



Methodological and Ideological Options

The urban political ecology of ecosystem services: The case of Barcelona

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ABSTRACT

This paper advances two arguments. First, the liveability of modern cities depends to a large extent upon urban and peri-urban ecosystems and their services. Second, these services are not only a gift of nature, but co-produced by human labour. Ecosystem services, in other words, are not just natural; they are also the outcome of historical, political, economic and social endeavours. We support our case with a study of the city of Barcelona and the adjacent Collserola Natural Park. Through an inter-disciplinary project combining biophysical, historical, and archival research, interviews and activist research we show that, first, the liveability of Barcelona highly improves because of the services provided by the ecosystem of Collserola. Second, that Collserola was not originally a pristine forest; it became one after agricultural abandonment institutional interventions and the action of social movements. If ecosystem services are co-produced by human action, and social struggles, as we argue is the case of Collserola, then this has implications for the ways ecological economists think about ecosystem services, their value and valuation. Whereas the social production of ecosystem services may seem an obvious and intuitive idea, it certainly challenges the foundational aspects of monetary valuation.

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1. Introduction

Urban areas depend on ecosystems for the provision of a range of services that contribute to human well-being. These include regulating services, such as water regulation, urban cooling, and air purification, or cultural services that serve recreation or spiritual human needs (Bolund and Hunhammar, 1999; Chiesura, 2004; Gómez-Baggethun and Barton, 2013; Haase et al., 2014; Luederitz et al., 2015; Muhamad et al., 2014; Niemelä et al., 2010; Trzyna, 2014). Ecosystem services (ES) to cities are provided at the local level, but also at regional, national or global scales (Chiesura, 2004; Givoni, 1991; Tzoulas et al., 2007; van Kamp et al., 2003). Strictly defined urban ecosystems (see for instance Pickett et al. (2001)) contribute only marginally to the demand for ecosystem services of densely built up areas (Baró et al., 2015; Niemelä et al., 2010). To understand how cities are made liveable, it is necessary to also look at the contribution of urban hinterlands (Baró et al., 2014; Depietri et al., 2013; Haase et al., 2012; Larondelle et al., 2014). Peri-

urban regional ecosystems are crucial for the healthiness and liveability of cities, a main concern for global human well-being as more and more people live in densely built urban areas (Elmqvist et al., 2013; MA, 2005; UNDESA, 2014).

Ecosystem services have been defined by ecological economists as “the benefits of nature to households, communities and economies” or, more specifically, as “components of nature, directly enjoyed, consumed, or used to yield human well-being” (Boyd and Banzhaf, 2007). Ecosystems are also often referred to as “natural capital” or “those components of the natural environment that provide a long-term stream of benefits to individual people or to the society as a whole” (Liu et al., 2010). Costanza et al. (2015, p. 108) define ecosystem services as “ecological characteristics, functions, or processes that directly or indirectly contribute to human well-being”. This literature explicitly states that humans are an integral part of ecosystems. However, the supply of ecosystem services is often referred to as the result of natural forces, habitat properties, and ecosystem functions or processes, where humans are regarded as their mere beneficiaries (Boyd and Banzhaf, 2007; Costanza et al., 1997; de Groot et al., 2002, 2010; Fisher et al., 2009; MA, 2005; Wallace, 2007). In defining ecosystem services as products of “nature”, the socio-economic and political factors and the human effort codetermining their provision generally remain unconsidered. In ecological economics, humans may use, damage or protect ecosystem

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services, or they may perceive and value them in one way or the other (Daly and Farley, 2010; de Groot et al., 2012; Fisher et al., 2009). However, humans do not 'produce' ecosystem services; these services, as the quotes and definitions provided above suggest, are attributable to external ecosystems, which in turn, are part of natural processes. The pre-paradigmatic ecological economics textbook diagram is telling in this respect: it considers the economy and society as smaller circles within an independent, external circle called 'nature' or 'ecosystem'. Society depends on, and may harm, the natural ecosystem; but ecological economics sees the two of them as distinct and separate; society does not 'produce' nature.

As political ecologists however have shown, urban and peri-urban ecosystem services do not just exist 'out there; they are 'entangled in social and political processes' (Ernstson, 2013). As Ernstson claims, ecosystem services are 'socially produced'. This terminology might strike ecological economists as strange, perhaps as too 'constructivist' and antithetical to the 'strong sustainability' foundation of the discipline. It should not. The hypothesis that nature is socially constructed has a long lineage in the field of urban political ecology (Swyngedouw and Heynen, 2003). If properly understood, it matches a co-evolutionary understanding of the relationship of societies to ecosystems that is also foundational for ecological economics (Kallis and Norgaard, 2010), though somewhat at odds with the textbook view of ecological economics.

According to the 'production of nature' thesis in urban political ecology, humans, ourselves a species, constantly refashion our habitats and/or environments and adapt to these transformed environments. A forest is the product of biophysical processes, but also of the human labour that has gone into the slash and burning, the plantation, the conservation or tree logging, the prescription of fires or the extinguishment of fires. Humans constantly transform bio-physical environments and have to adapt to their transformations in a co-evolutionary fashion (Norgaard, 1994).

Importantly, this is not a socially neutral process: ecological processes "become discursively, politically and economically mobilized and socially appropriated to produce environments that embody and reflect positions of social power" (Swyngedouw and Heynen, 2003, p. 6). Braun (2002), for example, in his book "The intemperate rainforest", reveals the various practices – social, discursive, political and material – through which Canada's West Coast forests have been given meaning and made the site of intense political and ideological struggle. González-Hidalgo et al. (2014) explain how different ways of imagining what a natural and sustainable forest is clash with one another when determining fire management practices. 'Wars' over the land-uses of forests are interwoven with 'wars of truth' over 'whose knowledge counts' (Sletto, 2008), or whose values matter (Martinez-Alier, 2003). These 'wars' in effect determine who has the power to transform landscapes and to what effect. Power relations play a role in ecosystem service supply, which goes generally overlooked in traditional approaches that simply perceive ecosystem services as services provided by nature (Dawson and Martin, 2015; Otero et al., 2011; Tadaki et al., 2015).

The transformation of urban and peri-urban landscapes and ecosystems is therefore a co-evolutionary process where technological and institutional interventions interact with values, imaginaries and ways of knowing as well as with ecological processes to produce what political ecologists call new 'socio-natures' (Swyngedouw and Heynen, 2003). Perhaps the word 'production' gives an unwarranted sense of intention and control of humans over this process, something that would be wrong. We use the word 'production' instead, to highlight the human effort that goes – consciously or unconsciously – into the transformation of ecosystems and the provision of their services. From this vantage point, urbanization is not always detrimental to ecosystem services (by occupying and transforming land, etc.), but can also, intentionally or unintentionally, be favourable when social, political and economic processes in the cities support the protection or enhancement of ecosystems.

In introducing a research agenda on the 'political ecology of ecosystem services', Kull et al. (2015) look at how the concept of ecosystem services can be framed in different ways and thus be mobilized for very different political projects. Instead, we are keen to support, with irrefutable data, a more prosaic point, which is, however, far from being established in ecological economics: namely, that ecosystem services are socially co-produced through human labour, intentional or unintentional, and that social movements can play a major role in their provision. To illustrate our claims, we study the case of the city of Barcelona in Spain. After looking at our evidence a reader may think that this is an obvious point. Nonetheless, ecological economics have not taken up this point yet, considering nature and the economy as distinct and separate entities. Moreover, if it were to be taken up, it would fundamentally undermine the basis for monetary valuation, a method that is still popular among (some at least) ecological economists.

Section 2 details the methods and data we apply to prove that:

- i) Barcelona would be much less liveable without the peri-urban ecosystem of Collserola (Section 3);
- ii) Collserola had not always been a forest, but became so after the retreat of agriculture since the mid-19th century (Section 4);
- iii) It was possible to safeguard Collserola's ecosystem also thanks to the work of social movements and activists (Section 5).

The paper presents, therefore, a quantitative assessment of the ecosystem services provided by the ecosystem of Barcelona and the Collserola peri-urban park to prove that these matter for the city's liveability (Section 3). Furthermore, it also provides a historical qualitative ('co-evolutionary') account of the different periods leading to the present Collserola peri-urban forest. In this way, it sets the prerequisites for the environmental benefits now enjoyed by the inhabitants of Barcelona (Sections 4 and 5). Finally, Section 6 concludes with some reflections on the implications of our research with regard to how ecological economists may think about ecosystem services, their value and their valuation.

2. Case Study, Methods and Data Sources

The city of Barcelona is located in the region of Catalonia (Spain), of which it is the capital. With a surface of 101.9 km², the city's population amounted to about 1.604 million in 2015.¹ It is the densely populated core of a metropolitan region home to about 4.77 million inhabitants in 2015 (IDESCAT, 2011²). Northwest of the city is the Collserola mountain range (see Fig. 1), which supplies Barcelona with vital ecosystem services.

The Collserola Natural Park (covering a total area 8300 ha, of which 20.47% belong to the municipality of Barcelona) has a typical Mediterranean climate with elevations ranging between 60 m and 512 m. Thereof, 38% of its surface is covered by mixed woodlands of Aleppo pine (*Pinushalepensis*) and Holm oak (*Quercus ilex*). Owing to its agricultural past, the rest of the park consists of a diverse mosaic of land covers ranging from Mediterranean scrub (13%) to savannas and grasslands (2%) (Cahill and Llimona, 2004). The forested area of the park is not a native forest; the only remnants of the original forest are in fact present in an area of 113 ha with indigenous deciduous and evergreen oak trees in Font Gropa, close to Sant Cugat (Cañas et al., 1995; CPC, 2011).

The park is situated in one of the most densely populated areas in Europe. As a result, it is enclosed by urban areas and crossed by roads and railways (Cahill et al., 2003). Given its proximity to Barcelona, it is also one of the most visited parks in the Catalan region with about 2 million visitors per year (Creel and Farrell, 2008).

¹ <http://www.idescat.cat/emex/?id=080193&lang=en>, (Retrieved 15/01/2016)

² <http://www.idescat.cat/pub/?id=aec&n=246> (Retrieved 15/01/2016)

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