



A toolbox for garden governance



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ABSTRACT

A substantial fraction of the open space in (peri-) urban and rural areas is covered by domestic gardens which support the delivery of multiple ecosystem services. Although individually they may look insignificant, the aggregation of domestic gardens and of gardening actions can be significant. Referring to 'the tyranny of small decisions', we launch the concept of a 'resource by small gardening actions': the positive cumulative outcome of individual garden owners adopting pro-environmental gardening practices. Using qualitative research, we gained a thorough insight into the barriers and levers related to the development of domestic gardens as a 'resource by small gardening actions'. By combining the data from expert interviews with a design workshop addressing garden and landscape architects, and focus groups with private garden owners, we identified eight barriers and nine levers. These levers are part of a 'mix and match' toolbox, allowing the development of tailor-made strategies for garden governance. These insights increase the understanding on if and how private actors and their properties could become part of policy plans to support ecosystem services. This adds to the global understanding of the strategic value of daily-life landscapes that exist all over the world.

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1. Introduction

All over the globe, the cumulated areal coverage of domestic gardens is considerable. In Europe, domestic gardens take up between 22% and 27% of the total area within the administrative city boundaries of Edinburgh, Belfast, Leicester, Oxford and Cardiff (UK) (Gaston et al., 2005b; Loram et al., 2007; Tratalos et al., 2007); 16% of the central part of Stockholm, Sweden (Colding et al., 2006); and 8% of Flanders, the northern region of Belgium (Dewaelheyns et al., 2014). In Dunedin, New Zealand, the vegetated garden area occupies 46% of the residential area, and 36% of the total urban area (Mathieu et al., 2007). In Tanzania, home gardens cover about 19% of the Kirua Vunjo Division territory (Soini, 2005).

Domestic gardens provide multiple ecosystem services (Cameron et al., 2012). Most research looking for beneficial aspects of gardens and gardening focuses on the landscape ecological role of domestic gardens for (agro-) biodiversity (Davies et al., 2009; Galluzzi et al., 2010; Gaston et al., 2005a; Goddard et al., 2013; Miller and Hobbs, 2002; Rudd et al., 2002; Thompson et al., 2004; Tratalos et al., 2007). Other acknowledged positive

effects are related to climate change, like carbon sequestration in soils (Zirkle et al., 2011), storm water run-off decrease (Pauleit and Duhme, 2000), and mitigation of the heat island effect (Skelhorn et al., 2014). Acknowledged negative impacts of domestic garden management include greenhouse gas emissions and nitrogen excess from fertilizer usage (Livesley et al., 2010), the contribution to the spread of non-native and invasive species (Niinemets and Peñuelas, 2008) and its effects on biodiversity (Burghardt and Tallamy, 2015), increased soil sealing (Beumer and Martens, 2015; Perry and Nawaz, 2008; Verbeeck et al., 2011) and extra water consumption (Runfola et al., 2013). Such negative outcomes are generally ascribed to inexperience of the general public with environmental issues (Thompson, 2004).

Governing such a complex land use and environmental resource as domestic gardens in a sustainable way and from a regional perspective is a challenge. Domestic gardens are private landscapes that are autonomously managed by a countless number of gardeners (Gaston et al., 2005a), often influenced by a wide range of factors including neighborhood rules and norms (Blomley, 2005; Colding and Folke, 2001; Cook et al., 2012; Freeman et al., 2012; Giner et al., 2013; Kendal et al., 2012; Kiesling and Manning, 2010; Kurz and Baudains, 2012; Larson et al., 2010; Nassauer et al., 2009; Politi Bertocini et al., 2012; Stern, 2000; Warren et al., 2008; Zhang and Jim, 2014; Zmyslony and Gagnon, 1998). The cumulative

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outcomes of garden management are an aggregation of individual, small and autonomously made decisions (Odum, 1982). Often they are neither optimal, desired, intended or preferred by society (Cooper et al., 2007; Odum, 1982; Stern, 2000). In the context of market economics, Kahn referred to this phenomenon as the 'tyranny of small-decisions' (Kahn, 1966). Because environmental problems are sensitive to small decisions effects (Odum, 1982), this concept has been adopted in the discourses of environmental and land management in general (Thompson, 2004), and of gardening in particular (Cooper et al., 2007; Goddard et al., 2010).

The 'tyranny of small gardening decisions' is not insurmountable. Modest and incremental changes in garden management may benefit the environment and society by supporting ecosystem services (Cooper et al., 2007). Kiesling and Manning (2010) observed benefits from the cumulative effect of gardeners who choose ecological gardening methods. Theoretical calculations by Davies et al. (2011) illustrated that the planting of one additional tree in 10% of the existing 159,789 urban gardens in Leicester (covering 18.7 km²) could generate a total additional carbon storage of 927 tons in above-ground vegetation, under the assumption that these trees grow to an average size for a garden tree. The work by Belaire et al. (2014) revealed the positive aggregated effects of individual garden management decisions on native bird species richness.

The above examples lead to the hypothesis that the 'tyranny of small gardening decisions' has potential to be transformed into a 'resource by small gardening actions': the positive cumulative outcome of individual garden owners adopting pro-environmental gardening practices. Lindemann-Matthies and Marty (2013) demonstrated that ecological quality can align with cultural concepts of aesthetic quality: a more ecologically managed garden contained more species and appeared attractive and aesthetically pleasing. Work already addressing the philosophy behind the idea of a 'resource by small gardening actions' is the 'urban based conservation' concept of Beumer (2014), and the indicator framework by Beumer and Martens (2015) aiming at engaging citizens in experiencing and exploring biodiversity and ecosystem services in their own domestic garden space. So, domestic gardens can be considered as a medium for self-responsibility of individuals and households in global challenges like climate change and the loss of biodiversity (Beumer, 2014; Cooper et al., 2007; Goddard et al., 2013; Larson et al., 2015; Nassauer, 2011).

Work by Visscher et al. (2014) indicated the need for governance to realize such a 'collective' potential of domestic gardens, especially in smaller gardens. Possible pathways to realize the collective resource potential of domestic gardens are situated in the field of environmental governance. Lemos and Agrawal (2006) define environmental governance as interventions that aim changes in environment-related knowledge, institutions, decision making, and behavior. In this paper, garden governance is introduced as a subdivision of environmental governance, specifically aiming at realizing the 'resources by small gardening actions' potential through sustainable and pro-environmental garden management.

The main goal of this paper is to explore limitations and possibilities for developing domestic gardens as a 'resource by small gardening actions'. First, barriers are identified that could hamper such development. Second, levers are identified that can be used to overcome the identified barriers. The gained insights will clarify how different stakeholders, like citizens, public actors and non-governmental organizations, could proceed to start developing the garden complex as a resource by small actions.

To bypass the initial consideration of domestic gardens as idiosyncratic objects, this study uses the concept of the garden complex (Dewaelheyns et al., 2011, 2013, 2014) as the basic concept. The garden complex is the aggregation of individual domestic gardens within a certain region (a neighborhood, a city, a rural area, a country, etc.). More specifically, the concept represents the aggrega-

tion of a broad range of aspects and characteristics of gardens within a certain region. From a spatial point of view, the garden complex can represent the total area of domestic gardens, or the total area of lawn, kitchen garden or sealed surface present in domestic gardens. From a managerial perspective, the total amount of, for example, fertilizers used during domestic garden management can be summed, or the amount of vegetables yielded. In terms of ecosystem services, the total amount of carbon stored in garden trees or domestic lawn soils can be estimated. From a socio-cultural perspective, the full range of meanings and cultural values attached to gardens can be mapped. As such, the concept can integrate social, spatial, environmental and ecological aspects of individual gardens to the whole of domestic gardens present in a region. This concept meets the calls by several researchers to consider gardens as networks of green space across the (urban) landscape (Belaire et al., 2014; Goddard et al., 2010; Miller and Hobbs, 2002; Rudd et al., 2002; Widows and Drake, 2014).

2. Data and methods

2.1. Case study Flanders

The study was carried out in Flanders, the northern region of the federal state of Belgium. Flanders is characterized by urban sprawl and fragmentation (Antrop, 2004; Kasanko et al., 2006). In the nineteenth and early twentieth century the Belgian Government strongly promoted and subsidized home ownership of a 'single family dwelling with garden' amongst the working and lower middle classes. The garden was meant as a space to produce fruit and vegetables at home (De Decker, 2011a; Meert, 2000); it opened the way to educate the workers and lower-middle class through horticultural courses (Segers and Hermans, 2011); and it expressed the ideal of the family as the cornerstone of society, contributing strongly to the consolidation of the dominant Catholic political framework (De Decker, 2011a,b). Increased prosperity, improved social security and government subsidies for private housing construction after the Second World War made this dream come true for the majority of the people (De Decker, 2011a,b; Meeus et al., 2013). Until today, being or becoming a homeowner of a house with a garden is integral part of the way of life for a Belgian household (De Decker, 2011a) and part of a lifestyle (Pisman et al., 2011). Currently about 8% of the Flemish territory is covered by domestic gardens (Dewaelheyns et al., 2014). More specifically, gardens take up about 21% of the total area of residential cores (Dewaelheyns et al., 2014) and on average 6% of the area of statutory farmland (Verhoeve et al., 2015). In 2005, more than 70% of the Flemish households lived in a house with a garden (Bomans et al., 2011).

Domestic gardens are a global theme exceeding the borders of the Flemish case studied in this research. Flanders may be rather unique because of the historical promotion of gardens through a liberal housing policy. But Meeus et al. (2013) describe four analogies between Flanders and suburban evolutions in other regions over the globe. These analogies are (i) the influence of the macro-economic logics of suburbia, e.g. stimulating consumerism to boost economy; (ii) the 'rural idyll' coupled to residential development, e.g. the garden as a place to produce your own food and to relax with the household; (iii) the degradation of spatial quality by private housing, for example through urban sprawl; and (iv) issues of governing an area with an unclear orientation towards city or countryside, e.g. the so called 'citta diffusa' (Indovina, 1990; Ryckewaert, 2002). The combination of these analogies with (i) the historically rooted and strongly established relation between households and domestic gardens, and (ii) the substantial area covered by gardens along the urban-rural gradient makes Flanders an interesting laboratory for research on garden governance.

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