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Cultivating nature-based solutions: The governance of communal urban gardens in the European Union

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ABSTRACT

In many countries in the European Union (EU), the popularity of communal urban gardening (CUG) on allotments and community gardens is on the rise. Given the role of this practice in increasing urban resilience, most notably social resilience, municipalities in the Global North are promoting CUG as a nature-based solution (NbS). However, the mechanisms by which institutional actors can best support and facilitate CUG are understudied, which could create a gap between aspiration and reality. The aim of this study is therefore to identify what governance arrangements contribute to CUG delivering social resilience. Through the EU GREEN SURGE project, we studied six CUG initiatives from five EU-countries, representing different planning regimes and traditions. We selected cases taking a locally unique or innovative approach to dealing with urban challenges. A variety of actors associated with each of the cases were interviewed to achieve as complete a picture as possible regarding important governance arrangements. A cross-case comparison revealed a range of success factors, varying from clearly formulated objectives and regulations, municipal support, financial resources and social capital through to the availability of local food champions and facilitators engaging in community building. Municipalities can support CUG initiatives by moving beyond a rigid focus on top-down control, while involved citizens can increase the impact of CUG by pursuing political, in addition to hands-on, activities. We conclude that CUG has clear potential to act as a nature-based solution if managed with sensitivity to local dynamics and context.

1. Introduction

1.1. Introduction

Historically, the demand for allotment gardens on the European continent has fluctuated as a result of mass urbanisation, and associated social problems, as well as food shortages during periods of armed conflict (Barthel et al., 2015). After a period of relatively low popularity, the number of people reporting to grow their own food in Europe is on the rise again, with an estimated increase of nearly 6% points in the EU15-countries[1] in the 2003–2007 period (Church et al., 2015).

This may be particularly the case for community-managed gardens; a recent study across 20 cities in 14 EU-countries revealed that for about one third of the cities, the interviewed municipal greenspace expert listed an initiative with a focus on urban agriculture within their top three of initiatives with highest degree of non-governmental actor involvement in urban green space governance (van der Jagt et al., 2016). A similar resurgence in appetite for food growing on community and allotment gardens has been reported in the other countries of the Global North, including the United States and Australia (Colasanti et al., 2012; Thompson et al., 2007).

As a result of this trend, a new type of publicly accessible allotment

garden has emerged which includes facilities such as cafés and playing fields to promote their use by a broader segment of society (Drilling et al., 2016). Other food-growing developments in the European Union (EU) are the booming of community gardens in which a group of people cultivates land collectively, and the establishment of gardens for temporary use (Kałużna and Mizgajski, 2016; van der Jagt et al., 2016).

A number of recent studies have commended (particular types of) communal urban gardening (CUG) for their role in supporting the resilience of cities (e.g., Barthel et al., 2015); urban resilience is defined as the capacity of urban centres to absorb and/or adapt to the shocks of different change and disturbance scenarios (Folke, 2006). Such scenarios are shaped by the complex interactions between social, political and environmental factors, potentially bringing about fundamental change in dominant societal ideologies, the degree of top-down control on environmental governance, technological innovations, population demographics and economic trends (Berkhout et al., 2002). Given the contribution of CUG to urban resilience, it has clear potential as a nature-based solution (NbS). We define NbS as multifunctional 'green' interventions delivering upon the social, economic and environmental pillars of sustainable development (Eggermont et al., 2015; European Commission, 2015). NbS thus per definition provide adaptive management approaches dealing with complex socio-ecological challenges (Nesshöver et al., 2016).

A challenge for research on CUG is to gain a better understanding of the complexities and the context-dependent nature of effective urban agriculture governance (Prové et al., 2016). For example, one is likely to encounter barriers to the institutional uptake of CUG as an NbS, which include municipal budget pressures leading to reactive management styles, silo mentality and environmental justice concerns (Kabisch et al., 2016; Lawrence et al., 2014). Indeed, what is needed is: "to examine by comparison the enabling or inhibiting context conditions (governance and socioeconomic) that affect the establishment and scaling of NbS across cities" (Kabisch et al., 2016, p.3). Here we will address this knowledge gap by studying success factors for the establishment of CUG delivering social resilience, with a particular focus on innovative governance approaches.

1.2. Explaining the popularity of CUG

The rise of CUG can be partly explained by an improved awareness by policymakers of the environmental and social benefits, beyond subsistence, of such food growing places (Drilling et al., 2016). At the same time, there is also increased awareness by citizens of the benefits associated with CUG, including healthy food provision, relaxation, recreational opportunities, connecting with nature, and community building (Birky and Strom, 2013; Voigt et al., 2015). Another body of literature has ascribed the increased involvement of citizens in food growing, and other aspects of public goods and services provision, to neoliberalism. Taking root in the United Kingdom (UK) and United States (US) in the late 1970s and early 1980s, neoliberalism is characterized by liberalisation of regulations, place-marketing as well as privatisation and commodification of resources and services, including green spaces, in order to promote innovation and competitiveness (Brenner and Theodore, 2002; Jessop, 2002). As a result of neoliberalist ideology, municipal budgets for green space provision and management, including land for food growing, are under much pressure (Jermé and Wakefield, 2013; Mathers et al., 2015). To illustrate, a recent UK survey amongst park managers revealed that park maintenance budgets have declined in 92% of all local authorities in the past three years, resulting in nearly 40% of managers expecting a decline in park quality (Heritage Lottery Fund, 2016). Some have argued that CUG acts as a counter-movement to reclaim the commons and to challenge the globalisation of food supply chains (McClintock, 2014). Others have described CUG as a response to cuts in public expenditure on social services, which include greenspace provision and maintenance. To compensate for this, institutional actors are increasingly looking at

engaging non-profits employing volunteers and community groups in greenspace governance (Jessop, 2002; Rosol, 2010; Roy, 2011).

In the present study, we exclusively focus on urban agriculture practices popularized by the processes described above. We refer to these practices as *communal urban gardening* (CUG). By this, we consider all gardens with a non-profit structure, situated in an urban context, that are managed collectively, or at least are managing some common areas (Birky and Strom, 2013). This definition does not exclude allotment gardens provided they manage some areas in common. In line with current policy interest (e.g., European Commission, 2015), we are specifically interested in the question to what extent and through what means CUG could be regarded a nature-based solution to societal challenges such as equitable access to nutritious food and climate change adaptation.

1.3. The contribution of CUG to social resilience

The social benefits of communal gardening, particularly in urban contexts, are a key driver for its increased popularity (Veen, 2015). Indeed, benefits of CUG to *social resilience*, which we understand to be reflected in a combination of contributing to healthy lifestyles, adequate occupational and social functioning, absence of psychopathology and quality of life (Norris et al., 2008), are widely reported. Urban gardens may act as locations where citizens are "trained" to be self-sufficient in times of severe food crises; they are focal points for sharing locally specific urban food growing knowledge and skills (Barthel et al., 2010, 2015; Barthel and Isendahl, 2013; Colding and Barthel, 2013). Moreover, CUG provides a means for safeguarding fertile and uncontaminated land in and around cities, suited to food growing, against development (Science for Environment Policy, 2015). Social support and improved community bonds are also known to contribute to social resilience (Norris et al., 2008; Okvat and Zautra, 2011). The positive effects of CUG on social cohesion and sense of place have been widely reported (Armstrong, 2000; Thompson et al., 2007; Veen, 2015; Wakefield et al., 2007; Ward Thompson et al., 2016; Zoellner et al., 2012). Moreover, CUG is also known to empower communities through stimulating transferable competencies (e.g., creative problem solving or teamwork; Bendt et al., 2013; Krasny and Tidball, 2009b), although new urban gardens may initially create conflict amongst users around issues such as appearance of plots or antisocial behaviour (Delshammar et al., 2016). Finally, involvement in CUG and, associated with that, learning about local ecosystems can facilitate sustainable urban lifestyles and alter environmental values (Colding and Barthel, 2013; Lawrence, 2006; Okvat and Zautra, 2011). This provides an indirect route to enhanced urban biodiversity and the delivery of ecosystem services (Krasny and Tidball, 2009a).

CUG also contributes to urban resilience through other routes. For example, widespread citizen participation provides a wider range of funding streams to greenspace management (Colding and Barthel, 2013). Diversification in food supply chains provides a supplementary source of nutritious food (Alaimo et al., 2008; Barnidge et al., 2013; Litt et al., 2011) and can even offer additional income (Glavan et al., 2016). Furthermore, CUG has been linked to increased levels of biodiversity in the landscape (Andersson et al., 2007; Beilin and Hunter, 2011), aspects of which enable ecological resilience (Peterson et al., 1998). Moreover, CUG provides regulating ecosystem services, such as urban heat island effect mitigation and flood mitigation (Haase et al., 2014; Middle et al., 2014; Okvat and Zautra, 2011), which present a buffer to ecosystem disturbances (Bennett et al., 2009).

1.4. Governance arrangements as success factors

Promoted as part of their 'Research and Innovation' agenda, NbS are expected to help the EU deliver upon their vision of an innovative green economy (Nesshöver et al., 2016). Therefore, it would be of particular relevance to identify examples of *innovative* governance to promote the

uptake and success of CUG as NbS. The Policy Arrangement Approach (PAA), discerning between *discourse, actors, rules, and resources* (Arts et al., 2006; van Tatenhove et al., 2000) is an effective instrument for systematically studying aspects of governance arrangements. We understand governance arrangements to be constellations of actors that, influenced by institutional context, discourses and resources, organize themselves in particular ways to deal with the content of a particular policy domain, such as urban agriculture (Arts et al., 2006; Lawrence et al., 2013; van Tatenhove et al., 2000). The urban forest governance framework by Lawrence et al. (2013) highlights several additional relevant governance aspects, including *partnerships* and *participation*, and can be used in conjunction with the PAA.

In order to better understand and describe the role of participation by civil society, models describing different aspects of co-governance involving government and non-government actors can be used. One such model was developed by van der Steen et al. (2014) in order to describe historical change in the role of the government in arrangements involving civil society. Examples of such governance arrangement categories are 'active citizenship' and 'new public management' (van der Steen, 2014), the former of which has been linked to sustainability transformations (Hajer et al., 2015) and urban green space resilience (Buijs et al., 2016). A related model by van der Jagt et al. (2016) was introduced to capture the broad variety of approaches employed to civil society engagement in urban green space management. Both typologies organize civil society engagement arrangements along different dimensions (Fig. 1). In the model by van der Jagt et al. (2016), the two dimensions are 'mode of governance' and 'means of participation'. The van der Steen et al. (2014) model has a similar 'mode of governance' axis while the second axis 'independence from political agenda' is different from the model used by van der Jagt et al. (2016). Initiatives characterized by political choice concern those offering citizens the choice to operate independently of political agendas while those characterized by public performance are aimed at delivering existing government policies.

1.5. The present study

The aim of the present study is to explore governance arrangements that successfully deliver NbS in a CUG context. We selected six case studies from five EU countries that were identified as successful CUG initiatives contributing to social resilience within their local context. While we aimed to identify a broad range of governance aspects, including partnerships and participation, predicting the success of CUG initiatives in delivering social resilience, we were particularly interested in identifying *innovative* governance arrangements effective in promoting the uptake of CUG as NbS.

2. Methods

2.1. Case study selection

We selected six CUG initiatives in which an innovative – a locally unique – approach was taken to dealing with urban challenges with a

social component, such as loss of human-nature interactions or mass migration. Although we were particularly interested in novel models to provide inspiration on alternative approaches to municipalities, we did not overlook long-established models that continued to work, despite many changes and challenges in an area. Case selection was done on the basis of local researcher knowledge and experience as well as suggestions by local city officials. We had probed for information on these aspects in relation to CUG and other types of participatory governance in green space creation and maintenance in a pan-European study involving desk studies, document analyses and interviews with municipal green space experts carried out in a total of 20 EU-cities (Buizer et al., 2015). To scrutinize contributions of CUG to resilience in different planning contexts, the six CUG-initiatives were sampled from five EU-countries – Hungary, Portugal, Slovenia, United Kingdom and Sweden (2 examples) – from varying planning families. These are clusters of countries with similar planning regimes and traditions (Davies et al., 2015; Nadin and Stead, 2008). Planning clusters – or families – can be distinguished based on level of centralisation, strategic planning and regulation; for example, EU New Member States have relatively weak regulation while the British planning family has relatively strong citizen involvement (Davies et al., 2015). In order to explore the role of governance arrangements driving the services and potential disservices of CUG, we carried out in-depth studies by interviewing a range of people with a stake in each initiative and studying documents relevant to each of these.

2.2. Materials and procedure

This study used a combination of interviews with several different types of stakeholders until a point of saturation was achieved in which additional interviewing would be unlikely to reveal new insights. In addition, all researchers performed a document analysis related to the studied initiative.

Ahead of data collection, an interview guide was prepared involving all local researchers to enable cross-case comparisons. In addition to the components of the governance arrangements approach, we also asked stakeholders about perceived social effects.

Interviews were transcribed, relevant information distilled and copied into a case study spreadsheet specifying the research questions and the sources of information. The local researcher performed an overall analysis for each research question based on information recorded in all other columns. The information in the overall analysis column was then used to construct a 5–10 page narrative for each case study, pulling together all relevant elements from the case study spreadsheet. Both the case study spreadsheet and narrative were prepared in English, shared with the research coordinator, who provided feedback, upon which the local researcher sought to fill the gaps. Following this, the final analysis was returned to local researchers for comments once again. Some basic information on data collected is provided in Table 1.

3. Results

3.1. Case studies: background

Below we briefly summarize the key features of the six CUG cases that have been studied. We covered the site features, year of origin, tenure and activities to provide a rapid overview of how initiatives are organized and operate (see Table 2). Information on aims and innovative highlights is provided in narrative format. Fig. 2 depicts a map showing the geographical spread of case study cities across Europe.

3.1.1. Beyond the Construction Site

The Beyond the Construction Site was set up by an NGO to engage local residents in governing urban green spaces in the city of Ljubljana (Slovenia). It aims to provide education and opportunities for social
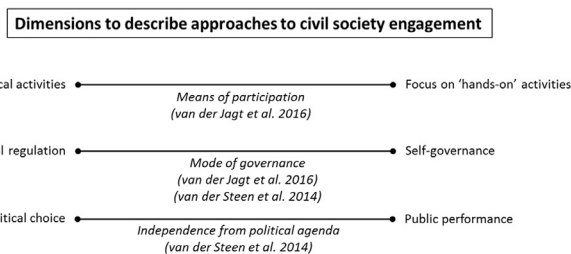

Fig. 1. Dimensions used in the typologies of governance arrangements by van der Jagt et al. (2016) and van der Steen et al. (2014).

Table 1
Overview of data collected for each of the case study initiatives.

CUG initiative	Interviews (N)	Webpages (N)	Papers and reports (N)
Beyond the Construction Site (Ljubljana, Slovenia)	5	1	–
Granton Community Gardeners (Edinburgh, United Kingdom)	7	2	1
Hyllie urban farming (Malmö, Sweden)	5	–	3
Igelbäcken Allotment Garden (Stockholm, Sweden)	7	2	3
Lisbon municipality allotment gardens (Lisbon, Portugal)	4	2	–
The "Stopping Place" (Szeged, Hungary)	8	3	2

interaction and celebrating local culture. Innovative features include the temporary nature of the garden and the role of facilitators (a group of enthusiasts and activists, including sociologists, landscape architects and architects) in empowering citizens to express themselves and gradually take on management responsibilities.

3.1.2. Granton Community Gardeners

Granton Community Gardeners is a grassroots community gardening initiative in an area of multiple deprivation in north Edinburgh, United Kingdom. The project was born out of the desire of community members to grow vegetables near home and has developed additional goals over time, which include promoting community cohesion, encouraging healthy nutrition and improving environmental awareness. Its most innovative feature is that it operates successfully with virtually no external support, and only has very loose ties with the municipality.

3.1.3. Hyllie urban farming

Hyllie is a temporary urban agriculture project in a new development area on the outskirts of Malmö, Sweden, which resulted from partnership working between a social enterprise, university and the municipality. The central aims of the project are to create jobs for, and provide on-the-job training to, unemployed immigrants as well as to facilitate sustainable urban development. Innovative features include the business model in which municipal land is used for commercial purposes albeit not for marketization purposes. In addition, the temporary and dynamic nature of the farming plots – being situated on land designated for development and moving along as the city perimeter expands, while elements of it are conserved as part of the city's green infrastructure – is also a unique feature (see Fig. 3). Besides the small scale commercial plots there are raised beds for leisure farming which offers an opportunity for the new residents in the area to grow vegetables and socialize with neighbours.

3.1.4. Igelbäcken allotment garden

This allotment complex is located in the Rinkeby-Kista municipal district of Stockholm, Sweden, and occupies 2.3 ha of land divided into 160 plots. The general aim is to serve as a place for people to grow food and flowers, and to promote social interactions. It provides insights into successfully retaining the place as a garden and social interaction space in the face of a changing neighbourhood demographic (i.e. "place keeping"); the majority of users are immigrants as the socio-economic status of the neighbourhood has changed over time.

3.1.5. Lisbon publicly accessible allotment gardens[2]

This municipal allotment garden network in Lisbon, Portugal provides a number of publicly accessible allotments that are integrated with urban parks and gardens as an integral element of the city's green infrastructure. The main aims of this initiative are to enhance green space, improve biodiversity, provide a source of income to the municipality and improve the well-being of citizens. The innovative aspect of this initiative is the provision of publicly accessible allotments, providing all citizens with an opportunity to experience food-growing

environments. In addition, by deliberately connecting allotments with other greenspaces, biodiversity potential and access opportunities were maximized.

3.1.6. The Stopping Place

This community garden called "The Stopping Place" ("Megálló") opened in 2014 and was the very first community garden in Szeged, Hungary. The garden, initiated by an NGO, strives to improve social cohesion, increase environmental awareness and provide food sovereignty. This garden is unique as it provides the first community garden in the city, thereby potentially paving the way for other bottom-up governance initiatives to emerge.

3.2. Contributions of cases to social resilience

In the first step of the analysis we validated whether cases selected on the basis of researcher and city official knowledge indeed contributed to social resilience. The majority of the studied gardens had a clearly formulated social regeneration purpose, varying from improving employability, fostering participation in green space governance to improving social cohesion and place identity. Amongst impacts contributing to social resilience, increased social cohesion was reported in each of the six case studies; even though a minority of cases reported to have organized particular activities with social cohesion envisaged as a key outcome (see Table 2). It simply came about as a by-product of communal gardening activities. One exception was the Edinburgh case in which a dance was organized for building community. The effects of CUG on social cohesion were mainly the result of gardens acting as a meeting place for people with different lifestyles or cultural backgrounds. For example, in Lisbon's Quinta da Granja Park allotment, one can encounter "a judge and an elderly person, who doesn't even know how to read" working in the same place [comment by Lisbon city official]. In Stockholm, gardeners originated from 13 different countries reflecting the changing demographics of the neighbouring estate. The garden also successfully engaged older and retired people as well as unemployed people. For many, the allotments acted as a social gathering point for activities such as tea drinking and barbecuing. This provided opportunities for long-term Swedish residents and new immigrant residents to interact, and for immigrants from different places to interact with each other. In Ljubljana, exposure to different gardening styles had anecdotally made garden users more tolerant towards different lifestyles. In Edinburgh, increased social interaction, and improved sense of identity, belonging and community were reported.

In all of our case studies, adult volunteers increased their awareness of, and expertise on, environmental issues, horticulture and healthy nutrition. Sometimes CUG also contributed to people's capacity to engage in management and political decision-making processes. This was achieved either through peer-to-peer learning or attending courses. In Malmö, for example, farmers were supported by a facilitator in developing a viable business model (i.e. choosing the right crop, product packaging and distribution). In addition, a number of groups shared their skills and knowledge beyond their immediate membership by organizing educational and/or cultural events or activities targeted at school children (Edinburgh and Szeged) or the general public (Edinburgh, Szeged and Ljubljana). The Stockholm case, together with

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[2] A more detailed description of this case study is provided by Drilling et al. (2016).

Table 2
Key features of case study initiatives. For the classification of activities, we clustered activities into five main groups; *horticulture, education, social cohesion, recreation & access,* and *biodiversity.* Cases were allocated to groups based on observed action(s) clearly intended to meet each of these outcomes (e.g., removing invasive plant species to improve biodiversity; organizing activities with a view on enhancing social cohesion), rather than indirect consequences (e.g., improved biodiversity as a result of growing fruit trees; improved social cohesion as a result of casual encounters between gardeners).

Initiative	City, country (planning family)	Year of origin	Site features	Land tenure	Focus of activities
Beyond the Construction Site	Ljubljana, Slovenia (New Member States)	2010	A 0.2 ha dormant construction pit in city centre with raised beds for gardening	Formal agreement	horticulture, education, recreation & access, biodiversity
Granton Community Gardeners	Edinburgh, UK (British)	2010	c. 10 small gardens on e.g. street corners, (< 1 ha) in area of multiple deprivation	Informal agreement	horticulture, education, biodiversity, social cohesion
Hyllie urban farming	Malmö, Sweden (Nordic)	2015	Several 0.1 ha farming plots (a) and a small area with raised beds (b) on land designated for development	Formal agreement	horticulture, education, recreation & access
Igelbäcken Allotment Garden	Stockholm, Sweden (Nordic)	1978	2.3 ha of land divided into 160 plots adjacent to a diverse neighbourhood	Lease	horticulture, education
Lisbon publicly accessible allotment gardens	Lisbon, Portugal (Mediterranean)	2007	11 gardens (+10 planned), total of 38 ha	Lease	horticulture, education, recreation & access, biodiversity
The Stopping Place	Szeged, Hungary (New Member States)	2014	12 plots of 7 m² on institutional land in council estate	Lease	horticulture, education, recreation & access

other allotments in the city, offered a paid gardening and construction work program for young people.

3.3. Analysis of governance arrangements

The next step of the anparalysis involved recording the governance components explaining success in delivering social resilience, a summary of which can be found in Table 3.

3.3.1. Rules of the game
The *rules of the game* describe the institutional context in which initiatives are embedded as well as the internal regulations and accepted practices. Rules can either be formal (e.g., regulations or a use agreement) or informal (e.g., policies or informally agreed ways of working). We found that sets of formal or informal rules served to regulate gardening practice in all cases. Typically, gardeners were expected to keep their plots tidy, safe and free of weeds, and to contribute to the maintenance of common areas. Restrictions regarding use of synthetic pesticides and fertilisers also applied in most studied cases. In a small number of cases, gardeners had an agreed set of rules regarding payment of membership fees, attending meetings, sale of garden produce and construction of sheds and other buildings. Some initiatives operated with an elected board of gardeners, representing the interests of the garden membership. In those cases, a constitution with additional rules regarding election of board members and annual reporting was in place. Some groups also indicated having a legal obligation to buy public liability insurance. Generally, a support structure with regular meetings, clear rules and regulations in areas outlined above was conducive to coordinating gardener efforts and their buy-in to the project.

In a nearly all cases, plans, policies and legislation at different levels of government were described as an important enabling factor. For example, "culture" and "farming" were the central themes within the South Hyllie master plan (Malmö). Edinburgh, the Community Empowerment (Scotland) Act 2015 was born out of a desire by the government to strengthen community planning and control over the management of public land and buildings. Planning concepts such as temporary gardening (Ljubljana & Malmö) and, in the case of Lisbon, publicly accessible gardens integrated with parks, were among the innovative highlights in those cities.

3.3.2. Actors
Concerning *actors* involved, the role of municipalities was in all cases significant, either in initiating or supporting initiatives. Although not always directly involved in project conceptualization or decision-making, they had in all cases played a crucial role as provider of land for CUG. They also supported initiatives to various degrees by providing legal permissions (e.g., formal use agreement), supportive policies, funding, tools and training.

NGOs played a key role in initiating two of the initiatives (Ljubljana and Szeged).

We found that an open-minded garden management style with a structure of regular gardener meetings and easy-to-approach committee members prompted garden users to proactively contribute to decision-making. For example, in the Edinburgh and Stockholm cases, gardening activities and interactions between users proceeded in a fairly unstructured and informal manner. The initiatives had been allowed to happen and unfold organically, through observing one another and seeing what everyone grows in their garden, through talking, and through the cleaning days and socializing over barbecuing and tea. Moreover, we observed little or no mandatory events in both gardens; gardeners were free to interact and contribute as much or as little as they desired. Another management aspect contributing to success was the active involvement of gardeners in co-creating the site. For example, facilitators in the Ljubljana case employed a range of methods in consulting local people about their green space needs ahead of deciding

Fig. 2. Map of Europe displaying the locations of the six case study cities.

upon the purpose of the site. This included interviews, field research, group meetings and focus groups.

Another important observation is that relevant actors to involve are not just those that directly participate in the initiative; success of CUG was linked to involving all stakeholders. To this end, several of the studied urban gardening initiatives (Edinburgh, Szeged, Ljubljana) had consulted the local community ahead of garden implementation using surveys, focus groups and interviews. Maintaining good rapport with local people by being transparent about (planned) activities was also considered important by some stakeholders. In Edinburgh, Ljubljana and Szeged, the community gardening initiatives engaged with local people using their own and partners' websites, social media, posters at strategic locations and/or delivering (door-to-door) flyers.

3.3.3. Resources

We found access to three basic types of *resources* – land, funding (financial or in-kind contributions) and expertise – to be essential to starting-up and establishing CUG initiatives. In all cases, land had been provided by the municipality and secured for practicing CUG for at least one year by means of a use or lease agreement. In all cases, except Edinburgh, municipalities had contributed some funding towards

buying tools and materials for creating and maintaining the gardens, and for building structures (e.g., sheds or paths). NGOs had covered some of these costs in those cases where they had set up an initiative; indirectly spending EU, government or private funds on CUG. In all cases, professional expertise had been provided by the organization(s) or individuals initiating the garden(s). Access to expertise in areas such as fundraising and community building, in addition to horticulture, was important in explaining success. Being connected to municipal decision-makers or other relevant peers, or a willingness to establish these, was conducive to accessing relevant support. For example, the allotment board at Igelbäcken (Stockholm) collaborated with two allotment associations for guidance on good practice, insurance, legal advice and opportunities for knowledge exchange.

The studied CUG-initiatives relied upon a variety of financial support mechanisms. In many of the cases, grant aid was an important source of funding. For example, the NGO which set up the Szeged garden relied on a grant from the European Social Fund – aimed at job skills training and increasing economic and social cohesion[3] – for most of their work on the site. Gardeners in the Edinburgh case successfully

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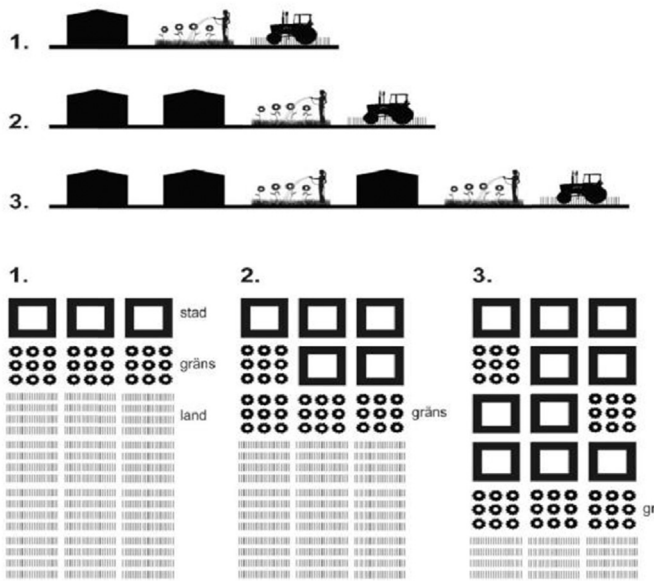[3] See: http://ec.europa.eu/esf/home.jsp.

Fig. 3. Illustration of Malmö's vision for urban development incorporating small-scale urban farming at South Hyllie, taken from the municipal Comprehensive Plan (Malmö Stad, 2015). The figure shows how the farming plots (tractor symbol) will move to unused land as the city (house symbol) expands, while some of the urban garden sites (watering flowers symbol) initially at the outskirts of the city may be incorporated as a public green space within the new development (stad = city; gräns = frontier; land = countryside).

applied for a Lottery grant aimed at community building, as well as from a national fund supporting voluntary action, which is supported by Scottish Government and private benefactors. Our case studies also demonstrated how corporate social responsibility activities – financial or in-kind donations or staff volunteer programmes – can support CUG-initiatives in relevant aspects of work. A third funding mechanism we identified was membership fees for garden use. Although charging for garden use poses the obvious risk of excluding people, fees were relatively low in the three cases in which we observed this (€19 per year in Szeged; €70 per year in Stockholm; €1.28/m² per year in Lisbon). Moreover, Lisbon municipality only charged a symbolic fee of €0.32/m² per year to users of the social allotments in the poorest neighbourhoods. Finally, innovative business models can be key to resource acquisition. In the Malmö case, for example, large plot gardeners are provided with start-up support and are expected to generate income over time by selling exotic, locally grown, crops.

3.3.4. Discourse

The success of the studied initiatives had to a large extent be influenced by its success in meeting broadly shared concerns or interests within the community. In all cases, some users indicated they were involved out of a need for healthy eating and/or food sovereignty. Others had joined to engage in a meaningful pastime activity and/or to relax (Szeged, Stockholm). Sustainable living and environmental education were also mentioned as drivers by some (Szeged, Ljubljana). For yet another set of users, the desire to socialize, build community and/or engage in active citizenship had been a key motivation (Ljubljana, Stockholm, Edinburgh).

Frontrunners in the public, private and third sector setting played an important role had sometimes actively shifted food-growing discourses. For example, an interviewed Community Gardening Development Officer in Edinburgh attributed increased local interest in community gardening in part to recent garden-related events in the city, such as the creation of a community orchard at the Edinburgh hospital and the introduction of gardening activities into the primary school curriculum. Related to this, we observed evidence for CUG-initiatives drawing inspiration from other locally successful projects popularizing CUG. For example, the enterprise responsible for the urban

Table 3
Summary of governance arrangements for each of the case studies.

CUG initiative	Rules of the game	Actors	Resources	Discourse
Beyond the Construction Site (Ljubljana, Slovenia)	Gardeners expected to participate in meetings, contribute to maintenance of shared spaces and abide by rules regarding (organic) cultivation methods	Municipality, NGO, citizens	Land and infrastructure provided by municipality; grant aid provided by an NGO, the municipality, the EU, the State, and a business providing seeds	Social regeneration of city quarter; creating sense of place and fostering social relationships
Granton Community Gardeners (Edinburgh, United Kingdom)	Rules regarding public liability insurance, membership, garden management structure, the annual general meeting, finance and dissolution of the association	Municipality, NGOs, citizens	Land provided by municipality; NGOs provided funding and insurance; volunteers (and occasionally a business) provided professional expertise and tools	Improving nutrition and health, environmental awareness and community integration
Hyllie urban farming (Malmö, Sweden)	Gardeners of larger plots need to set themselves up as a company, meet food handling regulation and pay tax, contribute to meetings and common operations. No such demands for small plot farmers	Municipality, business, university, government agency, citizens	Land, construction of raised beds, shed etc. funded by municipality; funding for facilitators by government agency; professional expertise provided by all project partners	Creating job opportunities, self-sufficiency and strengthening the ecological sustainability of the region
Igelbäcken Allotment Garden (Stockholm, Sweden)	Rules regarding payment of membership fee, maintenance of plots and contribution to shared areas, (anti)social behaviour and construction	Municipality, allotment garden associations, citizens	Land provided by municipality; legal support, public liability insurance and training provided by allotment garden associations; annual membership fee by gardeners	Providing a place to grow food and to support health and well-being
Lisbon municipality allotment gardens (Lisbon, Portugal)	All allotments have a defined catchment area; gardeners pay an annual fee and need to abide by (organic) cultivation methods	Municipality, resident associations, businesses and citizens	Land, infrastructure and planning expertise provided by municipality; annual membership fee by gardeners; funding by businesses	Reducing green space maintenance costs, improving environmental sustainability; promoting food sovereignty
The "Stopping Place" (Szeged, Hungary)	The garden has a defined catchment area; users are expected to contribute to maintenance of shared areas and there are rules regarding plot maintenance and trading of produce	Municipality, NGO, business, citizens	Land provided by business (subsidiary of municipality); funding provided by EU, municipality, gardener membership fee and donations from events; professional expertise provided by municipality and NGO	Reducing alienation and improving accessibility of green spaces for health benefits

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Table 4

Success factors of social resilience delivered by communal urban gardening (CUG) initiatives using the Policy Arrangement Approach (van Tatenhove et al., 2000).

Dimension	Success factor
Rules of the game	Provide internally agreed and clearly formulated goals, rules and governance procedures within the initiative
	Make the case for municipal policies and regulation directly or indirectly supporting civic greening
	Experiment with innovative planning concepts such as temporary gardening, rooftop gardens and publicly accessible gardens
Actors	Municipal support in providing legal permissions, supporting policies, land, funding, tools and training
	Engage in partnership working with businesses and NGOs in the gardening initiative
	Promote broad community support by consultation and transparent communication from the early planning stage of project onward
	Facilitators employing an open-minded management style by being approachable, responsive and using everyday language
Resources	Develop a sustainable business model drawing income from grant aid, events to raise financial or in-kind donations and charging gardener fees
Discourse	Create and nurture a social network providing access to technical support, political support and relevant know-how
	Encourage (organisational) leadership in promoting urban agriculture gain support
	Tap into broadly shared urban food growing motivations by providing opportunities for peer-to-peer learning, advocating for sustainable cultivation methods and creating scope for socializing
	Gain traction by targeting areas with high food-growing demand

farming plots studied in Malmö had previously been involved in creating a garden named "Herbs from Rosengård", which had revealed that many immigrant residents have the right skills to grow high-demand exotic crops. The Szeged case capitalized upon the growing popularity of community gardening in Budapest where 33 of such gardens had been created since the first was opened in 2011.

We also identified factors impacting on discourse that were somewhat independent of policies and food growing trends, instead relating to urban morphology or cultural traditions. For example, the gardens in Edinburgh, Ljubljana, Szeged and Lisbon were all situated in densely populated areas including a number of flats inhabited by people without garden access and/or limited accessible public green space, possibly giving rise to a relatively high desire for CUG. In other places, local people expressed a desire to preserve some of the lands traditionally used for agriculture by continuing to grow food. Concerns about the large amount of derelict land and buildings as a result of abandoned industries, described as "points where the city is dying", motivated the idea to create the temporary community garden in Ljubljana.

3.4. Partnership working and participation

In all cases, partnership working was absolutely central to explaining success in delivering social resilience Perhaps most illustrative in this regard was the Edinburgh case of Granton Community Gardeners. This truly grassroots initiative had successfully lobbied the municipality to change their policy on community food growing. In Edinburgh, the need for policy change came about as a municipal committee made the decision to charge all communities managing public land a commercial lease in a bid to level the playing field for all community groups. In response to this, representatives of Granton Community Gardeners and a nearby community group arranged for a deputation to go to this committee. This was successful, promoting the committee to come back on their decision. As a result, the current city-wide policy is that land for community growing should be made available at a symbolic (peppercorn) rent or free of charge. Paradoxically, in most other areas, the initiative wants to keep itself firmly distanced from authorities, which was key to their success. This was also acknowledged by a city official: *It's steered by them, not by us, there's not that link to the Council that may or may not affect their standing in their community. They are their own kind of organization without bounds to us, whether that's contractually or otherwise. They're able to do things and say things, work on projects and engage with people in a way that we would probably find very difficult.* In Stockholm case this distance to the rule of government was also described as a key success factor: *It would be best if we were left alone and that the voluntary integration project that this garden is can be seen as a successful thing. It is a long-term project and it really works. They* [local government] *can put in as much money as they*

like in short-term project that die after a couple years but we have been here since 1976 and it works relatively good. [It is] *A lot better than the short compulsory projects.* Despite their limited influence on actual practice, municipalities in both cases played a key role in providing crucial resources to these groups. This suggests true community empowerment commitment.

Innovative governance arrangements were also central to success in all other cases, although the innovativeness of the arrangements was confined to the local level. In Lisbon, for example, the studied allotment gardens provided the first example of authorities formally promoting active citizenship in CUG. In the Szeged case, the hybrid governance arrangement between an NGO and the municipality laid the groundwork for the first community garden in the city, while in the case of Hyllie (Malmö), partnership working resulted in the innovative urban gardening concept and business model that was so crucial to its success (see Section 3.3.3). There were other benefits as well: the social enterprise anticipated selling on their expertise to other municipalities and gained a percentage of farmer revenue, the university expected to demonstrate research impact while the municipality envisaged that the sustainable city district would increase the city's attractiveness to visitors and investors.

In all cases, partnership working was absolutely central to explaining success in delivering social resilience. Finally, in Ljubljana partnership working between an NGO and the community resulted in the decision to push for a use agreement to carry out CUG on derelict land.

4. Discussion

4.1. Governance aspects predicting CUG success

The present research revealed a range of key drivers predicting the success of CUG initiatives in establishing themselves and promoting social resilience, which have been summarized as recommendations in Table 4.

4.1.1. Internal rules and institutional context

Our findings suggest that community groups benefited from internally agreed and clearly formulated objectives, rules and governance procedures. By governance procedures we mean a degree of hierarchical organization with an elected board of representatives responsible for administrative tasks, decision-making and regular meetings to discuss and plan activities. Rules were formulated around such areas as plot maintenance and sustainable cultivation methods. Previous research has also outlined the importance of formulating clear goals and granting additional responsibilities to some gardeners in volunteer green space maintenance (Molin and Konijnendijk van den Bosch, 2014; Saldivar-Tanaka and Krasny, 2004; Stenseke, 2009).

Various studies, mainly in the US and Canada, have explored the importance of municipal urban agriculture plans or strategies in supporting urban food growing (Cohen and Reynolds, 2014; Hanson and Schrader, 2014; Jermé and Wakefield, 2013; Lang, 2014). Such policies reflect a growing understanding of the role of urban agriculture in creating more sustainable food systems and delivering ecosystem services, such as food provision and community building (Swagemakers et al., 2014). Although municipalities contributed resources to design and implementation of urban agriculture in the majority of the studied cases, we did not find evidence of such specific urban agriculture documents in the six case study cities. Instead, urban agriculture was often an element of more generic urban green plans or spatial planning documents. For example, the publicly accessible allotments in Lisbon were implemented as part of the city's wider Green Plan and provided the very first formal allotments delivered by the municipality.

Perhaps as a response to urban densification, new planning concepts for CUG are emerging, and in some cases actively promoted, to meet increasing demand for urban food growing despite limited space. These include community gardens integrated with parks (Middle et al., 2014), public access community gardens (Bendt et al., 2013), rooftop gardens (Yuen and Hien, 2005) and temporary gardens on brownfields (van der Jagt et al., 2016). In the present study, we also observed creative approaches to securing land by some CUG initiators, including temporary land use in Ljubljana, use of several isolated pockets of land, too small for property development, in Edinburgh, publicly accessible allotments in Lisbon and both the consideration of CUG as a spatially dynamic planning concept, moving outwards as the city expands, and the integration of CUG with parks in Malmö.

Although internal rules contribute to long-term success, this may not necessarily be the case for externally imposed rules and regulations. For example, the present study included one case in which keeping some distance from the municipal decision-making structures was thought to improve the legitimacy of the group locally. This could be at least be partially explained by communities mistrusting the municipality (Lawrence et al., 2014; Mathers et al., 2015). However, for the municipality to withdraw support for this reason is no option given their role as key actor through providing land or funding in all cases. Echoing a recommendation by Lawrence et al. (2014), municipalities facilitating CUG are therefore advised to avoid bureaucracy and a wide range of formalities in their dealings with community groups.

4.1.2. Key actors, consultation and outreach

The municipality played a central role in all six of our studied cases as land owner, policy maker and provider of legal permissions and, to varying degrees, funding, tools and training. This is in agreement with the contention that municipalities increasingly acknowledge the benefits of CUG and other types of civic greening, which stimulates co-governance (Bendt et al., 2013; Rosol, 2010; Swagemakers et al., 2014). Notably, municipalities had not been the driver in any of the four most recent examples of CUG in our set of case studies; they were initiated by NGOs, a social enterprise and a community group. This is illustrative of what Lawrence et al. (2013) called the trend towards "governance with government" as opposed to "governance by government" or "governance without government". The support and formal recognition provided by municipalities aid in mustering citizen interest in greening initiatives and to ensure a level of legal protection against the ever-looming threat of housing development (Halloran and Magid, 2013; Mathers et al., 2015).

Most of the projects in our study sample had been started by non-governmental actors, including NGOs, a social enterprise and a community group. This is in agreement with previous observations. In relation to community gardens, for example, Veen (2015) noted that "these projects have been started by a wide variety of initiators including citizens, housing corporations, local governments, entrepreneurs, artists and community workers". In a review of the literature on community gardens, Middle et al. (2014) also reported

evidence of garden management by a range of actors; government, private actors, schools, health centres and community groups. It follows from this that partnership working is important to the success of citizens and communities engaging in CUG with a view on drawing in support (Seymoar et al., 2010). Partnership working is becoming increasingly prevalent as a result of improved online communication networks and public bodies recognizing the value of collaborative planning in making effective decisions, encouraging local buy-in and improving awareness (Birky and Strom, 2013; van Herzele et al., 2005).

Consultation and outreach activities were undertaken in half of the case study gardens to connect with actors internal and external to the gardening initiative. In all instances, this was done at an early stage when the initiating actors were planning the actual project. In the case of Ljubljana, facilitators took it one step further by inviting local people to suggest different options for co-designing and -creating the derelict site. Early input to plans is important to enable communities to take ownership of the project (van Herzele et al., 2005). We also found that a range of approaches to consultation, going beyond basic public engagement methods, were employed in CUG initiatives. Methods included interviews, field research, focus groups and surveys. Related to this, outreach activities including the use of a website, social media and printed communications were used to recruit new gardeners and increase local support of gardening activities. Another important success factor was an open-minded management style in which facilitators or leading members were approachable, responsive and spoke the language of the local people. Availability and receptiveness of executive staff was similarly considered a lesson in achieving successful local co-management by Stenseke (2009), while evidence by Moskell and Allred (2013) underscores our findings by demonstrating that community urban forest stewardship initiatives benefit from governmental actors communicating directly in easy-to-understand language.

4.1.3. Land, funding, knowledge and skills

The availability of resources was crucial to the ability of studied initiatives to engage in place making. We can distinguish between two main types of resources: funding and expertise. In agreement with earlier findings (Saldivar-Tanaka and Krasny, 2004; Stenseke, 2009; Wakefield et al., 2007; Zoellner et al., 2012), external funding – used towards purchasing tools and materials, and to cover ongoing expenses on seeds, utilities and infrastructure – was fundamental to the survival of community groups. In some cases, funding was also used to organize the participatory processes involving NGOs or municipalities and gardeners. The set of case studies also showed the crucial role of technical support, political support and access to information, and related to that a strong social network, in accessing skills and expertise in relevant areas. These have been cited as success factors in previous studies too (Ghose and Pettygrove, 2014; Glover et al., 2005; Saldivar-Tanaka and Krasny, 2004). Popular means for accessing resources included grant aid, financial or in-kind donations and gardener fees. This, combined with involving knowledgeable and/or powerful actors, as well as being sensitive and making the most of skills and expertise internal to the group, proved to be popular delivery mechanisms. Obviously, land is an important resource as well. Land acquirement is strongly dependent on funding and expertise, as well as legal permissions and the policy context as discussed previously.

4.1.4. Broadly shared concerns and interests

A variety of broadly shared motivations for CUG emerged in the present study. Reputable organizations have the potential to influence support for CUG by acting as frontrunners or champions. Increased familiarity with CUG as a result of exposure to other successful examples may also have a positive influence. The latter is an example of peer-to-peer learning, which is known to be highly effective given the ease of building high levels of interpersonal trust (Seymoar et al., 2010). Current gardener motivations, as reflected in our findings, did not usually take a broad range of ecosystem services into account.

Table 5
Characteristics of civil society involvement in each of the six case studies.

City (initiative)	Mode of governance	Means of participation	Independence from political agenda
Ljubljana (Beyond the Construction Site)	Self-governance	Mainly hands-on; some political influence	Political choice
Edinburgh (Granton Community Gardeners)	Self-governance	Mainly hands-on; some political influence	Political choice
Malmö (Hyllie urban farming)	Self-governance	Hands-on and political influence	Political choice
Stockholm (Igelbäcken Allotment Garden)	Self-governance	Mainly hands-on; some political influence	Public performance
Lisbon (publicly accessible allotment gardens)	Self-governance	Hands-on	Public performance
Szeged (The Stopping Place)	Self-governance	Hands-on	Political choice

Typically, reference was made to learning new skills and food sovereignty, relaxation, sustainable living and healthy eating, and/or community building. This is in agreement with previous research showing community development (Saldivar-Tanaka and Krasny, 2004), access to fresh produce and knowledge on food growing (Birky and Strom, 2013) and a more sustainable food system (Swagemakers et al., 2014) to be dominant motivations. By highlighting these lesser known ecosystem service benefits – particularly regulating services such as flood mitigation – delivered by urban gardens, facilitators could thus potentially further strengthen citizen support for this practice.

4.2. Innovative approaches to civil society involvement

Interpreting the present findings on partnerships and participation using the civil society engagement typologies described by van der Steen et al. (2014) and van der Jagt et al. (2016) revealed some variation in the relationships between government and civil society across the cases (see Table 5). Yet, all were successful in their own ways. This suggests that there is no single "right" solution; what works is likely dependent on context.

Regarding the *mode of governance* dimension, most initiatives provide examples of self-governance in the sense that they involve civil society actors in decision-making. This is unsurprising as we only consider examples of communal gardening in our dataset. In those two cases (Lisbon & Stockholm) where CUG was initiated by the municipality, this initially mainly served to deliver upon their own political agenda. Yet, we can see in the Stockholm case that while the initiative is still delivering upon political aims, it is now also providing users with the freedom to act rather independent of any political input. In fact, such experimentation without government steering was seen as absolutely key to the success of this garden. Therefore, a low *independence from political agenda* in successful initiatives does not imply that users have no actual political choice. Likewise, municipalities joining civil society initiatives with high *independence from political agenda* do not automatically have to make concessions to their own agenda. Indeed, the benefits by grassroots CUG initiatives to social resilience often match the health and well-being agendas of governments. Moreover, they may also contribute to an improved city reputation for tourism and investment (see Malmö case). These findings demonstrate the important role of polycentric governance (Huitema et al., 2009; Ostrom, 2010) in CUG; both government-initiated projects involving citizens and grassroots initiatives can drive innovative NbS. Yet, innovative solutions are most prevalent at the nexus where government and non-government actors operating at different scales meet and all parties are open to experimenting with new ideas and solutions, and in doing so are prepared to let go of, and exchange, hierarchical power positions.

Concerning the *means of participation* dimension, we found that all initiatives were predominantly concerned with hands-on participation. Some evidence of political activities could, however, be observed. This even applied to the case of Edinburgh that deliberately chose to operate as independent as possible from the municipality in order to gain better rapport with local people. Yet, the grassroots initiative engaged in active lobbying of the municipality in order to get them to change their policy on community food growing.

In the Ljubljana and Malmö cases, plans to engage with formal municipal decision-making processes were developed as well. For example, experiences around project implementation have been documented in Malmö for the purpose of compiling guidance on the farming and commercial aspects of the project which is to be disseminated to other municipalities in Sweden. Attempts to lobby for policy change were also reported in the Stockholm case. Similar to the *independence from municipal agenda* dimension, we therefore need to consider this axis as a spectrum of activity along which initiatives can dynamically move. Doing so can have clear pay-offs for initiatives; this flexibility in *means of participation*, even for true grassroots initiatives, acted as an important success factor in this study.

5. Conclusion

From building community capacity, contributing to social regeneration, increasing citizen input into decision-making, through to their potential to act as an instrument for socio-cultural integration that brings people from different cultures together, as demonstrated by this study, the communal urban gardens in our study acted as nature-based solutions contributing to social resilience. Notably, benefits of CUG extended beyond the people immediately involved. We found evidence of people not involved in CUG benefiting from this practice through enhanced access to affordable, nutritious food, environmental education (school children), and transformed local green spaces more adequately matching their lifestyle and culture.

Despite there being "no one size fits all" solution to achieving successful civic engagement in CUG, success factors applying across different planning and cultural contexts could be identified. The present findings underscore the importance of human and financial resources of local communities in explaining success, it also points to the influential role of government policies, municipal support, facilitators or local food 'champions' and public demand for food growing. The role of context is significant as well, the community garden initiative in Szeged (Hungary) was very innovative within the local context but would unlikely have been regarded as such within any of the other five case study cities. We did not find any evidence of either top-down or bottom-up initiatives being more effective than the other, which could be due to the variation in contexts. More relevant was the degree to which government actors involved were prepared to let go of a command-and-control style of governance and appreciated the role CUG, even when not strictly regulated, could play in meeting their own political agenda. For civil society, an important success factors was the degree to which involved actors were prepared to engage in both hands-on and political activities, even for those grassroots initiatives with a desire to operate somewhat beyond the political radar. Therefore, perhaps the most important message emerging from this exercise is that for CUG to achieve community buy-in and flourishing, ultimately we need an approach that enables local people to discover, nourish, adapt and co-create their own culture.

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References

Alaimo, K., et al., 2008. Fruit and vegetable intake among urban community gardeners. J. Nutr. Educ. Behav. 40 (2), 94–101.

Andersson, E., Barthel, S., Ahrné, K., 2007. Measuring social – ecological dynamics behind the generation of ecosystem services. Ecol. Appl. 17 (5), 1267–1278.

Armstrong, D., 2000. A survey of community gardens in upstate New York: implications for health promotion and community development. Health Place 6, 319–327.

Arts, B., Leroy, P., van Tatenhove, J., 2006. Political modernisation and policy arrangements: a framework for understanding environmental policy change. Public Organ. Rev. 6 (2), 93–106.

Barnidge, E.K., et al., 2013. Association between community garden participation and fruit and vegetable consumption in rural Missouri. Int. J. Behav. Nutr. Phys. Act. 10, 128.

Barthel, S., Folke, C., Colding, J., 2010. Social-ecological memory in urban gardens - retaining the capacity for management of ecosystem services. Glob. Environ. Change 20, 255–265.

Barthel, S., Isendahl, C., 2013. Urban gardens, agriculture, and water management: sources of resilience for long-term food security in cities. Ecol. Econ. 86, 224–234.

Barthel, S., Parker, J., Ernstson, H., 2015. Food and green space in cities: a resilience lens on gardens and urban environmental movements. Urban Stud. 52 (7), 1321–1338.

Beilin, R., Hunter, A., 2011. Co-constructing the sustainable city: how indicators help us "grow" more than just food in community gardens. Local Environ. 16 (6), 523–538.

Bendt, P., Barthel, S., Colding, J., 2013. Civic greening and environmental learning in public-access community gardens in Berlin. Landsc. Urban Plan. 109 (1), 18–30.

Bennett, E.M., Peterson, G.D., Gordon, L.J., 2009. Understanding relationships among multiple ecosystem services. Ecol. Lett. 12, 1–11.

Berkhout, F., Hertin, J., Jordan, A., 2002. Socio-economic futures in climate change impact assessment: using scenarios as "learning machines". Glob. Environ. Change 12 (2), 83–95.

Birky, J., Strom, E., 2013. Urban perennials: how diversification has created a sustainable community garden movement in the United States. Urban Geogr. 34 (8), 1193–1216.

Brenner, N., Theodore, N., 2002. Cities and the geographies of "actually existing neoliberalism". Antipode 34 (3), 348–379.

Buijs, A.E., et al., 2016. Active citizenship and the resilience of urban green: fostering the diversity and dynamics of citizen contributions through mosaic governance. Curr. Opin. Environ. Sustain. 22 (January), 1–6.

Buizer, M., et al., 2015. The governance of urban green spaces in selected EU-cities. Deliverable 6.1 of the GREEN SURGE project. Available at: ⟨http://greensurge.eu/working-packages/wp6/⟩.

Church, A., et al., 2015. "Growing your own": a multi-level modelling approach to understanding personal food growing trends and motivations in Europe. Ecol. Econ. 110, 71–80.

Cohen, N., Reynolds, K., 2014. Urban agriculture policy urban agriculture policy making in New York's "New Political Spaces": strategizing for a participatory and representative system. J. Plan. Educ. Res. 34 (2), 221–234.

Colasanti, K.J.A., Hamm, M.W., Litjens, Charlotte, M., 2012. The city as an "Agricultural Powerhouse"? Perspectives on expanding urban agriculture from Detroit, Michigan. Urban Geogr. 33 (3), 348–369.

Colding, J., Barthel, S., 2013. The potential of "Urban Green Commons" in the resilience building of cities. Ecol. Econ. 86, 156–166.

Davies, C., et al., 2015. Green infrastructure planning and implementation. Deliverable 5.1 of the GREEN SURGE project, Copenhagen. Available at: ⟨http://greensurge.eu/working-packages/wp5/⟩.

Delshammar, T., Partalidou, M., Evans, R., 2016. Building trust and social skills in urban allotment gardens. In: Bell, S. (Ed.), Urban Allotment Gardens in Europe. Routledge, New York.

Drilling, M., Giedych, R., Poniży, L., 2016. The idea of allotment gardens and the role of spatial and urban planning. In: Bell, S. (Ed.), Urban Allotment Gardens in Europe. Routledge, New York, pp. 35–61.

Eggermont, H., et al., 2015. Nature-based Solutions: new influence for environmental management and research in Europe. GAIA - Ecol. Perspect. Sci. Soc. 24 (4), 243–248.

European Commission, 2015. Towards an EU Research and Innovation policy agenda for Nature-Based Solutions & Re-Naturing Cities. Available at: ⟨http://bookshop.europa.eu/en/towards-an-eu-research-and-innovation-policy-agenda-for-nature-based-solutions-re-naturing-cities-pbKI0215162/⟩.

Folke, C., 2006. Resilience: the emergence of a perspective for social-ecological systems analyses. Glob. Environ. Change 16, 253–267.

Ghose, R., Pettygrove, M., 2014. Actors and networks in urban community garden development. Geoforum 53, 93–103.

Glavan, M., Istenič, M.Č., Cvejić, R., Pintar, M., 2016. Urban gardening: from cost avoidance to profit making—example from Ljubljana, Slovenia. In: Samer, M. (Ed.), Urban Agriculture. InTech, Rijeka, Croatia, pp. 23–42.

Glover, T.D., Parry, D.C., Shinew, K.J., 2005. Building relationships, accessing resources: mobilizing social capital in community garden contexts. J. Leis. Res. 37 (4), 450–474.

Haase, D., Haase, A., Rink, D., 2014. Conceptualizing the nexus between urban shrinkage and ecosystem services. Landsc. Urban Plan. 132, 159–169.

Hajer, M., et al., 2015. Beyond cockpit-ism: four insights to enhance the transformative potential of the sustainable development goals. Sustainability 7, 1651–1660.

Halloran, A., Magid, J., 2013. The role of local government in promoting sustainable urban agriculture in Dar es Salaam and Copenhagen. Geogr. Tidsskr.-Dan. J. Geogr. 113 (2), 121–132.

Hanson, L.L., Schrader, D., 2014. Creating new urban spaces of sustainability and governmentality: an assessment of the development of a food and urban agriculture strategy for Edmonton, Canada. In: Holt, W.G. (Ed.), From Sustainable to Resilient Cities: Global Concerns and Urban Efforts (Research in Urban Sociology 14. Emerald Group Publishing Limited, Bingley, UK, pp. 191–214.

Heritage Lottery Fund, 2016. State of UK public parks 2016. Available at: ⟨https://www.hlf.org.uk/state-uk-public-parks-2016⟩.

Huitema, D., et al., 2009. Adaptive water governance: assessing the institutional prescriptions of adaptive (co-)management from a governance perspective and defining a research agenda. Ecol. Soc. 14 (1), 26.

Jermé, E.S., Wakefield, S., 2013. Growing a just garden: environmental justice and the development of a community garden policy for Hamilton, Ontario. Plan. Theory Pract. 14 (3), 295–314.

Jessop, B., 2002. Liberalism, neoliberalism and urban governance: a state-theoretical perspective. Antipode 34 (3), 451–472.

Kabisch, N., et al., 2016. Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action. Ecol. Soc. 21 (2), 39.

Kałużna, M., Mizgajski, A., 2016. Community gardens in Poland – impulse, assistance, expansion. In Tappert, S., Drilling, M., eds. Growing in Cities. Interdisciplinary Perspectives on Urban Gardening. in: Proceedings of the Conference, Basel, Switzerland: University of Applied Sciences, pp.106–118.

Krasny, M.E., Tidball, K.G., 2009a. Applying a resilience systems framework to urban environmental education. Environ. Educ. Res. 15 (4), 465–482.

Krasny, M.E., Tidball, K.G., 2009b. Community gardens as contexts for science, stewardship, and civic action learning. Cities Environ. 2 (1), 8.

Lang, U., 2014. Cultivating the sustainable city: urban agriculture policies and gardening projects in Minneapolis, Minnesota. Urban Geogr. 35 (4), 477–485.

Lawrence, A., et al., 2014. Local authorities in Scotland: A catalyst for community engagement in urban forests? In: Proceedings of the Institute of Chartered Foresters, The Trees, People and the Built Environment II (TPBEII) Conference, Birmingham, UK.

Lawrence, A., 2006. "No personal motive?" Volunteers, biodiversity, and the false dichotomies of participation. Ethics, Place Environ. 9 (3), 279–298.

Lawrence, A., et al., 2013. Urban forest governance: towards a framework for comparing approaches. Urban For. Urban Green. 12 (4), 464–473.

Litt, J.S., et al., 2011. The Influence of social involvement, neighborhood aesthetics, and community garden participation on fruit and vegetable consumption. Am. J. Public Health 101 (8), 1466–1474.

Malmö Stad, 2015. Fördjupad översiktsplan för Södra Hyllie (Comprehensive plan for South Hyllie). Available at: ⟨http://malmo.se/download/18.5f3af0e314e7254d70e613e5/1491301624843/S%C3%B6draHyllieutst%C3%A4llningsf%C3%B6rslag.pdf⟩.

Mathers, A., Dempsey, N., Frøik, J., 2015. Place-keeping in action: evaluating the capacity of green space partnerships in England. Landsc. Urban Plan. 139, 126–136.

McClintock, N., 2014. Radical, reformist, and garden-variety neoliberal: coming to terms with urban agriculture's contradictions. Local Environ. 19 (2), 147–171.

Middle, I., et al., 2014. Integrating community gardens into public parks: an innovative approach for providing ecosystem services in urban areas. Urban For. Urban Green. 13 (4), 638–645.

Molin, J.F., Konijnendijk van den Bosch, C.C., 2014. Between big ideas and daily realities – The roles and perspectives of Danish municipal green space managers on public involvement in green space maintenance. Urban For. Urban Green. 13 (3), 553–561.

Moskell, C., Allred, S.B., 2013. Residents' beliefs about responsibility for the stewardship of park trees and street trees in New York City. Landsc. Urban Plan. 120, 85–95.

Nadin, V., Stead, D., 2008. European spatial planning systems, social models and learning. DISP 172 (1), 35–47.

Nesshöver, C., et al., 2016. The science, policy and practice of nature-based solutions: an interdisciplinary perspective. Sci. Total Environ. 579, 1215–1227.

Norris, F.H., et al., 2008. Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. Am. J. Community Psychol. 41, 127–150.

Okvat, H.A., Zautra, A.J., 2011. Community gardening: a parsimonious path to individual, community, and environmental resilience. Am. J. Community Psychol. 47, 374–387.

Ostrom, E., 2010. Beyond markets and states: polycentric governance of complex economic systems. Transnatl. Corp. Rev. 2 (2), 1–12.

Peterson, G., Allen, C.R., Holling, C.S., 1998. Ecological resilience, biodiversity, and scale. Ecosystems 1 (1), 6–18.

Prové, C., Dessein, J., de Krom, M., 2016. Taking context into account in urban agriculture governance: case studies of Warsaw (Poland) and Ghent (Belgium). Land Use Policy 56, 16–26.

Rosol, M., 2010. Public participation in post-Fordist urban green space governance: the case of community gardens in Berlin. Int. J. Urban Reg. Res. 34 (3), 548–563.

Roy, P., 2011. Non-profit and community-based green space production in Milwaukee: maintaining a counter-weight within neo-liberal urban environmental governance. Space Policy 15 (2), 87–105.

Saldivar-Tanaka, L., Krasny, M.E., 2004. Culturing community development, neighborhood open space, and civic agriculture: the case of Latino community gardens in New York city. Agric. Human. Values 21, 399–412.

Science for Environment Policy, 2015. Ecosystem Services and Biodiversity. In-depth Report 11 produced for the European Commission, DG Environment by the Science Communication Unit, UWE, Bristol. Available at: ⟨http://ec.europa.eu/science-environment-policy⟩.

Seymoar, N., Ballantyne, E., Pearson, C.J., 2010. Empowering residents and improving

governance in low income communities through urban greening. Int. J. Agric. Sustain. 8 (1–2), 26–39.

Stenseke, M., 2009. Local participation in cultural landscape maintenance: lessons from Sweden. Land Use Policy 26, 214–223.

Swagemakers, P., Jongerden, J., Wiskerke, J.S.C., 2014. Urban green infrastructures in Europe: new architectural orientations for finding a way out of the dead-end road of industrialized modernity. Span. J. Rural Dev. 5 (1), 1–6.

Thompson, S., Corkery, L., Judd, B., 2007. The Role of Community Gardens in Sustaining Healthy Communities. In: Proceedings of the State of Australian Cities National Conference. Adelaide, Australia: University of South Australia, pp. 161–171.

van der Jagt, A.P.N., et al., 2016. Participatory governance of urban green spaces: trends and practices in the EU. Nord. J. Archit. Res. 28, 3.

van der Steen, M., et al., 2014. Learning by doing : Government participation in an energetic society. The Hague: PBL and NSOB. Available at: ⟨http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2015-nsob-learning-by-doing-government-participation-in-an-energetic-society.pdf⟩.

van Herzele, A., Collins, K., Tyrväinen, L., 2005. Involving people in urban forestry: a discussion of participatory practices throughout Europe. In: Konijnendijk, C.C. (Ed.), Urban Forest and Trees in Europe: A Reference Book. Springer Verlag, Berlin, Heidelberg, pp. 207–228.

van Tatenhove, J., Arts, B., Leroy, P., 2000. Political Modernisation and the Environment: the Renewal of Environmental Policy Arrangements. Kluwer Academic Publishers, Dordrecht, The Netherlands.

Veen, E.J., 2015. Community gardens in urban areas: a criticial reflection on the extent too which theys trengthen social cohesion and provide alternative food. (Ph.D. Thesis) Wageningen University.

Voigt, A., et al., 2015. Environmental behaviour of urban allotment gardeners in Europe. In: Proceedings of the ECLAS 2015 Conference: Landscapes in Flux. Tartu, Estonia: Estonian University of Life Sciences, pp. 78–82.

Wakefield, S., et al., 2007. Growing urban health: community gardening in South-East Toronto. Health Promot. Int. 22 (2), 92–101.

Ward Thompson, C., et al., 2016. Mitigating stress and supporting health in deprived urban communities: the importance of green space and the social environment. Int. J. Environ. Res. Public Health 13 (4), 440.

Yuen, B., Hien, W.N., 2005. Resident perceptions and expectations of rooftop gardens in Singapore. Landsc. Urban Plan. 73 (4), 263–276.

Zoellner, J., et al., 2012. Exploring community gardens in a health disparate population: findings from a mixed methods pilot study. Progress. Community Health Partnersh.: Res. Educ. Action 6 (2), 153–165.