Ecosystem Services 32 (2018) 159–169

Contents lists available at ScienceDirect

Ecosystem Services

journal homepage: www.elsevier.com/locate/ecoser

Business attitudes towards funding ecosystem services provided by urban forests

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ARTICLE INFO

Keywords:
Payments for ecosystem services
Public-private partnerships
City trees
Climate change adaptation
Corporate social responsibility

ABSTRACT

Urban trees and woodlands provide a wide range of ecosystem services (ES) to society, for example, flood risk reduction, air purification, and moderation of urban heat islands. Despite this, local government budgets for tree planting and maintenance have declined in many cities throughout the world. Thus far, the academic literature has largely ignored whether businesses are willing to help fund urban forests and the ES they provide. Business financing via payments for ecosystem services (PES) within the urban realm is also under-researched and lacking in practice. This study aims to address these research gaps. Semi-structured interviews were carried out with 30 businesses of varying sizes and sectors, operating in Southampton, UK. Respondents thought a public-private partnership would be feasible, with a focus on voluntary payments towards enhancing air quality, reducing flood risk, and improving aesthetics. Respondents would prefer to choose from a list of location-specific, cost-effective, monitored projects to fund directly, for marketing and/or corporate social responsibility purposes. To facilitate business funding of urban forest-based ES, clear communication of the expected environmental benefits and a strong business case are required, drawing on the experience of similar initiatives. From our findings, we recommend the piloting and analysis of such PES schemes.

1. Introduction

The world is experiencing increasing urbanization and growth of cities: the proportion of the population residing in urban areas increased from 34% in 1960 to 54% in 2016, and is projected to reach 66% by 2050 (United Nations, 2015; The World Bank, 2017). The proportion of urban dwellers is particularly high in developed countries, with 83% in the UK, 82% in the US, and 75% in the EU (The World Bank, 2017). As cities become more densely developed, the increase in human-made surfaces and corresponding loss of urban greenspace increases the risk of flooding and urban heat island effects (Lemonsu et al., 2015; Miller and Hutchins, 2017). Air pollution is also a problem in many densely populated cities – particularly in more deprived areas – influenced by urban morphology and local meteorological conditions (Netcen, 2006; Abhijith et al., 2017; Bodnaruk et al., 2017). Each of these negatively impacts human health and wellbeing and is likely to be exacerbated by climate change. Increased frequency and intensity of extreme weather events (i.e. heatwaves and extreme precipitation events) as well as increasing ozone concentration, will impact significantly on businesses and communities in city environments (European Environment Agency, 2016).

Supporting other engineering and policy solutions, urban forests[1] can help address these issues through the provision of regulating ecosystem services (ES) such as heat amelioration (Doick and Hutchings, 2013); stormwater attenuation (Armson et al., 2013); and air purification (Escobedo and Nowak, 2009). There are calls for additional tree cover in cities worldwide in order to improve resilience to climatic changes and enhance quality of life (e.g. Salbitano et al., 2016). How-

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[1] The 'urban forest' is defined as "all woods and trees in and around urban centres" (Konijnendijk et al., 2006).

https://doi.org/10.1016/j.ecoser.2018.07.006
Received 27 October 2017; Received in revised form 2 March 2018; Accepted 16 July 2018

ever, funding for urban trees and other green infrastructure[2] has declined in many cities, particularly in Europe, exacerbated by government austerity (van Zoest and Hopman, 2014; Kabisch, 2015). Business financing – perhaps through payments for ecosystem services (PES) – could pose a potential solution (Bade et al., 2015; Davies et al., 2017).

Drawing on definitions by Wunder (2005), Muradian et al. (2010) and Defra (Smith et al., 2013), and a study by Waylen and Martin-Ortega (2018), this paper defines PES as 'a transfer of resources between ES buyers and sellers that aims to improve provision of ES for the benefit of society and the environment'. The following principles apply:

- Voluntariness – stakeholders ideally enter into a PES agreement on a voluntary basis, however governments may act on their behalf, or regulate involvement, if necessary.
- Payment source – payments are made by the beneficiaries of ES (citizens, businesses, or governments acting on their behalf). This includes those benefitting from reputational enhancement or actions that compensate for (unregulated) environmental harm.
- Conditionality – payment is conditional on the delivery of quantified ES, or on the implementation of robust land use practices proven to deliver ES benefits.
- Additionality – ES benefits (or proxy land use practices) are over-and-above the baseline (or business-as-usual) level, and do not lead to the loss or degradation of ES elsewhere.

The limited literature on the subject suggests that business attitudes towards (investing in) ES are generally positive, but with some business owners unaware of ES and others with perceptions that may prevent increased ES provision (Wolf, 2004a; Koellner et al., 2010). Furthermore, there are currently few documented examples of business-funded PES schemes located entirely in urban areas. During 2012–2015, Defra funded three pilot projects to investigate the potential for urban PES schemes in the UK. Those in Luton and Hull were considered to be a success – despite the fact that neither are actually up and running as a fully-fledged PES scheme – while that in Manchester failed to gain any business support (Defra, 2016). Eves et al. (2015) suggest that applying PES to urban contexts is more challenging than in rural environments because costs and benefits are less clear, and there are far more stakeholders involved.

Though not labelled as PES, there are other urban schemes with similar objectives. A social enterprise in Edinburgh offers corporate sponsorship packages to support tree planting in the city, however it is unclear how successful this has been (TreeTime Edinburgh, 2015). A non-profit organisation in the US (City Forest Credits, 2017) has recently started offering carbon and quantified co-benefit credits to urban forest projects in cities nationwide; while another has launched a private-to-private stormwater trading market in Washington D.C. to facilitate developers in funding green infrastructure projects to reduce stormwater runoff in the city (NatureVest, 2017). In Australia, the City of Melbourne (2018) has launched an 'Urban Forest Fund' seeking to match-fund contributions from organisations and individuals in order to pay for 40,000 new trees in the city.

This study aimed to explore business attitudes towards establishing business-funded PES schemes in a developed city context. Three research questions were posed:

1. What are business attitudes towards trees and the ES they provide?
2. What are business attitudes towards private sector investment in urban forests?
3. What are business preferences regarding the operation of an urban forest PES scheme?

2. Materials and methods

2.1. The study area

Given the exploratory nature of the study, it was deemed appropriate to take a case study approach. Southampton was chosen as the study area for three reasons: representativeness, worsening environmental quality, and proactive city planning. With a population of just over 250,000, Southampton is classified by the OECD (2017) as a medium-sized city, thus representative of cities in Europe (Dijkstra and Poelman, 2012). However, Southampton has a higher population density (4917 persons per km) and population growth rate (9% during 2004–14) than the majority of Europe's cities (Eurostat, 2016), and is an international transport hub (boasting a port and airport, as well as three motorways). The city is thus particularly exposed to environmental hazards, including air pollution, urban heat islands, and surface water flooding (Southampton CC, 2014). Indeed, Southampton become one of five UK cities requiring designation of a 'Clean Air Zone' due to its continued failure to comply with EU law on limits for nitrogen dioxide (NO_2) (Defra, 2015a). Finally, the city benefits from a proactive local authority that uses the Green Space Factor[3] in planning decisions (Kruuse, 2011; Farrugia et al., 2013), as well as a tree canopy cover of 18.5% (Mutch et al., 2017) – higher than the average for English towns and cities of 16.4% (Doick et al., 2017).

2.2. Data collection

Interviews were conducted by the lead author with senior business representatives such as sustainability managers, directors and business owners. These were carried out by telephone (n = 28) or face-to-face (n = 2). The methods used to recruit businesses included:

- Contacting existing business contacts of staff at the University of Southampton – 11 out of 31 participated.
- Approaching attendees of two business functions held in Southampton – ten out of 19 participated.
- Contacting Southampton businesses directly via email – four out of 34 participated.
- Advertising the study in the newsletters of five business membership organisations – five out of an unknown number participated.

Due to difficulties encountered in recruiting participants, just 16 of the 30 businesses included in the study were physically located within the area administered by Southampton City Council. Six were located in the adjacent local authority areas of Eastleigh, Test Valley and the New Forest (largely with Southampton postcodes), whilst nine were based elsewhere in the county of Hampshire (e.g. Winchester or Fareham). In these cases, staff and/or customers were known to reside within Southampton, and all business representatives were asked to respond as if financial contributions would be going to their local council.

The interviews were semi-structured, with business representatives initially answering 26 closed questions provided in advance (see Appendix A). Questions were grouped into six themes:

[2] Green infrastructure is defined by the European Commission (2013) as "a strategically planned network of natural and semi-natural areas [incorporating green and blue spaces] with other environmental features designed and managed to deliver a wide range of ecosystem services". This concept has been extended by Lafortezza et al. (2013) to comprise five interrelated blocks (ecosystem services, biodiversity, social and territorial cohesion, sustainable development, and human wellbeing), which importantly interact over both time and space.

[3] The Green Space Factor is a planning policy tool that has been adopted by a number of city authorities across Europe to incorporate green infrastructure in development projects. The tool allocates a score to different types of surfaces based on infiltration potential, which is used as a proxy for ES delivery.