attention to the eco-social dimension of urban climate transitions, which encompasses both the social and ecological dimensions of cities and urban regions (also termed the ‘social-ecological’ or ‘socio-ecological’ dimension in this literature). They argue that not all citizens and cities benefit equally from the innovations and actions that drive urban climate transitions, and that the ecological and social

dimensions of urban climate transitions must be integrated in both theory and practice (Frank et al, 2017). Failure to integrate the two dimensions could result in missed synergies and sub-optimal urban climate transitions (Gough, 2017; Berghauser Pont et al, 2022).

This chapter seeks to review the literature on the eco-social nexus in urban climate transitions in four sections. In the first, it provides a brief overview of the ecological and social challenges of modern cities and urban regions. In a next step, it summarises the literature on the role of cities and urban regions in the urban climate crisis, which has flourished since the 1990s. The following section focuses on the eco-social discourse within this urban scholarship, highlighting the need for integration of the ecological and social dimensions of urban climate transitions. The final part concludes the discussion.

Social and ecological challenges of cities and urban regions

It goes without saying that cities and urbanisation have played a crucial role in human prosperity. The concentration of people and resources in urban areas has led to increased economic growth, job opportunities and cultural exchange (Taylor, 2013). Urbanisation has enabled the development of complex social and economic systems that have enabled advancements in technology, science and the arts. Urban centres have facilitated the dissemination of knowledge, allowing individuals to learn from one another and access education and healthcare (Glaeser, 2011). Additionally, urbanisation has contributed to increased social mobility and the formation of diverse communities (Mumford, 1961). In short, the growth of cities and urbanisation has been a key driver of human progress and prosperity.

However, cities and urbanisation have also long been associated with social challenges such as urban segregation and inequalities. Urban segregation refers to the uneven distribution of populations in different areas of a city, often resulting from poverty, racial, ethnic or gender dynamics, and gentrification (van Eijk, 2010). Urban inequalities, on the other hand, refer to unequal access to opportunities, resources and services within a city, which can also be related to race, class, gender and other social factors (Castells, 1983). In her seminal work *The Death and Life of Great American Cities*, Jane Jacobs (1961) argued that traditional urban planning approaches based on rigid zoning regulations and separation of land uses often lead to the creation of isolated, homogeneous neighbourhoods that lack diversity and vitality. Instead, she advocated for a mixed-use approach that would foster social interactions and support local economies.

More recent research has highlighted the persistence of urban segregation and inequalities in many cities around the world, despite efforts to promote diversity and inclusion. For example, in the United States, studies have shown

that residential segregation by race and income has remained relatively stable over the past few decades, leading to persistent gaps in access to quality education, healthcare and job opportunities (Mijs and Roe, 2021). In Europe, research has shown that migrant populations are often concentrated in urban areas with high levels of poverty and unemployment, leading to *social exclusion* and *marginalisation* (Benassi et al, 2020). In some cases, urban inequalities have also been linked to environmental issues, such as the uneven distribution of pollution and lack of access to green spaces (Kephart, 2022). To address these social challenges, scholars have called for more inclusive and participatory approaches to urban planning and governance, which involve a diverse range of stakeholders in decision-making processes and prioritise the needs and aspirations of marginalised communities (Gough, 2017).

In a related vein, cities present a range of ecological challenges, including heat island effects, air and water pollution, loss of green spaces, and species degradation (Pickett et al, 2011). *Heat island effects* are a result of the large number of paved surfaces and lack of green spaces in cities, leading to higher temperatures and increased energy demands for cooling. This is of particular concern given that heat waves are becoming more frequent and intense due to climate change (Kim and Brown, 2021). *Air and water pollution* are also significant challenges for urban areas, with high levels of pollutants in the air and water contributing to a range of health problems and species degradation (Janhall, 2015). The *loss of green spaces* in cities is a further concern, as these spaces provide important benefits such as air purification, cooling and mental health benefits, as well as providing habitats for wildlife (Frank et al, 2017). Further, as cities expand, green spaces are often converted to built environments, leading to a *loss of biodiversity* and increased vulnerability to ecological disruptions (McPhearson et al, 2022).

Addressing these ecological challenges requires a multifaceted approach, including the promotion of green infrastructure, such as green roofs and walls, parks and green spaces, and the restoration of degraded urban ecosystems (Krueger et al, 2022). It also requires the adoption of more sustainable practices, such as the use of renewable energy, the reduction of waste and pollution and the promotion of more sustainable modes of transportation (Sharifi, 2016).

Social and ecological challenges of urban climate transitions

Much has been written about the role of cities and urban regions in the climate crisis. Given the abundance of data available, it is easy to perceive cities as a significant contributor to climate change (Solecki et al, 2018). While cities cover less than 5 per cent of the globe, they account for 70 per cent of global greenhouse gas emissions and consume 70 per cent of global resources (UN, 2016). Over 70 per cent of global GDP is generated

in cities, and over half of the world's population already lives in cities, a number that is projected to grow to 70 per cent by 2050 (UN-HABITAT, 2016). Because urban lifestyles are considerably more resource-intensive than rural lifestyles, the negative impacts of cities on climate change are expected to grow exponentially (Bai et al, 2014). At the same time, cities are often considered a central victim of climate change. They are likely to be the most affected by the effects of climate change due to their high population densities and location in areas prone to climate-related disasters such as sea-level rise, extreme droughts, flooding and heatwaves (Sanchez et al, 2018). Poor and marginalised groups in cities are particularly vulnerable to the impacts of climate change due to their settlement in the more vulnerable parts of cities and lack of access to societal safety nets (Chu et al, 2016).

Since the early 2000s, cities are increasingly presented as promising sites for climate action, with cost-effective technologies available to reduce resource consumption and generate resources at a city level (Booth et al, 2010). It is expected that these interventions hold the most promise in cities due to their relatively high densities and the possibilities of scaling up and scaling out niche interventions. Much progress has also been made in understanding how to improve the behaviour of individuals, households and organisations to reduce their resource consumption and waste production through regulatory, economic or other *nudge-type incentives* (van der Heijden, 2020). Together, these technologies and interventions may even result in *regenerative cities* that create a net positive impact through urban development (Hes & Bush, 2018). The ease of collecting *big data*, advances in big data analysis techniques and improvements in artificial intelligence can only further tap the potential of cities to reduce their negative impact on global climate change and make them more resilient to the negative consequences of climate change (Bibiri, 2018).

More recently, cities have even been presented as 'saviours of the planet' in the face of climate change, with polemicists, advocacy organisations and local governments driving this perspective (Brescia and Marshall, 2016). This narrative portrays cities as the essential link between available solutions – technology and behavioural change – and climate action. Advocates of this perspective cite scholarly literature to support their arguments, pointing out that cities often set higher climate governance ambitions than the nation states to which they belong and collaborate in trans-local and sometimes trans-national networks. They are critical of state-led regulatory interventions and hopeful about bottom-up collaborations involving citizens, businesses, NGOs and local governments (for example, C40 and Arup, 2017).

However, these sweeping claims made by polemicists and advocacy organisations are being critiqued too. The narrative of cities as saviours draws on a relatively small number of front runners in climate action, not on the majority of cities and citizens around the globe (van der Heijden,

2017). Scholars are increasingly pointing out that it is all too easy to mistake or selectively present quantitative evidence as a sign of a global tendency of cities to act on climate change (Westman et al, 2022). In many cities around the world, traditional matters such as housing provision, sanitation and waste disposal are the more urgent areas for urban governance and action, and climate change remains ungoverned or is a complement rather than a key topic in urban development and planning (Johnson et al, 2015).

Increasingly, also, urban climate transitions are being scrutinised by scholars for their challenges in achieving equity and justice. While much has been written about justice and climate change as well as action in cities separately, little work has been carried out to consider their intersection (Fitzgerald, 2022). In line with the earlier concepts of ‘the right to the city’ (Harvey, 2003) and ‘the just city’ (Fainstein, 2010), scholars studying urban climate transitions argue that these transitions should move beyond the dominant focus on reducing environmental ‘bads’, such as carbon emissions and resource consumption (van der Heijden et al, 2019). Scholars like Sara Hughes and Matthew Hoffmann advocate for a focus on ‘just urban transitions’ (JUTs), which they define as ‘the fusion of climate action and justice concerns at the urban scale’ (Hughes and Hoffmann, 2020, p 2). To achieve JUTs, these and other scholars contend that it is important to raise questions about *procedural justice* (that is, power distribution in the planning process and who participates), *distributional equity* (that is, allocation of benefits and burdens of climate action among different communities), and *recognition* (that is, representation of minority groups and communities in the planning process).

The eco-social discourse in scholarship on urban climate transitions

From the previous two sections it has become clear that the broad scholarship on urbanisation as well as the more targeted scholarship on urban climate transitions are actively engaging with the central theme of this volume – that is, the eco-social nexus. While it remains a niche area in these literatures, scholars increasingly argue that the transition to a *low-carbon urban economy* must be accompanied by a transformation of social relations and institutions to ensure that the benefits of such a transition are equitably distributed and that marginalised groups are not left behind. To gain a better understanding of the eco-social discourse in scholarship on urban climate transitions, the following sub-sections provide an overview of the key themes from this literature.

Environmental justice

The notion of environmental justice is gaining prominence in the literature on urban climate transitions. It involves addressing the disproportionate

environmental burdens that vulnerable populations, such as low-income communities and communities of colour, often face (Gough, 2017). It is argued that urban environmental justice requires recognising the interconnectedness of social and environmental issues and considering the needs and perspectives of diverse communities (Agyman et al, 2016). Likewise, the importance of understanding power relations in shaping environmental injustices and achieving a just sustainability transition is emphasised in the literature (Hughes and Hoffmann, 2020). To these ends, scholars advocate for a socio-ecological urbanism approach that combines environmental and social concerns in research and practice in order to advance environmental justice in urban areas (Berghauser Pont et al, 2022).

One of the key challenges in addressing environmental justice is the lack of participation by and representation of marginalised groups in decision-making processes. Low-income and minority communities often have limited access to political power and resources, making it difficult for them to have a meaningful say in the planning and implementation of urban climate policies (Agyman et al, 2016). This can result in the prioritisation of policies that may not align with the needs and perspectives of these communities. To address this challenge, scholars have proposed various participatory and inclusive approaches to decision making, such as community-based research, citizen science, and co-production of knowledge and policies (Krueger et al, 2022).

Environmental justice also highlights the need to consider the social and economic dimensions of sustainability in urban climate transitions. For example, the use of market-based approaches to addressing climate change may not benefit vulnerable populations and may even exacerbate existing inequalities (Hughes and Hoffmann, 2020).

Social equity

Social equity is another key theme in the eco-social discourse on urban climate transitions. Transitioning to a low-carbon urban economy should not only aim to reduce carbon emissions and resource consumption but also ensure that the benefits and burdens of the transition are equitably distributed across different social groups (Agyman et al, 2016). As mentioned earlier, studies have shown that marginalised communities, particularly low-income communities and communities of colour, often bear a disproportionate burden of the costs of climate action (Fitzgerald, 2022). These communities are more likely to live in areas with high levels of pollution and less access to green spaces, making them more vulnerable to the negative impacts of climate change, such as extreme weather events, rising sea levels and air pollution (Wolch et al, 2014).

To address these social inequities, scholars call for policies that explicitly prioritise the needs and interests of marginalised communities (Agyman et al, 2016). For example, community-led initiatives that empower marginalised

communities to take control of their own environmental and social futures have been proposed as a way to achieve more just and equitable outcomes in urban climate transitions (van der Heijden et al, 2019). Such initiatives can involve collaborations between community organisations, local governments and other stakeholders to identify and address the specific needs and priorities of marginalised communities (Checker, 2011).

In addition to addressing social inequities through policy, scholars argue that urban climate transitions must also involve a transformation of social norms and values. Such a transformation can help to ensure that sustainable and just forms of consumption and production become the norm rather than the exception in urban regions (Nguyen et al, 2019). For example, campaigns aimed at promoting neighbourhood clean-ups by residents or community-based e-waste repair and recycle centres have been proposed as ways to shift societal norms and promote sustainable behaviour (Heacock et al, 2016). Such campaigns can also help to build a sense of collective responsibility and action towards the shared goal of a more sustainable and just urban future (Karvonen and van Heur, 2014).

Political ecology

Political ecology is a third key theme in the eco-social discourse on urban climate transitions. Scholars argue that the transition to a low-carbon urban economy must be accompanied by a transformation of the underlying economic structures that contribute to climate change (Frantzeskaki et al, 2012). This includes a shift away from growth-oriented economic models that prioritise short-term profits over long-term sustainability and towards more sustainable and equitable economic systems that prioritise the well-being of people and the planet (Liao, 2019). One aspect of this transformation involves rethinking the role of the state in urban climate transitions. Scholars argue that the state has an important role to play in shaping the transition to a low-carbon economy through policies and regulations that support sustainable and just forms of urban development (Castán Broto, 2020).

However, there is also recognition that the state is often limited in its capacity to drive transformative change, due to factors such as political and economic constraints, resistance from vested interests, and neoliberal ideologies that prioritise market-based solutions over government intervention (van der Heijden, 2014). As a result, scholars argue that urban climate transitions must also involve the mobilisation of alternative forms of political and economic power, beyond the state and traditional economic actors (Swyngedouw, 2010). This includes grassroots movements, community-based organisations and other forms of civil society that can challenge existing power structures and advocate for more sustainable and just forms of urban development (Bulkeley et al, 2015).

In addition, scholars argue that urban climate transitions must also address the intersection of climate change with other forms of inequality and oppression, such as race, class and gender (Stissing et al, 2018). This requires an understanding of how these intersecting forms of oppression shape the distribution of power and resources in urban areas, and how they interact with climate change to create unique challenges and opportunities for different social groups (Lwasa, 2018).

Just transitions

A final key theme in the eco-social discourse on urban climate transitions is the concept of just transitions. Scholars argue that urban climate transitions must prioritise the needs and interests of marginalised communities, and that the transition to a low-carbon urban economy must be accompanied by a redistribution of resources and power to ensure that the benefits of this transition are equitably distributed (Burch, 2021). This requires a focus on social justice, which addresses the inequitable distribution of benefits and costs associated with climate change and urban development (Fitzgerald, 2022). To achieve just transitions, scholars suggest a range of strategies, including *participatory planning processes* that engage diverse stakeholders in decision making and build capacity among marginalised communities (Hughes and Hoffmann, 2020). Such processes must prioritise the needs of low-income communities and communities of colour, which are often the most vulnerable to the impacts of climate change and the least able to adapt (Fainstein, 2010).

Moreover, just transitions require attention to the distribution of benefits and costs associated with climate action. Because the costs and benefits of urban climate transitions are often unevenly distributed, a focus on distributional equity is critical to achieving just transitions (Keenan et al, 2018). This requires an understanding of the social and political processes that shape the distribution of benefits and costs, and the development of policies that explicitly address the needs and interests of marginalised communities (Agyman et al, 2016).

Finally, scholars argue that just transitions require a transformation of social norms and values to ensure that sustainable and just forms of consumption and production become the norm rather than the exception. This requires a focus on recognition, which addresses the ways in which different social groups are included or excluded from decision-making processes and the distribution of benefits and costs associated with climate action (Hughes and Hoffmann, 2020). Recognition also involves addressing historical injustices and inequalities, and acknowledging the ways in which race, class, gender and other forms of identity intersect to shape the experiences of marginalised communities (Stissing Jensen et al, 2018).

Conclusion

Cities and urban regions play a critical role in addressing climate change. Effective urban climate actions must tackle both ecological and social challenges in an integrated manner. Although scholars have called for urban climate transitions that pursue both ecological and societal goals for over two decades, little is known about how this translates to policy and practice (Frank et al, 2017; Bärnthaler, 2023). Furthermore, the existing knowledge is largely based on a small number of case studies from cities in developed economies such as Australia (Gulsrud et al, 2018), the US (Anderson et al, 2019), Singapore (Liao, 2019) and Sweden (Khan et al, 2020). Future scholarship on the eco-social nexus in urban climate transitions must move beyond making normative calls for linking ecological and social goals and instead focus on empirical investigations in both developed and developing economies to identify promising outcomes.

To achieve this goal, it is crucial to explore new ways of studying the eco-social nexus in urban climate transitions in a manner that facilitates comparison across different studies. One promising approach is the use of systems thinking, which provides a holistic perspective that recognises the interconnectedness of social, economic and ecological urban systems. For example, the concept of Social-Ecological Urbanism (SEU) offers a broad conception of urban climate transitions by addressing cities at the relevant systems level (Berghauser Pont et al, 2022, p 1). Similarly, the social-ecological-technological systems (SETS) framework provides a systems perspective that considers the reality of cities as complex systems and provides a baseline for developing a science of and practice for cities (McPhearson et al, 2021, p 173). These analytical frameworks allow for the study of what is essentially a highly complex cross-disciplinary research topic.

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