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Urban agriculture: evaluating informal and formal practices

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Abstract

Urban agriculture (UA) is a fast-increasing element in many settlements in the Global North. This paper reviews the diversity of UA activity, ranging from legal to illegal, formal to informal. Focusing particularly on current research on UA projects in England, including small-scale guerrilla gardening and large community projects supported by community and government funding, we look at the realities of UA. We suggest that it is under-theorised as previous research has focused on practicalities and activism. In particular, we highlight the problematic contribution of UA to food production, the wider value in terms of community development, health and wellbeing, and warn of the danger of the 'local trap'.

Keywords

Urban Agriculture; Sustainable Cities; Food Security; Green Infrastructure

Introduction

Although growing food in urban areas has been practiced for centuries, Urban Agriculture (UA) is a relatively new concept, at least in the European context (Hardman and Larkham, 2014a). Allotment gardening has been familiar for some time, but activities such as community gardening, urban farming and more radical forms of urban food growing are now taking hold; UA is now becoming commonplace in many European cities and towns, and urban space is being used more imaginatively for UA purposes (Gorgolewski *et al.*, 2011). Yet the relationship between practice and theory is unclear; UA is under-researched and under-theorised, and this paper seeks to address this gap.

UA has various definitions ranging from, at the most simple, the production of food in cities (Caputo, 2012) to, at the more complex, any form of agricultural activity within the urban (including suburban) environment (COST UAE, 2014). The latter may involve the grazing of animals and other activities which do not necessarily involve the cultivation of fruit and vegetable crops. The potential contribution of the peri-urban environment (Scott *et al.*, 2013) also needs to be more systematically considered. The bulk of the UA literature derives from North America with industrial/

post-industrial cities from Toronto to Detroit, New York and Chicago forming the majority of the case studies (see, for instance, Gorgolewski *et al.*, 2011; Giorda, 2012). In addition, there is a small but growing body of literature focusing on the role of UA in the African context; particularly how the concept is being used to alleviate issues around food insecurity; but this literature also highlights the differing cultural, environmental and economic situations of the Global North and Global South (Chipungu *et al.*, 2015).

This paper provides an overview of different forms of UA, focusing primarily on activity in Europe and the UK. We begin with an initial analysis of policy and an evaluation of opportunities/barriers for UA. We then explore the diversity of UA, from the informal to formal: the former sees guerrilla gardeners – individuals who colonise land without permission – cultivating crops in cities across the continent (cf. Reynolds, 2008). While more formal UA includes the systematic structuring of policy and space to make provision for UA growing and marketing activities. We reflect principally on those more formal types of UA that are likely to provide edible produce, and provide an overview of some of the major schemes currently ongoing within the UK, based on our own ongoing research. Finally, we reflect

on the core messages from the policy exploration and the empirical material gathered, to determine the importance of UA and how to move the concept forward in the future.

Urban Agriculture in Policy and Practice

It is first important to understand the need for UA. With 9.1 billion people expected to inhabit this planet by 2050, and a large majority of them predicted to live within urban settlements, food security is increasingly viewed as a major global issue (Chipungu, 2015; Johnson, 2011; Marsden, 2010). The United Nations Food and Agricultural Organisations (FAO) argues that, in order to meet the demands of such a drastic rise in population, global food production will need to increase by 70% (FAO, 2009). To some, UA is seen as a mechanism to help achieve such an ambitious target, adding an urban element to the traditionally rural-dominated agricultural sector. Others, such as the New Optimists (2012), a forum of scientists in the UK, see the benefits of UA more in terms of contributing to public health and wellbeing agendas. Overall, though, the contribution of UA to such large-scale issues, in terms of food productivity, needs to be questioned.

Much UA activity has been small in scale. Even allotment gardens form a tiny proportion of a minority of towns; and other activities have used the sort of spaces once characterised as SLOAP (Space Left Over After Planning) (Ginsburg, 1973). Much planning policy paid little heed to UA as an urban land use and, while access to “public open space” was often specified, this related to public parks and playing fields. Studies of urban form are only recently recognising the potential for UA within the existing urban fabric, including more intensive uses of previously-unregarded

spaces and flat roofs (for example Nasr *et al.*, 2014). Yet still more could be achieved if planning policy was more receptive to temporary uses of development sites where projects have been ‘stalled’ during the current financial downturn, or which form the land-banks of major developers (Kitchin, 2012). A more flexible land-use policy approach may persuade more landowners to make sites available.

UA Policy

The idea of UA has received growing interest in recent decades in the Global North, largely because of its potential to contribute towards contemporary agendas such as climate change mitigation, health promotion and community development (Schmutz *et al.*, 2014). This range of agendas leads to a complex set of issues: including those of the diverse types and scales of UA activity, and how these vary according to geographical context; the types of people and organisations engaged, and their diverse motivations; and the differing production possibilities in varying climates, locations, economies and cultures. This section charts the types of policies and initiatives that continue to characterise the development of UA, particularly in the UK, providing a background on policy before we explore case studies from current projects attempting to embed UA in everyday culture.

Explicit UA policies have been apparent in North America for some time (Hardman and Larkham, 2014b). In Toronto for instance, a city often described as an exemplar in incorporating UA activity into the city fabric, policies have been in place since the late 1990s. The Toronto Food Policy Council (1999) has demonstrated how the city aimed to pioneer the practice and push the boundaries of what could be achieved within the city: setting targets such as having 10 food-producing rooftops by the next review date in the early 2000s and ensuring that community gardens, along with other types of urban food activities, received support to develop. More recently, GrowTO (2012) – an umbrella organisation that brings together academics, individuals organisations and other key actors – has published an action plan to ensure that this momentum is not lost. This is an important point, as some of these policy initiatives clearly originate from powerful political individuals or groups, and may be vulnerable to changing local or national politics, funding cuts, and so on.

It should not only be dedicated UA policies that are of interest here, however, since UA is also supported, and potentially thwarted, by policies and practices across the sphere of urban governance. Cohen (2014: 138) attributes New York City’s ‘large and diverse agriculture’ system in part to the city’s zoning ordinance, which allows gardening



Figure 1: A suburban site, suitable for UA but undeveloped since before 1990 (photograph by Peter Larkham).

and farming almost everywhere. The city's plan, PlaNYC 2030, demonstrates the ways in which UA is intended to permeate planning and governance, with strong commitments to 'community gardens and other forms of agriculture' across a range of city departments.

In the UK, there has been a recent increase in policies specifically focused on developing UA (Hardman and Larkham, 2014b). Cities, regions and national government have embraced the idea of bringing cultivation into urban contexts using tools ranging from food charters to explicit food policies. Food charters are viewed as mechanisms to bring together interested parties around the idea of urban or local food (Food for Bristol, 2010). They are often enacted on the city scale, although there are several instances of regional food charters, which tend to be much broader in their focus (see, for instance, Heasman, 2007). Generally, charters are created through engagement with key actors in the locale. Their success is heavily dependent on building good and stable relationships between a range of stakeholders (Hardman and Larkham, 2014b).

In Birmingham, for instance, interviews with a variety of individuals and organisations demonstrated the extent of the practice along with what should be included in the emerging charter (Hardman and Larkham, 2014b). Such as charter is a document that brings together businesses, farmers, activists, practitioners, academics and other organisations around the idea of UA. In the UK, cities from Bristol to Brighton, Plymouth to London, and many more, now have food charters – however, these are not necessarily the cities suffering from food poverty (for example as measured by use of food banks). Heasman (2007) analysed charters at a regional level, commenting on their effectiveness in bringing together interested actors around the idea of urban agriculture. In this sense, the charters are often an initial 'step on the ladder' to the creation of a food policy or food council.

Greater Manchester provides a useful UK example of the plethora of initiatives that coalesce around the notion of UA. The Food Futures strategy for Manchester (2007) reflects a set of aims that connect health, environment, economy, and sustainable communities. The network 'Feeding Manchester' has wide participation including growers, traders and public sector representatives. More recently, the Kindling Trust has facilitated a process of developing 'A Sustainable Food Strategy for a Greater Manchester'. Alongside these activities concerned directly with food, connections are readily made with overlapping policy areas such as the Greater Manchester Low Carbon Hub; Manchester A Certain Future, the city's climate change

strategy; the Greater Manchester Poverty Commission in relation to food poverty; and transport planning, with its relationship with food accessibility.

These examples from Europe and North America illustrate the diversity of activity around urban food and the potential for it to contribute to, and intersect with, wider policies and wider stakeholder groups in the fields of urban planning, climate change and health. Despite the relatively recent rise of concern for UA, it is particularly timely to evaluate the effectiveness of UA initiatives: there is a need for more evaluative work on informal and formal UA before it can be embraced as a concept suitable to address various contemporary and future social and environmental needs.

From Guerrilla Gardening to Top-Down Projects: Exploring Impact

Whether or not specific policy initiatives are in place or functioning, there is a broad range (although very variable amount) of UA activity. In this section, we reflect on the diversity of forms of UA and their potential for impact; considering key questions around dietary change, social inclusion and the use of urban space. To explore this in a meaningful manner, we adopt a case study approach – using empirical material collected through our recent interactions with UA projects – to explore the potential of this activity. The section begins with an analysis of the informal, focusing explicitly on guerrilla gardening, before shifting to focus on more formalised activities and the case study of Wythenshawe (Manchester).

Informal UA

There is very little academic exploration of those who practice UA informally, despite the fact that many of the most successful (in terms of visibility, community engagement, and productivity) growing projects around the globe started through such action (Crane *et al.*, 2012; Reynolds, 2008). The term 'guerrilla gardener' is often attached to those who pursue such an agenda: an umbrella term for a form of growing activity which does not have the necessary permission such as planning permission or landowner consent (Johnson, 2011; McKay, 2011; Tornaghi, 2014). Although guerrilla gardening is often viewed as a small-scale activity and is often undertaken for thrills or for urban beautification rather than food production, the activity may also involve large-scale cultivation, with unpermitted community gardens and urban farms falling under the umbrella term (Hardman and Larkham, 2014a).

The Rise of Guerrilla Gardening

Guerrilla gardening is practised worldwide. From the 'trendy' and relatively 'soft' intransigent political movements in North American and Europe, to the those pursuing it for survival in Africa and other Global South nations, the activity is very broad (Adams *et al.*, 2014; Reynolds, 2008). In the case of Africa, most of the UA practised across the continent could be viewed as guerrilla gardening, as city authorities and national governments often discourage the practice of UA (Chipungu *et al.*, 2015). In a similar manner, residents of Havana, Cuba – one of the most frequently-cited exemplars of UA – faced barriers from authorities and originally practised guerrilla gardening (Hardman and Larkham, 2014). Once the positive aspects of UA were realised, municipal authorities encouraged the activity and provided support, along with guidance, for those interested in growing across Havana.

Despite these examples, it is usually the subversive, illegal aspects of guerrilla gardening, with participants colonising land under the cover of darkness, which are most often featured especially in mass media (Lewis, 2010). The modern movement began with the Green Guerillas (*sic*) who beautified neglected spaces across New York City in the 1970s. The creation of the website guerrillagardening.org, by Richard Reynolds in 2004, brought the guerrilla gardening movement up to date, widening its profile and enabling participants to connect through the internet and social media before carrying out any action (Reynolds, 2008). The movement has grown rapidly, with social media enabling guerrillas to share and plan action on a scale never before seen; but even so the guerrilla focus on edible productivity is small, and many guerrilla projects are also small (cf Hardman and Larkham, 2014a).



Figure 2: Guerrilla gardening in Walsall, UK (photograph courtesy of Anna Rogozinska)

Figure 2 shows a 'traditional' guerrilla gardening project in the UK. In this case, the guerrilla gardeners colonised neglected land in Walsall, an urban area close to the city of Birmingham; the guerrilla action acted as a tool for bringing together the community. The community was fragmented due to the influx of Eastern Europeans to the area and tensions were high. In this case, guerrilla gardening brought people together and helped residents put aside their differences. Whilst this is not an example of guerrilla gardeners pursuing a UA agenda, it demonstrates the ability of the activity to have a significant impact on those who surround colonised spaces.

Evaluating Guerrilla Gardening

Although there may be a media-led stereotypical image of a guerrilla gardener being a young hipster who plants flowers to beautify an area, research about those involved reveals that a wide variety of individuals including businessmen, professionals and retired people take part in the action (Adams and Hardman, 2014). The action is increasingly involving the planting of edibles, with schemes such as Incredible Edible Todmorden providing evidence that guerrilla gardening can facilitate UA on a large scale. In this case, residents of Todmorden – a small town in West Yorkshire – adopted sites across the town to plant a variety of produce (IET, 2014). The scheme was so successful that a large international network evolved, with other towns and cities replicating the Incredible Edible concept.

This, and evidence from several academic studies, suggests that guerrilla gardening has acted as a mechanism for much larger green movements (see for instance Crane, 2011; McKay, 2011; Zanetti, 2007). It has enabled people to have greater access to food and started many more formal movements; an example of such impact can be seen in the many case studies exhibited in *On Guerrilla Gardening*, a textbook on how to go about guerrilla gardening by Richard Reynolds (2008). Reynolds shows how guerrilla gardening has enabled people to have greater access to greenspace and how it has significantly changed a wide range of urban sites: from inside prisons to underground and on the street corner, every space can potentially be colonised and made useful.

Whilst guerrilla gardening practices generate many positive factors, from the ability to engage people in innovative ways to beautifying spaces or growing food for those who require it (Reynolds, 2008), there are also problematic aspects to the activity. For instance, Allen (2014) argues that guerrilla gardening is a reactionary activity and that the activity is not a solution to the oppressive force of powerful elites who control elements of urban space. He also draws

attention to how the guerrillas perform their activities without obtaining the permission of the local authority or landowner, and for failing to consult with local communities and 'guardians' active in the area (Allen, 2014). This view is substantiated through research conducted by Hardman and Larkham (2014a), who demonstrate how guerrilla gardening can have negative impacts ranging from the lack of maintenance of colonised spaces, to the guerrilla activity designedly excluding those who surround the areas.

The range of guerrilla UA activity is paralleled in more formal activities, although these are more likely to be of larger scale and are more focused specifically on food production. There are many varieties of formal UA projects, ranging from everyday spaces such as allotments or community gardens, to more radical growing projects, such as vertical or rooftop farms. For the purposes of this paper, this section will explore a significant case study in the UK: the Real Food Wythenshawe project, which received over £1 million of investment from the Big Lottery¹ to support UA. The focus here is on one of the largest UA schemes in the UK and aims to critically explore the potential to feed deprived areas through the concept.

UA in Wythenshawe, Greater Manchester, UK

Wythenshawe, a district of South Manchester, was designed as a garden suburb during the interwar period (Hall, 2002). It was planned as a means of housing people living in the slums of Manchester and was previously used predominantly for arable farming (RFW, 2014). These original plans are still reflected in present-day Wythenshawe, which still boasts many of the original trees and an abundance of green space. More recently, however, the area has suffered from high levels of deprivation and has been referred to as a 'food desert' due to the residents' lack of access to fresh food (SWC, 2013). Issues surrounding food access along with high levels of unemployment, poor health and a lack of knowledge regarding food preparation amongst residents have inspired the Real Food Wythenshawe project (RFW)².

In 2012, RFW was awarded £1 million for a 5-year project by the Big Lottery Fund as part of the Communities Living Sustainably (CLS) initiative. RFW aims to pioneer the practice of UA in Wythenshawe whilst providing education around healthy eating and growing. The project aims to encourage behavioural change within the community,

whereby residents will redevelop their connection to food and will be more inclined and better equipped to grow, cook and eat fresh, local food. It seeks to be inclusive and to engage residents of Wythenshawe whilst encouraging people to adopt lower-carbon lifestyles by changing their dietary habits to include more fresh fruit and vegetables (RFW, 2014).

Binder (2014) demonstrates how the RFW project has facilitated the creation of new growing spaces in Wythenshawe; one innovative example of this is the geodome project, located in the Wythenshawe campus of The Manchester College. This uses an integrated, closed-loop system for food production, whereby the system demonstrates how food can be grown using sustainable techniques



Figure 3: Outside of the Geodome (St. Clair's photograph).



Figure 4: Growing inside the Geodome (St. Clair's photograph).

1. The Big Lottery is a funding body under the UK's National Lottery scheme.
2. RFW's partners are: Willow Park Housing Trust, Parkway Green Housing Trust, the Forum Trust, the Manchester College, Manchester City Council, University Hospital South Manchester Foundation Trust (Wythenshawe Hospital), Creative Concern, FareShare North West, and BITE (a partnership initiative of Manchester MIBND / Manchester Mental Health and Social Care Trust).

including vermiculture, aquaponics, hydroponics and fungiculture, in an urban setting.

Elsewhere, the Wythenshawe urban farm aims not merely to produce vegetables and fruit, but also meat; employing local residents in key roles on the farm. The farm, along with the connected historic walled garden which has been revitalised by the RFW team and provides a space for growing and learning from volunteer growing sessions to visiting school groups and training sessions run by RFW. Much of the vegetable produce grown in the walled garden is sold in the farm shop, along with eggs and meat that have been produced on the working farm.

Alongside these larger growing projects are a number of more traditional growing spaces, such as allotments and community gardens. The RFW project is also replicating elements of the Incredible Edible ethos, through the growing of fruit and vegetables in less ordinary spaces across the urban environment. An agreement with the Greater Manchester Transport Authority, for instance, sees vegeta-

bles grown at the new Metro stations in the Wythenshawe area; a key stop on the route to Manchester Airport which will be visited by large numbers of people.

As part of the Manchester Geographical Society Research fund, our research focussed on exploring the impact of the project. The research used observations and interviews to explore both the motivations driving participation in growing activities and the resulting impacts of involvement at two study sites: a community garden and urban farm. Continuing involvement from committed participants is a critical factor when considering the feasibility and sustainability of UA projects, particularly those that depend heavily on volunteers (Garnett, 2000). In order to comprehend more fully the motives for sustained participation it is also necessary to explore the less appealing aspects of growing projects from participants' perspectives. Accordingly, Table 1 provides an overview of some of the benefits and hindrances of the two UA sites.

The focus on the community garden and urban farm was to enable an understanding of practice on the ground. Alongside the qualitative data collection, material was collected through a questionnaire which enabled comparison with a baseline survey conducted in 2014. A key finding from the survey was the improvement in those eating their 5-a-day, or close to this amount. In the 2014 survey, there were around 6% who did not have any fresh produce in a day. In comparison, the 2017 survey revealed that all residents spoken with eat at least 1 portion a day, with the majority eating 1-4 or 5 and more. In this sense, almost half of the respondents to the 2017 survey eat 5 or more a day, much higher than the national average (NHS, 2015).

The survey also revealed wider benefits to the group's actions, away from growing activities. For example, the questionnaire showed that there was a 1.5% increase in food market usage between the first year of Real Food's operation and 2017. This demonstrates a greater awareness of the market facilities and show more interaction with the space. This also adds value to the footfall increase and the efforts by the RFW team to engage people in the space more around healthy eating. Adding to this evidence of wider benefits, survey results showed that there was a 20% increase in composting in Wythenshawe. This is reinforced through the qualitative and more in-depth research (see earlier) which showed a greater awareness of the environment and behaviour change. Although the project did not employ a particular approach in terms of behaviour change, the many events and workshops have clearly contributed to residents' knowledge in this area.



Figure 5: Livestock on the urban farm (St. Clair's photograph).



Figure 6: Growing in the walled garden (St. Clair's photograph).

	Macmillan Community Garden	Wythenshawe Farm
Motivations	Autonomy of decision making	Helping others
	Charity/helping others	
	Socialising and mutual support	Socialising as a way to rebuild a sense of community
	No obligation to work	Learning to grow
Disincentives	Lack of secure tenure	Insufficient numbers of volunteers/infrequent and unstructured nature of sessions/lack of autonomy
	Insufficient information exchange between landowner, land users and intermediaries	Difficulty integrating with other growing groups and sharing space
	Levels of work involved in establishing growing site	
Impacts	Growing skills	Gaining confidence in growing abilities
	Dietary impact (limited)	Dietary impact (limited)
	Produce exchanged for donations	
	Therapy	

Table 1. Summary of de/motivating factors and impacts of growing activities for participants at two study sites: Macmillan community garden and Wythenshawe Farm.

Re-theorising UA Practices: Local and Global

There is a wide range of innovative ‘informal’ grassroots community gardens and allotments, permaculture sites, ‘transition towns’, landshare projects, and certain ‘official’ institutional frameworks that seek to encourage social cohesion and develop more socially just and/or environmentally sustainable forms of localized urban living, and informal, ‘guerrilla’ activities (for example, Giradet, 2008; Hopkins, 2009; Cohen *et al.*, 2014; for a review, see Hardman and Larkham, 2014a). In their different ways most of these UA initiatives are, to some extent, and consciously or unconsciously, informed by historical notions that a ‘return to the local scale’ can provide a much-needed safeguard against contemporary forces of macro-economic and environmental change and social upheaval (see Tornaghi, 2014). A ‘localism’ dimension to food supply is also promoted by the now-common concept of ‘food miles’ (Pretty *et al.*, 2015).

In times of stress and challenge, such as the still-current economic downturn, it is entirely understandable that people should seek refuge through drawing on past ideas of small-scale subsistence living; this was, of course, a common reaction to the deleterious forces of industrialization during the nineteenth century amongst both conservative and radical commentators such as Thoreau, Ruskin, Reclus, Morris, Kropotkin and Howard. Yet several decades of research across the social sciences by Castells, Giddens, Harvey, Massey, Thrift and others suggests that ‘local’ space should be interpreted in a relational way; where the ‘local’ is intricately related to ‘global’ processes’ (Cosgrove, 2004, p. 59), and where urban networks provide infrastructure

through which different flows – goods, capital, information, knowledge, and labour – are able to move across borders.

This presents both an opportunity and a barrier to successful implementation of UA projects. On the one hand, a renewed focus on the local raises immediate and rather obvious question as to whether urban populations are going to be sustained through the creation of isolated, single-project approaches in an apparently increasingly globalized world characterised by different ‘flows’ (see, for example, Taylor, 2013, 2014). And it might also be argued that individuals, communities and governance arrangements within certain cities are better positioned to capitalize on the opportunities of UA, and how these strategies could potentially privilege particular areas and social interests (Hodson and Marvin, 2012). There are other uncomfortable questions. Even if a return to the small scale – i.e. a move towards ‘subsistence urban spaces’ premised on UA – proved successful in the UK and in other towns and cities across the world, reducing, or worse, removing, innovation from society would arguably result in sacrificing the potential of human creativity – the very thing that carries the promise of sustainable survival (Jacobs, 2004). On the other hand, however, human innovation could be channelled through the globalized ‘space of flows’ in ways to share ideas about the potential social, political and environmental benefits of UA, instead of seeing globalization as means to facilitate economic growth.

Purcell (2005) also warns against falling into a ‘local trap’, underpinned by an unflinching desire to automatically seek preference for the local scale. In this sense he argues

how global food systems are seen as undesirable (Purcell, 2005; Born and Purcell, 2006) whilst 'local-scale food systems, since they are not global, are assumed to be inherently desirable' (Purcell, 2005: 1924). Purcell and his colleagues question the current assumption that producing food locally is attractive, whilst simultaneously claiming that academics are obsessed with the local scale. Born and Purcell use the example of food miles to demonstrate this local food obsession that a range of professions sometimes harbour. They question the need to move resources to the local and reduce transport costs: for example, highlighting an example in Texas, where rice production was localised for this reason, they demonstrate how, due to the immense water requirements and land degradation, it made more ecological sense to maintain rice production in other parts of the world (Born and Purcell, 2009). In this case, Purcell's local trap challenges the idea that UA is a universal requirement; whilst more localised food production may be suitable in some contexts, it may not be in all. Nevertheless, the local trap, according to Carolan (2011: 136), 'has been used to conceptually disassemble those that make a case for local food'; more detail is required before moving away from the local option.

Conclusions

This paper has explored the diversity of approaches to UA, including formal and informal, legal and illegal, successful and otherwise, and food-producing or not. The diversity is also apparent over space and time, with particular distinctions between the Global South and Global North. An exploration and evaluation of grassroots food-producing examples in the UK allows a more specific focus, raising several questions. Crucially, is UA actually likely to be even a partial solution to resolving issues of food security and shortage? Use of more sites, including flat roofs and long-term derelict sites, and a wider acceptance of temporary uses of unused and 'stalled' sites can indeed raise productivity by significant amounts, and therefore can contribute to reducing local food poverty. However, this is likely to be a relatively small contribution to food security overall, especially as many contemporary urban populations – particularly in the Global North – demand more, more diverse, and unseasonal foodstuffs. Moreover, food poverty is a complex political and ethical issue; and the real value of UA may be more in terms of the recognition that growing food can contribute to food-related awareness, skills and knowledge. Many 'successful' projects, including Wythenshawe, measure success more in other terms, including health and education, than in food production *per se*.

Second, will the potential health benefits of UA be significant? Again, these are difficult to measure directly and with scientific accuracy, although many of our survey respondents and project organisers report perceptions of benefit. Yet, as public health concerns rise, especially about obesity, unhealthy diets and lack of exercise, even small amounts of fresh food and exercise are likely to be beneficial; and even the perceptual benefits can be advantageous, for example in cases of psychological ill-health. Psychologically, guerrilla activity seems to be more about people gaining more control over their environments than about food production; but, arguably, formal UA can also contribute to this, focusing attention to food systems, sources, and bringing a greater understanding of the role that food plays in people's lives.

Third, if the potential benefits of UA are sufficiently significant, how can UA be effectively promoted to municipal authorities, landowners, and individuals? The projects we have studied have multiple stakeholders, and specifically involve numerous organisations and individuals from outside municipal authorities, which are still sometimes viewed with suspicion by potential UA participants. Successful projects communicate locally, nationally and even internationally, as did Todmorden, and with Wythenshawe's award of a Gold Medal by the Royal Horticultural Society at the Tatton Park Flower Show. They have a significant, and usually designed, outreach dimension in addition to simple cultivation and production. This is shown in the Wythenshawe context, with survey results showing how the project had a significant impact on green behaviour across the area.

Fourth, UA is by its very nature a local initiative, but is local always best? Considering Purcell's 'local trap', the very localised availability and suitability of UA sites, and the much wider networking successes of some projects, it seems timely to re-theorise UA in a much wider spatial context. Not only might this include wider, aspatial, communities of interest but it may also spread consideration to peri-urban spaces. As we face pressures for urban expansion or new settlements, the value of peri-urban space and its effective management – including its contribution to those same urban areas – could be better structured: at present this is in limbo, waiting for plans to be fulfilled, decisions to be made, and ideas to be realised or development to be started (Qviström 2007; Scott *et al.*, 2013). These are opportunity spaces for many types of "urban" agriculture activity.

Last, how can UA initiatives (both projects and policies) be made sufficiently robust to withstand the changing

circumstances of politics, economics and personality? Many initiatives, including guerrilla groups and their digs, fade from lack of interest or the loss of a charismatic (or effective) key individual. Even the Wythenshawe project has funding for only a fixed period in its current form. Projects need not only capable management with a succession planning strategy, but support from a sufficiently diverse body of stakeholders such that alternative individuals, directions, and funding could be obtained. But flexibility is needed: as urban communities change over even short spans of time (consider the impact of in-migration in the UK) then their needs will change, as will their preferred methods of operation.

Overall, UA is an under-theorised activity whether in terms of food production, an urban space use, or as a contributor to other factors including community cohesion, producing healthier urban environments and lifestyles, and combating obesogenic environments. This very complexity

of issues suggests that the concept of ecosystem services could very constructively be applied in this context, as it has in wider spatial planning-related applications (Haines-Young and Potschin, 2007; Scott *et al.*, 2013). The concept is an 'eye-opening metaphor' (Norgaard, 2010) both despite and because of its complexity. The scope of its applications, thus far more focused on natural environment and ecology, suggest its flexibility and thus potential for human ecology and culture (Prager *et al.*, 2011; Reed *et al.*, 2013). In short, the contemporary rise of formal and informal UA is likely to be widely welcome but as diverse in its successes as in its forms and locations. Success could be short-lived or long-term; local or international; and is more likely to be considered in terms of health, wellbeing, community cohesion and education as in food production. Recent UA research suggests that its diversity needs to be more widely recognised, accepted and celebrated.

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