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Urban sustainability experiments in their socio-economic milieu: A quantitative approach

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1. Introduction

‘Experimentation’ has taken centre stage in the writings and practices concerned with the purposeful transformation of unsustainable systems of production and consumption (Jordan et al., 2017).

‘Sustainability experiments’ broadly refer to practice-based initiatives that put to the test technological, institutional, and social innovations in real-life contexts, pursuing overarching goals, such as the reduction of carbon footprints, the encouragement of local economic development, and the fostering of community cohesion (Evans et al., 2016). A growing body of scholarship has engaged with different ‘types’ of experiments, including new business models, technologies, infrastructures, governance, or citizen and community practices. These studies have explored questions such as: under what circumstances do these initiatives emerge? what factors encourage their growth in size, activity, or impact? and (how) do they diffuse to new contexts? (e.g. Berkhout et al., 2010; Bulkeley and Castán Broto, 2013; Kivimaa et al., 2017; Sengers et al., 2016).

Although the geographical dimensions of these questions are highly pertinent (Truffer et al., 2015), sustainability experiments have typically been studied without much attention to their socio-demographic and socio-economic contexts. Some in-depth, qualitative studies have identified specific places as being generative of sustainability initiatives due to a clustering of populations or groups with a more ‘progressive’ profile (Feola and Butt, 2017; Longhurst, 2015; Wolfram, 2016). However, there is a lack of quantitative studies able to identify generalisable patterns in the development of experiments and the way they are embedded in local ‘milieus’ (Longhurst, 2015) or ‘habitats’ (van den Heiligenberg et al., 2017). This limits our understanding both of the emergence and the potential impacts of experiments across different social groups and geographies.

Taking its starting point in the uneven geography of sustainability experiments, this paper presents a quantitative study of the socio-spatial relationship between experiments and their local urban environments. Its contribution to the literature is twofold. Theoretically, it expands our understanding of the defining socio-demographic and socio-economic contexts within which experiments emerge. Rather than viewing these contexts as ‘predetermined’ and stable backdrops, it suggests that urban social dynamics and neighbourhood transformations are central to their materialisation.

Methodologically, the paper complements the existing repertoire of largely exploratory, qualitative studies by providing the first quantitative city-wide statistical analysis of sustainability projects, employing small-scale neighbourhood data. In doing so, it engages explicitly with intra-urban differences and similarities, revealing a typology of ‘favourable’ contexts, thus moving beyond a mere emphasis of ‘context-specificity’. As Hansen and Coenen (2014:12) observe in their review of the geography-of-transitions literature: “...the risk for overemphasising particular place-specificities that is of little general purchase for theorising transitions is very high. Future research . . . would strongly

benefit from more theoretically informed empirical analysis that allows for an assessment of how particular types of territory-specific institutions influence transitions dynamics”.

This paper engages with urban agriculture – a practice with experimental and innovative potential in the domains of ‘food’ and ‘land-use’ that has attracted attention from sustainability-oriented studies like the transitions literature, and beyond. The paper is underpinned, therefore, not only by transitions conceptions of ‘experimentation’, but also by theories from urban geography – especially theories of gentrification, the process by which neighbourhoods are transformed “for progressively more affluent users” (Hackworth, 2002:815). It demonstrates that, in many ways, sustainability initiatives can be seen as manifestations of certain phases of gentrification. However, the paper also shows that the underlying economic, social, and political processes are more complex and varied than the findings suggest at first sight. It thereby supports the recent critique by urban geographers such as Stehlin and Tarr (2016) and McClintock (2018) that a “...misrecognition of eco-oriented, hipster-led” urban agriculture initiatives and of the neighbourhoods in which these take place, has obscured the diversity of urban populations and the varying motivations that drive these initiatives. Recent research has highlighted initiatives, such as urban agriculture, green housing, or waste management, emerging in low-income areas where visions of social equity and local wealth creation appear to prevail (Anguelovski, 2015). This is echoed in the findings of the present paper, which also identifies deprived urban neighbourhoods as potentially ‘fertile soil’ (Sekulova et al., 2017) for sustainability experiments – a phenomenon and geographical focal point that has largely been neglected in the transitions literature where ‘cities’ tend to be viewed as *one* context.

Empirically, the study draws on a dataset that has not previously been used for scientific studies – an extensive urban agriculture initiative in London (‘Capital Growth’), instigated by a sustainable food charity in collaboration with the city government. It constitutes an experiment that is simultaneously ‘top-down’ and ‘bottom-up’, thereby challenging this simplified distinction commonly made in the transitions literature (e.g. Jordan et al., 2017). Capital Growth consists of nearly two thousand individual food-growing projects founded between 2009 and 2012 across metropolitan London. This paper maps the geographical distribution of these projects, seeking to identify the socio-demographic and socio-economic characteristics of the neighbourhoods where they emerged, and testing hypothesised relationships statistically. Despite the acknowledged fundamental role of cities for sustainable transitions, urban neighbourhoods as geographical units have so far received little attention. However, especially as notions such as ‘socio-spatial embeddedness’ and ‘place specificity’ (Truffer et al., 2015) become ever more prominent in transitions research, comparative studies even *within* city-contexts are essential for wider-ranging conclusions as to what determines this specificity or how it matters. The Capital Growth dataset provides a unique opportunity for such analyses.

The paper is organised as follows: the next section briefly compares how urban agriculture has been theoretically conceptualised and empirically studied in two related but distinct fields of research, the transitions literature and urban geography. The discussion forms the basis for the theoretical framework of the study and for the three hypotheses that it empirically examines. These hypotheses are explicated in section three. Section four describes the methodology employed, followed by the results of the empirical analysis. The implications of these are discussed in the final section.

2. Theoretical foundations: Urban agriculture and the geography of sustainability experiments

Two strands of literature provide the theoretical underpinnings of this study: (1) sustainable transitions studies with an explicit focus on urban experimentation, and (2) research on gentrification and environmental justice in urban geography. Both are used to illuminate the phenomenon of urban agriculture – also referred to as ‘urban farming’ or ‘urban gardening’ – i.e. the growing, processing, and distribution of food in and around cities. Urban agriculture takes a variety of forms, including: community gardens, allotments, and farms; residential gardens on housing estates and rooftops; organisational gardens run by schools, churches, or charities; commercial market and restaurant-supported vegetable gardens; food-growing projects in public parks; and more. In the context of sustainable urbanism, urban agriculture has experienced a resurgence in the global North over the past two decades, receiving considerable attention from researchers across disciplines often stressing its manifold ecological, social, and economic benefits (e.g. Mok et al., 2014).

2.1.1. Approaches in transitions studies

Recent studies on urban experiments for sustainable transitions have critiqued their conceptualisation as ‘bounded’, ‘controlled’ entities, emphasising instead the processual nature of experiments and their role in dynamically ‘reconfiguring’ existing urban contexts (Hodson et al., 2017). This broadens earlier conceptualisations in the transitions literature which tended to see experiments primarily as the constituent elements of ‘niches’ – (market, geographical, or socio-cultural) fringe spaces where sustainable alternative practices and technologies can develop, and from where they potentially diffuse to help replace dominant, unsustainable ‘regimes’ (Geels and Raven, 2006; Seyfang et al., 2014). For this diffusion, a favourable political environment, established social networks, and guiding visions (e.g. Späth and Rohrer, 2010); ‘intermediary organisations’ that facilitate learning across and beyond initiatives; and ‘demographic factors’ (van den Heiligenberg et al., 2017) have all been suggested as important ‘pre-existing place-based conditions’ (Feola and Butt, 2017).

Urban agriculture has been conceptualised as a so-called ‘*grassroots innovation niche*’, configured as an ‘alternative’ network of community-led projects and intermediary organisations (Kirwan et al.,

2013; White and Stirling, 2013). While this niche's capacity to influence established food regimes is usually considered to be limited, scholars and practitioners alike have argued that – through its various (economic, ecological, and social) use values and its relations to *multiple* regimes – urban agriculture can be 'transformative' (McClintock, 2014).

Drawing on social movement theories, studies of grassroots innovations have emphasised their pursuit of 'solutions for social justice and environmental sustainability' (Smith et al., 2016) and their intrinsic benefits for local communities (Seyfang and Smith, 2007). Some scholars, however, have noted the ethnic and cultural homogeneity of such initiatives (Ferguson and Lovell, 2015) and their frequent disconnectedness from local communities of place (Håkansson, 2017).

Hodson and colleagues (2015) see urban agriculture as an 'alternative strategy of remaking urban space' but conclude that the interests of the actors shaping neoliberal urbanism prevent 'alternative' initiatives from substantively changing the socio-economic fabric of cities. The creation of market opportunities and attraction of business and real estate investment are prioritised, while political support for progressive initiatives remains largely symbolic (Karvonen et al., 2014). This points to the influence of institutional and political-economic dynamics beyond specific 'local' contexts. It falls short, however, in not recognising that this influence manifests itself differently and unequally across a given city.

Despite being core to many studies of sustainability experiments (Evans et al., 2016; Zhang et al., 2018), cities are often treated as 'singular categories' (Dodson, 2013), with little regard for intra-urban gradients and differences. This calls for a richer and more differentiated view of 'urban context', considering both the heterogeneity of urban environments and the associated politics of experimentation. As Karvonen and colleagues (2014:105) observe: "Experiments are frequently portrayed as beneficial to cities as a whole while sidestepping troubling issues about who is doing the experimenting, who is being experimented on, and who is being left out".

2.1.2. Approaches in urban geography

In urban geography, two main positions have evolved on the topic of urban agriculture, foregrounding questions of power, justice, and equity. One approach has conceptualised urban agriculture as a 'grassroots tactic' to exercise the 'right to the city' in a battle for environmental and food justice (Tornaghi, 2014). Scholars in this tradition often emphasise activism in marginalised urban areas where low-income and minority communities are exposed to "greater environmental harm than well-off and white residents" (Anguelovski, 2015:703; Heynen et al., 2006) elsewhere. A considerable amount of research has been conducted in such areas on activism *against* environmental harm and neighbourhood abandonment. However, as Anguelovski (2015) argues, only limited attention has

been paid to initiatives that organise proactively and creatively *for* sustainable transformations in deprived neighbourhoods. Studying urban farming, waste management, green housing, and similar projects that have emerged in deprived neighbourhoods in Barcelona, Boston, and Havana, she illustrates how resident groups and organisations in marginalised neighbourhoods “act purposefully to create long-term quality environments and to revitalize their place”, envisioning “environmental projects with social equity and wealth creation in mind” (Anguelovski, 2015:703). In the case of urban food-growing, research has also argued that projects are often found in immigrant communities where they also fulfil valuable cultural functions (e.g. Saldivar-Tanaka and Krasny, 2004).

The second analytical perspective on urban agriculture within urban geography focuses on its entanglement in capital accumulation (Checker, 2011; Dooling, 2009; Gould and Lewis, 2017). A body of research on so-called ‘environmental gentrification’ has examined the co-option of ‘community gardening’ by profit-driven actors, such as real estate developers (Quastel, 2009); rising property values and rents fuelled by urban green infrastructure (Kwon et al., 2017); and the commodification of urban green spaces (Desfor and Keil, 2004). In regard to socio-cultural and consumption-related aspects of gentrification, urban agriculture is sometimes seen as a manifestation of gentrifiers’ ‘eco-habitus’ – a “set of practises and dispositions undergirded by green values” (McClintock, 2018:582). Hubbard (2016:1), for example, speaks of ‘hipster urbanism’ to describe the emergence of particular retail outlets and forms of Do-It-Yourself (DIY) activism spearheaded by “young professionals, trendy urbanites and creatives” in search for “healthy, green and ‘authentic’ consumption choices”.

Current debates within urban geography emphasise the need to overcome the perceived ‘radical vs. neoliberal’ dichotomy (e.g. McClintock, 2014). Scholars have redirected attention from the (potentially negative) consequences of urban agriculture to focus on how initiatives are socio-spatially and temporally constituted and differentiated across cities: “Focusing on process – on *how* and *where* urban agriculture arises – ultimately offers a better understanding of urban agriculture’s various functions and forms” (McClintock, 2014:157).

In this context, Stehlin and Tarr (2016) note that analysing urban agriculture primarily as a ‘local’ practice obscures uneven developments and inequalities on metropolitan scales. McClintock (2018), in turn, engages with the uneven realisation of economic value from different initiatives. He argues that urban agriculture in disadvantaged areas – where questions of food security often prevail – can go unnoticed by ‘urban growth coalitions’ (city governments, private developers, etc.) unless more affluent and educated, predominantly white populations move into a neighbourhood and take up the practice. Through the predominance of their ‘eco-habitus’, this tends to raise the area’s symbolic ‘sustainability capital’, which, in turn, can be economically leveraged at different scales.

2.2. Hypotheses

Based on the review and analysis above, this paper puts to the test three hypotheses.

Hypothesis 1. *Urban sustainability experiments are overrepresented in gentrifying neighbourhoods.*

Gentrification is a complex, multi-faceted process with local variations and nuances, reflecting the historical specificities of particular cities and neighbourhoods. The conceptualisation of ‘gentrification’ varies accordingly, and the constructs used to operationalise it are necessarily approximations, with inherent limitations. Some of the core debates – especially in the context of London – have evolved around questions of how to measure gentrification-induced ‘displacement’ (Atkinson, 2000), capture the changing roles of housing tenure (Paccoud, 2015), discern the role of government (Davidson and Lees, 2005), differentiate the tastes and practices of gentrifiers (Butler and Robson, 2001), or analyse the importance ‘race’, ethnicity, gender, and other forms of identity (Lees, 2016). Notwithstanding these complexities, there tends to be agreement – in British research, at least – that gentrification essentially is a process of ‘class change’ (Butler, 1997). This paper concurs with this claim and operationalises ‘gentrification’ accordingly.

Although acknowledging that there are frequent departures from typical gentrification ‘stages’, the analysis employs a simplified distinction between marginal and more progressed stages of gentrification: Gentrifying neighbourhoods typically exhibit a rise in household income and in property prices as well as cultural and landscape changes associated with, for example, gentrifiers’ ‘eco-habitus’. Before these changes are fully realised, ‘marginal’ gentrification occurs via an influx of artists and other ‘cultural professionals’ known to value a bohemian landscape and urban ‘authenticity’ (Zukin, 1982). This can involve physical, socio-cultural, and image changes of a neighbourhood without that neighbourhood necessarily becoming particularly wealthy (e.g. Van Criekingen and Decroly, 2003), and has recently been associated with so-called ‘hipster urbanism’ and other forms of entrepreneurial, creative, and sustainable grassroots ‘place-making’ (Håkansson, 2017). These “hipsters”, Hubbard (2016:3) argues, “appear rich in cultural and educational capital, [but] they are seldom part of the super-rich elite”.

Hypothesis 2. *Urban sustainability experiments are underrepresented in advantaged neighbourhoods.*

In a study on Barnsbury, a neighbourhood in inner-London, Butler and Lees (2006:483) examine “the grown up version of pioneer gentrifiers” – so-called ‘super-gentrifiers’ – a new group of super-wealthy professionals. This elite group, the authors argue, looks for safe, homogeneous

neighbourhoods in which it will have little “contact with the ‘ordinary’ dwellers of cities”. Super-gentrifiers “[seek] out a distinctive neighbourhood/community in which they have almost no involvement” as opposed to a “more humble first and second generation of gentrifiers” (Butler and Lees, 2006:483) who through their social involvements help create a neighbourhood richer in social capital. In maturely gentrified neighbourhoods, characterised by limited local engagement, a lower number of citizen-driven initiatives can therefore be hypothesised.

Hypothesis 3. *Urban sustainability experiments are overrepresented in deprived neighbourhoods.*

Processes of gentrification have shaped the social geography of urban areas for several decades, and global cities like London are characterised by intensifying inequalities both between and within neighbourhoods (Hamnett, 2003). In addition to the proposition that the emergence and development of experiments are linked to the socio-economic ‘upgrading’ of neighbourhoods, this study also examines Angelovski's (2015) observation that deprived urban neighbourhoods provide ‘fertile soil’ for sustainability initiatives. Rather than ‘ecological consciousness’, linked to ‘green’ consumption and creative DIY urbanism, the motivations for initiatives in low-income areas are likely to be based on a combination of long-term visions of social equity and short-term immediate needs.

3. Methods and analysis

This section describes the empirical setting of the study and explains the methodology and variables employed to test the hypotheses. The analysis focuses on the association between the geographical distribution of urban agriculture projects and small-scale, geographically-specific socio-demographic and socio-economic indicators across metropolitan London during recent decades.

3.1. Empirical context and study population: Capital Growth

The urban gardening initiative Capital Growth was triggered by London’s successful bid to host the 2012 Olympic and Paralympic Games, which promised to deliver the “most sustainable Olympic games of modern times” (BBC News, 2012). In reaction to this commitment, the charity *Sustain - the alliance for better food and farming* took up the challenge of creating 2,012 new food-growing spaces across London by the end of 2012. The experiment was officially launched under the name ‘Capital Growth’ in late 2008, when the Mayor of London and the London Development Agency (LDA) became involved via the Chair of the London Food Board, providing an initial £87,000 to get the initiative off the ground (Håkansson and Turnheim, 2016).¹ Publicity was undoubtedly an incentive for the city government to offer political and financial support, while encouraging food-growing

¹ Until the end of 2012, the two key funders were the Greater London Authority and the Big Lottery Fund; smaller grants were obtained from e.g. Islington Council, the Royal Parks Foundation, and City Bridge Trust.

among urban communities was the leading objective for *Sustain*. The experiment was widely publicised and discussed in local media.² Capital Growth encouraged interested community groups to join its network, offering small grants, practical teaching and advice, free tools and seeds, networking events, and support with insurance solutions. Simultaneously, Capital Growth encouraged local councils, schools, and other organisations to make land and materials available for growing spaces and tried to influence local and national policy on the long-term provision of land for urban food growing (Håkansson and Turnheim, 2016). Several borough councils signed up to Capital Growth, making it easier for community groups to approach local authorities for access to land.

Exceeding its original 2,012 target, Capital Growth managed to secure further funding, transforming from a finite experiment into an initiative that today is praised on the Mayor of London's website as "one of the largest urban food growing networks in the world".³ This study focuses on the original Capital Growth experiment, thus projects that were instigated between 2009 and 2012.⁴

Through an agreement with *Sustain*, access to Capital Growth's database was obtained, which includes information on individual gardening projects (including location, size, landownership, or association with particular organisations – where applicable and known) and their objectives. The projects and their objectives are rather diverse, associated, for example, with schools as a way of encouraging learning or housing estates to foster neighbourhood cohesion.⁵ Including *all* of these projects heeds calls not to analytically restrict urban agriculture to a single 'food regime' but to recognise its manifold and interconnected sustainability values (e.g. White and Stirling, 2013). For this study, the geographical location – in latitude and longitude – of all projects that emerged in the 2009-2012 timeframe was retrieved from the database. After removing projects with incomplete geographical information and erroneous database duplicates, the population for the subsequent analyses included 1,935 projects. Figure 1 shows the distribution of projects across all boroughs of the metropolitan area, with clear clusters especially in the northern districts of Inner London.

² See e.g. <https://www.theguardian.com/politics/2008/nov/04/boris-london> (Accessed 06.03.2018)

³ See <https://www.london.gov.uk/what-we-do/business-and-economy/food/our-projects-food-london/food-growing-london> (Accessed 06.03.2018)

⁴ The pre-condition for projects to join Capital Growth and be eligible for financial and practical support was that projects' formation did not date back further than 2009. Other conditions were that they were run by five or more unrelated people, the growing space was larger than five square meters, and provided clearly stated benefits for local communities. After reaching the 2012 benchmark target, these conditions were relaxed.

⁵ See <http://www.capitalgrowth.org/spaces/> (Accessed 06.03.2018)

INSERT FIGURE 1 HERE

[Caption: “**Figure 1.** Distribution of Capital Growth food-growing projects (2009-2012).”]

The following sections briefly describe the variables included in the statistical analyses. Details on their operationalisation and sources are provided in Table A1.

3.2. Dependent variable

The study’s dependent variable is the *number of food growing projects per neighbourhood population*. Lower Layer Super Output Areas (LSOAs) are used as neighbourhood proxies.⁶ LSOAs are small areas designed to be of a similar population size and – at least to some degree – possess similar attributes (e.g. property type). Although their boundaries may not always be coterminous with those of the ‘neighbourhoods’ that residents identify with, LSOAs are commonly used to describe or study neighbourhoods (e.g. Freeman et al., 2016).⁷

3.3. Control Variables

To control for the physical availability of space for food-growing projects, two land use categories were included. Population density and an existing ‘sustainability score’ were also included as controls:

Percentage greenspace. ‘Greenspace’ is a land-use category accounting for land that is not built-up (buildings, roads, paths, or rail), domestic gardens, or ‘other’ and unclassified land-use. The assumption is that the higher the percentage of greenspace area per LSOA, the higher the likelihood of food-growing spaces being established there.

⁶ LSOAs are defined by the Office for National Statistics for the reporting of small area statistics, replacing ‘electoral wards’ – the traditional unit used in the UK decennial census up to 2001. LSOAs encompass on average approximately 1,500 residents or 650 households. This is the smallest scale of aggregation for social data available in the UK and has been used in previous gentrification research (e.g. Freeman et al., 2016). Between 2001 and 2011, some LSOAs were split, merged, or completely redesigned (the number changed from 4,765 LSOAs to 4,835). This analysis draws on both 2001 and 2011 Census data which is why 2001 LSOA boundaries are used. For 4,730 LSOAs, 2011 data could be converted onto 2001 boundaries using the *InFuse Geo-converter* tool. LSOAs where this conversion was not possible were excluded. The excluded LSOAs contained only a very small number of food-growing projects, and the exclusion did not unduly influence the statistical analyses.

⁷ In other spatial and quantitative studies of urban agriculture (e.g. Taylor and Lovell, 2012), area measures are commonly used and, indeed, ‘gardening area per population’ would have provided a valuable complementary indicator for the dependent variable. However, information on individual projects’ size was incomplete in the Capital Growth database, with the number of zero observations clearly too large as to provide a reliable measure.

Percentage domestic gardens. Based on the assumption that in neighbourhoods with large numbers of domestic gardens, demand for communal projects is generally lower than in neighbourhoods without private gardens, the proposition is the inverse of the above, namely: that the higher the area percentage of domestic gardens per LSOA, the lower the number of urban agriculture projects.

Population density. This control variable is included to explore its possible effect without a pre-specified assumption as to its direction. On the one hand, high population density may imply more built-up land and, as argued above, less available space for food-growing projects; on the other, residential high-rise buildings (with high population densities) are sometimes surrounded by green areas, potentially available for communal gardens.

Borough sustainability score. Scholars have identified the importance of a ‘favourable political environment’ (in the form of, for example, supportive and cooperative local authorities) as a crucial precondition for the emergence and success of sustainability experiments (North and Longhurst, 2013; Sekulova et al., 2017). This control variable is a proxy indicator for this. It is based on a ‘sustainability score’ developed by *Sustain* to highlight which London local authority districts have actively taken actions ‘to support healthy and sustainable food’. The maximum score a borough can obtain is 6.5. The control variable is the score obtained by an LSOA’s respective borough. The ‘sustainability score’ is comprised of five sub-categories (including, for example, provision of public land for community food growing or supporting healthy food catering at schools). In 2013, the top two boroughs reached 6 points whilst the bottom three reached 1.

3.4. Independent Variables

Hypothesis 1 was tested by means of three proxies:

Gentrifying neighbourhood. In line with established gentrification studies (Atkinson, 2000; Freeman et al., 2016; Hamnett, 2003), the measure of gentrification employed here is based on the degree of ‘professionalisation’ in a neighbourhood. LSOAs were classified as ‘gentrifying’ if they were relatively “disadvantaged” in 2001 – i.e. possessed a representation of professionals that was below the median for all LSOAs – while experiencing an above average increase in professionalisation in the following decade (see Freeman et al., 2016).

Beyond this ‘overarching’ measure of gentrification, the following variables are included as proxy indicators for ‘early’ and ‘later’ stages of gentrification:

Percentage people working in creative industries. Related to ‘hipster urbanism’ and other forms of creative (grassroots) place-making, the assumption is that the higher this percentage, the more food-growing projects will be found in an LSOA.

Percentage change in median income. This variable is used as proxy indicator for later stages of gentrification. Here, a well-established, spatially manifest ‘eco-habitus’ of gentrifiers can be expected

in the form, for example, of organic supermarkets or independent cafes (Håkansson, 2017), as well as infrastructure such as bicycle lanes (Stehlin, 2015) and community gardens to provide for residents' sustainable lifestyle choices. The higher the percentage change in incomes in an LSOA the more food-growing projects are expected to emerge.

To test Hypothesis 2, two variables were included as proxy indicators for neighbourhoods that, at the time of Capital Growth's establishment, were already maturely gentrified or otherwise 'advantaged'⁸:

Percentage higher professionals. In accordance with the 'gentrifying' variable above, this variable measures the top three NS-SEC groups in 2001. Following scholars such as Butler and Lees (2006) on super-gentrification and Glucksberg (2016) on super-rich neighbourhoods, the assumption is that already 'advantaged' or maturely gentrified ('elite') neighbourhoods are characterised by a certain disconnection of residents from their immediate social surroundings and an absence of local engagement. The higher this proxy indicator, the lower the number of expected food-growing projects.

Median house price. An alternative proxy indicator for 'advantaged' neighbourhoods, following the same rationale as above, is house prices in 2009. The assumption is that the higher the house prices in a neighbourhood were at the time of Capital Growth's establishment, the lower the number of food-growing projects. Since the variable is highly skewed, it is in the regressions measured by its natural logarithm.

For Hypothesis 3, which proposes that urban agriculture projects are over-represented in deprived urban areas, one variable was included:

Income deprivation. This variable measures the percentage of income deprived people in an LSOA. The hypothesis is that the higher this percentage, the more food-growing projects are to be found. Long-term visions for social equity and neighbourhood improvement, are assumed to be strengthened by short-term immediate material needs in the development of sustainability projects in these neighbourhoods.

One additional variable is included in the analysis:

⁸ In order to differentiate neighbourhoods that had undergone gentrification from those that were 'advantaged' at the time of Capital Growth's launch without necessarily having experienced an upward socio-economic transformation, a measure of (lower class) 'displacement' could have been included to test hypothesis 2. However, gentrification-induced 'displacement' is heavily debated in the literature, not least because of the empirical difficulties to document it (e.g. Hamnett, 2003). These debates are beyond the scope of this paper which views gentrification essentially as one important parameter for urban contexts affecting sustainability experiments.

Percentage non-UK-born. Much research on urban agriculture has emphasised the role of ethnicity and nationality (Shava et al., 2010). Food-growing is often associated with cultural heritage and viewed as a form of ‘taking root’ in new environments. Mainstream supermarkets usually have a limited repertoire of ethnic foods, which is why gardening – for some groups – serves as an addition to specialised stores and markets. A large percentage of non-UK-born residents in an area could therefore be expected to affect positively the number of food-growing projects there. However, in a global metropolis like London, complex patterns of immigration involving different diaspora are reflected in complex spatial distributions of nationalities (and ethnicities) and socio-economic classes. This variable is thus included with caution in the analysis.

Several other local socio-demographic and socio-economic indicators (such as percent home ownership, percent social renting, percentage Black and Asian minorities, percentage people with higher education) were omitted due to high correlation with other variables.

4. Statistical methodology

Visual inspection of the geographical distribution of community gardens in London shows a clearly clustered pattern, with some areas strongly overrepresented and others with very few gardens (Figure 1). This, in turn, indicates that testing the hypothesised relationships by means of ordinary least squares (OLS) may be inappropriate due to spatial autocorrelation. Following recommended practice for spatial specification search (Anselin and Rey, 2014:110), an OLS regression was run with diagnostics for spatial dependence (Lagrange Multiplier Tests against spatial lags of dependent and independent variables, as well as against autoregressive errors). These, as well as the global Moran’s I were all highly significant, pointing to the presence of spatial autocorrelation. Spatial weights matrices were calculated with the help of shape-files obtained from the Greater London Authority Data Store⁹, using first-order queen contiguity, i.e. defining LSOAs as neighbours if they share a border or vertex.

Finding an optimal specification for a spatial autoregressive model (SAR) is difficult on the basis of the spatial diagnostics obtained, which provide no clear indications as to the precise nature of the observed spill-over effects between adjacent areas. The spatial regressions were therefore calculated using different specifications of spatial two-stage models. As indicated below, the results proved robust to different specifications.

4.1. Descriptive statistics

⁹ See <https://data.london.gov.uk/dataset/statistical-gis-boundary-files-london> (Accessed 06.03.2018)

The hypotheses were tested by means of a series of multi-linear regressions. Preceding the statistical analyses, data were verified to comply with the requirements of linear regression – linearity, equality of variance and normality. With only one exception – that between median house prices and percentage employed in higher occupations – correlations among the independent variables did not give rise to concern about undesirable collinearity. Descriptive statistics are presented in Appendix A.2.

4.2. Results

The hypotheses were first tested by means of hierarchical OLS regression (Table 1). In the base model (Regression 1), all control variables except population density were strongly significant in the expected directions. Adding the predictor variables related to the hypotheses (Regression 2), increases the adjusted R² significantly, from .08 to .14.

Table 1. Ordinary least squares (OLS) regressions.
Dependent variable: Number of gardens per person (n=4,730).

Regression	(1)	(2)	VIF
Constant	.373*** (.037)	.232 (.245)	2.441
Greenspace area (%)	-.020*** (.005)	-.015** (.005)	2.312
Domestic garden area (%)	-.072*** (.005)	-.048*** (.006)	2.323
Population density (person per hectare)	.000 (.000)	-.001*** (.000)	1.121
Borough sustainability score	.041*** (.004)	.028*** (.004)	1.166
Gentrifying LSOA (dummy)		.055** (.025)	2.384
Creative professionals (%)		.038*** (.003)	1.284
Median income change 2001-2011 (%)		.004*** (.001)	2.322
Median house price 2009 (natural logarithm)		-.007 (.021)	3.948
Higher professional occupations 2001 (%)		-.008*** (.002)	2.955
Income deprived (%)		.005*** (.001)	1.570
Non-UK born (%)		-.001** (.001)	2.441

Standard errors in parenthesis, two-tailed tests: * p<.1;
. p<.05; * p<.01

Adjusted R² .08 .14

	Standard error	.422	.408
	F-value	107.2***	72.9***
Diagnostics for spatial dependence:			
	Moran's I (error)		9.058***
	Robust Lagrange Multiplier (lag)		78.016***
	Robust Lagrange Multiplier (error)		38.374***
	Lagrange Multiplier (SARMA)		156.667***

In the expanded model (Table 2), all of the control variables are significant, as are all except one of the predictor variables. The exception is the variable for median house price 2009, possibly because of the collinearity with employment in higher professional occupations. The suspicion is strengthened by the value of the corresponding variance inflation factor (VIF). Although well below the recommended limit of 5, it is the only one exceeding 3 in the regression.

Table 2. Comparison of ordinary least squares regression with generalised spatial two-stage least square regressions (n=4,730).
Dependent variable: Number of gardens per person.

	OLS	Lag of dependent variable	Lag of independent variables	Spatially autoregressive errors
Constant	.232 (.245)			
Greenspace area (%)	-.015** (.005)	-.009 (.012)	-.030*** (.009)	-.011** (.005)
Domestic garden area (%)	-.048*** (.006)	-.050*** (.014)	-.064*** (.008)	-.043*** (.006)
Population density (person per hectare)	-.001*** (.000)	-.002*** (.000)	-.001*** (.000)	-.001*** (.000)
Borough sustainability score	.028*** (.004)	.028*** (.010)	.024*** (.004)	.028*** (.005)
Gentrifying LSOA (dummy)	.055** (.025)	.076 (.061)	.077 (.053)	.049** (.025)
Creative professionals (%)	.038*** (.003)	.045*** (.006)	.044*** (.003)	.035*** (.003)
Median income change 2001-2011 (%)	.004*** (.001)	.005** (.002)	.002** (.001)	.004*** (.001)
Median house price 2009 (natural logarithm)	-.007 (.021)	-.069 (.052)	-.001 (.023)	-.018 (.021)
Higher professional occupations 2001 (%)	-.008*** (.002)	-.008** (.004)	-.011*** (.002)	-.007*** (.002)
Income deprived (%)	.005*** (.001)	.007*** (.002)	.006*** (.001)	.004*** (.001)
Non-UK born (%)	-.001** (.001)	.001 (.001)	.003*** (.001)	.001 (.000)

Adjusted R ²	.143			
Wald Chi ²		967.18***	982.81***	523.92***
Pseudo R ²		.161	.172	.144

Standard errors in parenthesis. two-tailed tests

* p< .1. ** p<.05. *** p<.01

5. Findings and discussion

5.1. Control variables

The tested regressions strongly support the influence of the control variables (*percentage greenspace*, *percentage domestic gardens*, *population density*, and *borough sustainability score*) on the likelihood of urban garden projects being established in a neighbourhood. *Percentage greenspace* is generally significant, but in the opposite direction than hypothesised. This suggests that the largest number of food-growing projects are on land in built-up areas or on brownfield, i.e. previously developed, sites. Probably, the size of projects matters in this context: Although there are less projects in areas with a high percentage of *greenspace*, these are likely to be larger in size. Projects in built-up land, on the contrary, might be larger in number but smaller in size. An alternative measure for the dependent variable, such as ‘gardening size per population’ (see Footnote 7), might have confirmed this supposition. The finding may also reflect Capital Growth’s explicit encouragement of ‘interim use’-projects through ‘meanwhile leases’:

As originally conceived, these are temporary leases granted to tenants which permit the non-profit use of vacant business properties, while recognising that the landlord is looking to find a commercial leaseholder. Through the work of intermediaries [such as *Sustain*] working in the field of communal growing, this has since been extended in its application to include plots of land without buildings and on which growing can take place. (White and Stirling, 2013:844)

Given the scarcity of land in London people came to Capital Growth with an extraordinary variety of potential growing spaces including children’s nurseries, prisons, roof gardens, floating barges, concrete car parks, and sites awaiting redevelopment as well as unused green space around housing estates and schools. (Sustain, 2013:6)

Clearly, such ‘interim use’ influences the longevity of projects and points to important questions about the temporality and short- or long-term impacts of projects and the activities they generate (Tonkiss, 2013).

As hypothesised, neighbourhoods with a large area of *domestic gardens* tend to have fewer communal food-growing projects, presumably because access to private gardens reduces the demand for communal gardening projects.

Population density is strongly negatively related to the number of food-growing projects within LSOAs. At first sight, the interpretation of this finding may appear obvious in that high population densities limit the physical availability of space suitable for gardening. On the other hand, there is a diversity of projects, which include, for example, the use of roof tops and green spaces surrounding housing estates. Moreover, since high population-density areas in London are diverse in terms of socio-economic characteristics and land prices, simple interpretations of the causalities involved are not possible (Hill, 2017).

The fourth control variable – Capital Growth’s *sustainability score* for boroughs providing a ‘favourable political environment’ – is strongly positively related to the emergence of projects. This suggests that local authorities play an important role as ‘brokers’ and ‘political interface’ (North and Longhurst, 2013; Peters et al., 2010) between local communities, sustainability initiatives, and central government policy. Many borough councils integrated Capital Growth into local development plans and core strategies, perhaps “contingent upon the exhortations and related (‘official’) communications emanating from Central Government” (Peters et al., 2010:7598)¹⁰ and presumably influenced by local marketing efforts and intra-borough competition, sometimes promoted by particularly engaged local officials (Sustain, 2013).

5.2. Hypotheses

As shown in table 3, the analyses provide support for all three hypotheses.

Hypothesis 1. The dummy variable ‘*gentrifying*’, a proxy indicator for professionalisation within a neighbourhood, is significant in the OLS and spatially autoregressive errors model, but not in models including a spatial lag of dependent and independent variables, possibly because spatial dummy variables are ill-suited for spatial regressions.

The results show a statistically highly significant association between the *percentage of residents working in creative industries* – a generally accepted proxy indicator for marginal gentrification – and the existence of food-growing projects. This supports claims in the literature that food-growing projects are commonly expressions of creative DIY place-making, grassroots projects, and small-scale interventions to inventively reshape urban space (Iveson, 2013). These often thrive in neighbourhoods where competition for land is not yet fierce and housing still affordable for economically-struggling artists and other ‘bohemian’ groups (Ley, 2003; see Grodach et al., 2016 for contrasting perspectives).

¹⁰ Food-growing was mentioned, for example, in the London Mayor’s 2006 *Food Strategy*. See https://www.london.gov.uk/sites/default/files/the_mayors_food_strategy_2006.pdf (Accessed 06.03.2018)

McClintock and colleagues (2016) find that urban agriculture emerges disproportionately often in areas where – through entwined economic and cultural forces – potential ground rents are rising, attracting investment. As gentrification advances in these neighbourhoods, urban gardening projects are more likely to be co-opted by economic interests:

... ‘squatted buildings, open spaces and other “biotopes”, which precarious artists made interesting . . . become harnessed by clever city officials and (especially real estate) capital as branding assets that contribute to the image of “cool cities” or “happening places”’ (Mayer, 2013:11)

This points to influences and roles of experiments beyond their ‘sustainability’ ambitions (Håkansson, 2017), but also to their spatial and temporal constraints in ‘alternatively’ re-making the city (Hodson et al., 2015). Yet, despite – or arguably because of – such projects often being provisional, filling temporary spatial ‘cracks’ before new rounds of investment arrive, Tonkiss (2013) emphasises their value in contending for “alternative reckonings of time and value”: “It may be a basic urban error to think about spatial interventions in terms of end-users. . . There is no such thing as an ‘end-user’: there are only users over time” (Tonkiss, 2013:320). She thus challenges the idea of urban experiments as part of systemic transitions, highlighting instead, for example, their ‘power to delay’ (see Hodgkinson, 2012) in the contestation of urban space.

The high statistical correlation between people working in creative industries and the incidence of projects might point also to the increasing popularity of environmental sustainability and ethics concerns within the arts more generally (Lineberry and Wiek, 2016), indicating influences and ‘trends’ beyond gentrification. An example is the Tate Modern museum on the London Southbank, which opened a community garden as a participatory art project in 2007, with the aim to support environmentally friendly practices and design¹¹.

The *income change* variable, a proxy indicator for later gentrification stages, is also significantly positive. As suggested in the literature, projects found in these neighbourhoods might be linked to various forms of (green) consumption, being part of cafes or restaurants, for instance, and generally embodying residents’ ‘eco-habitus’. Indeed, with the amenity and commodity consumption typical of gentrifying neighbourhoods, the link between food consumption and production might be most obvious here.

Many projects are associated with schools and nurseries, which might symptomize the generational change of ‘later’ gentrifiers as members of family-based middle-class communities (Butler and Robson, 2001). This comprises a change also in how urban food-growing projects are often made to

¹¹ See <http://www.tate.org.uk/about-us/projects/tate-modern-community-garden> (Accessed 06.03.2018)

fit into a succession of neighbourhood descriptions (McClintock, 2018): from ‘up and coming’, ‘cool’, and ‘trendy’ to ‘family friendly’, ‘village-like’, and ‘green’.

Hypothesis 2. According to Hypothesis 2, food-growing projects are under-represented in advantaged neighbourhoods. This is supported by the negative, strongly significant association between the establishment of gardens in a neighbourhood and the proportion of higher professionals there. Residents in such areas typically belong to a ‘global’ elite where professions and lifestyles involve frequent international travel and limited local attachment (Butler and Lees, 2006; Glucksberg, 2016). Their time for and interest in local community initiatives are accordingly more limited.

Simultaneously, new high-end real estate development projects, such as at London’s Elephant and Castle or Earl’s Court, often feature community gardens as part of their ‘sustainable’, ‘green’ living schemes. This reflects, critics argue, “...the growing ability of real estate developers and their target consumers to use discourses of the environment” (Quastel, 2009:1), something captured in the notion of ‘environmental gentrification’. However, it seems unlikely that urban gardening schemes of this kind, embedded in luxury compounds, will join networks like Capital Growth. Here, the objective appears to be exclusivity in private spaces, rather than to make new, public milieu.

Peckham in South London has been following a different gentrification trajectory than super-rich enclaves or developments (Håkansson, 2017), but the proposition that maturely gentrified neighbourhoods are characterised by low place-attachment and limited local engagement by its residents was echoed in an interview with a Peckham-based sustainability activist:

There used to be anarchists, activists, artists... and I think [*the neighbourhood has*] become a lot more wealthy, posh, younger, and you got your famous people around. I think those sorts of people are probably much less likely to get involved in environmental activism. (Interview with PP member, quoted in Håkansson, 2017)

House prices around the time of the study period are negatively but not significantly related to the establishment of community gardens. As already noted, this is perhaps a statistical artefact of the variable’s high correlation with the proportion of *higher professionals* in the area (see Table A.2).

Hypothesis 3. *Income deprivation* shows a strong positive significance and hence supports Hypothesis 3: Food-growing projects are over-represented in deprived urban neighbourhoods. This finding supports recent arguments in the environmental justice literature (Anguelovski, 2015). Urban gardens in income-deprived neighbourhoods are likely to fulfil other roles than those found in gentrifying neighbourhoods. In these settings, urban gardens are perhaps less related to eco-conscious lifestyle and consumption choices and more oriented towards longer-lasting neighbourhood improvements, immediate supplements of fresh produce, or education in schools or other organisations.

This finding underscores the multiple origins and social roles of sustainability experiments, and the varying motivations and circumstances behind them. This contrasts with a literature (van den Heiligenberg et al., 2017) which sees ‘creative people’ – in reference to Florida's (2005) controversial ‘creative class’ model – as the main demographic factor to influence positively the establishment of experiments. As critical urban geographers have argued, projects that are *not* associated with ‘trendy’ urban neighbourhoods are often overlooked. The findings of the current paper suggest a variety of ‘seedbeds’ for experimental initiatives, including disadvantaged social geographies.

The final variable, ‘*non-UK born*’, is negatively significant. Both the statistical strength and the direction of its effect are surprising. The result points to the importance of questions of identity, diversity, and perhaps of inclusivity in analysing the sources of urban experimentation. However, the complexity of these issues, especially in a global city like London, preclude simple generalisations and conclusions at this point. The finding should be seen as an invitation for future research.

5.3. Limitations and future research avenues

The study has several limitations that should be kept in mind when interpreting the results. The lack of conceptual consensus over what constitutes ‘gentrification’, ‘deprivation’, or even ‘neighbourhood’ means that the constructs and variables used in this study can only imperfectly capture the phenomena of interest. Gentrification, for instance, is a dynamic and multi-faceted process that occurs unevenly, can transform neighbourhoods gradually or abruptly, and never involves a homogenous group of ‘gentrifiers’.

Related to this are eminent issues of ecological fallacy, where inferences about individuals are deduced from inferences from groups: not all individuals who live in a gentrifying or ‘deprived’ area are ‘gentrifiers’ or members of deprived communities. Furthermore, not all individuals who are engaged in sustainability initiatives are ‘gentrifiers’ or members of a deprived community, nor do they necessarily live in the neighbourhood where these initiatives are located. Given the urgency to understand factors that influence the development of sustainability experiments beyond initiative-internal aspects or specific local contexts, however, this study still makes a unique contribution to the literature in its examination of differing socio-economic and socio-demographic urban contexts.

As for the experiment under study, 1,935 is an impressively large number of projects, but not all urban agriculture projects in London are part of Capital Growth and an issue of representativeness and a risk of self-selection remain even within this large network. Capital Growth was advertised widely in several media outlets, but was it really accessible to *all* communities? And to what extent did personal networks of activists or engaged local administrators, for instance, contribute to the observed spatial clustering? The high significance of the control variable ‘borough sustainability score’ – a

proxy indicator for a favourable political environment – is likely to be an indication for this and deserves greater attention in future studies.

The R square of the models is relatively low, underscoring the importance of other factors as well as the complexity of the phenomenon under study, which clearly cannot be reduced to a few determining factors. One important avenue for future research is to identify these other underlying factors and (urban) processes at work. The chosen approach in this study may underestimate, for instance, the importance of ‘holistic’ differences between neighbourhoods. To pursue this possibility, one could employ a classification approach dividing local neighbourhoods into clusters depending on their socio-cultural and demographic characteristics – perhaps along the lines of Singleton and Longley's (2015) geodemographic classification for London.

At least four more avenues can be suggested. First, although making simplified distinctions between different stages of gentrification, this study viewed gentrification mainly as a spatial phenomenon. Future research could focus on its temporal aspects, asking questions concerning projects' longevity and survival within transforming urban contexts. Second, this paper included some speculation as to the underlying motives behind different initiatives in different urban context. To substantiate these and provide a more detailed analysis of these aspects, future research could combine spatial analyses with qualitative data gathered from on-the-ground projects. Third, whilst this study explicitly did not focus on ‘the experiment’ itself, future research could explore *Capital Growth* in greater detail, particularly its role as a political instrument in the run-up to the London Olympics, pointing to questions such as: How are experiments used as marketing tools? Fourth, to speak to the generalisability of urban agriculture as a sustainability experiment, future studies should aim for comparisons of different types of experiments, including, for example, in the transport and housing domain.

6. Conclusions

This paper has analysed the spatially uneven distribution of urban sustainability experiments, focusing on largely neglected demographic, socio-economic, and socio-cultural characteristics to explain where and why experiments are likely to emerge (or not). Applying a quantitative approach, it complements earlier qualitative studies that have successfully described how unique localities shape the development of experiments, but that have typically not engaged with systematic patterns of ‘favourable’ geographical contexts.

Emphasising the distinctiveness of places seems insufficient for a comprehensive understanding of how and why experiments emerge, diffuse, and become geographically embedded. Issues of consistency and similarity across and beyond places are of equal, if not greater importance. This paper

has provided empirical evidence that there are a variety of socio-economic and socio-cultural urban contexts in which experiments emerge – with presumably spatially variegating roles, values, and consequences.

Through its large-n statistical analysis of the correlation between experiments' location within a city and neighbourhood-specific indicators, the paper provides a novel methodological contribution. Studying an urban agriculture experiment that consists of projects all across London, it examined variations of urban settings on a metropolitan scale whilst, simultaneously, engaging with the detail of small area socio-economic and demographic data.

Specifically, the paper identified particular types of gentrifying as well as income-deprived neighbourhoods as distinct urban milieux in which agriculture initiatives emerge disproportionately often. Already gentrified or otherwise advantaged urban neighbourhoods, in contrast, were found to have disproportionately low number of urban agriculture projects which, the paper argued, is due to a lack of neighbourhood attachment or local engagement by residents in these areas.

As such, projects reflect the lifestyles and life stages of neighbourhood dwellers. In marginally gentrifying areas, the paper linked the emergence of projects to ad-hoc, creative DIY activisms and 'place making' activities, while in neighbourhoods with more progressed gentrification, consumption and family-oriented food-growing projects probably prevail. The medium- and long-term effects, the symbolic value, and the potential 'capturing' of projects to fit into specific neighbourhood narratives or marketing strategies vary accordingly.

In areas with a high proportion of income-deprived people, where projects were also overrepresented, the paper suggested that initiatives are driven not only by immediate benefits associated with local food production, but also by more far-reaching visions of neighbourhood improvements. They thus play a different social and economic role: Rather than being a manifestation of socio-cultural dynamics in the context of gentrification, initiatives are here likely to be a response to social entrenchment in low-income neighbourhoods.

These findings have several implications for our theoretical understanding not only of the emergence of initiatives in manifold, dynamic urban and social contexts, but also of their expected significance for wider societal sustainability transitions.

First, the transitions literature typically views experiments as embedded in 'niches' where networking efforts, collectively defined visions, and systematic learning are the foundation for the successful replication and diffusion of sustainability projects. The findings of this study raise questions as to what extent innovative knowledge can be codified and transferred across divergent contexts, given the disparities in their preconditions and functions. In other words, is it perhaps easier and more likely for projects across gentrifying neighbourhoods in London (and other cities) to socially (and virtually)

connect and conjointly generate and profit from transferable lessons than it is for projects across quite dissimilar environments within the same city?

Second, then, we must continue to empirically explore questions about the potential exclusiveness of initiatives – or ‘niches’ for that matter – and the uneven valorisation of the innovative knowledge, skills, and other merits that different projects in different settings might harbour.

Third, if we take the underlying socio-spatial diversity of projects seriously, we must move beyond a discourse of ‘inclusivity’ and investigate how to best make room for, acknowledge, and harness *different* – perhaps ambiguous and contending – visions, values, practices, and forms of knowledge. Here, critical (self-)reflections are essential for the transitions scholarship which has repeatedly been urged to “address whose voices, concerns, and socioeconomic and environmental conditions are more or less heard, addressed, and improved through transition initiatives” (Truffer et al., 2015:2). In this context, the findings of this paper shed new light on disadvantaged social geographies as vital ‘seedbeds’ for transition initiatives which deserve much more attention.

In sum, this paper points to sustainability experiments’ interrelationships with socio-cultural and economic developments transforming major cities that so far have received little attention in the transitions literature. It challenges the common distinction between ‘initiative-internal’ and ‘contextual’ factors used to explain the emergence and development of experiments, suggesting that the so-called ‘habitat’ of initiatives cannot be understood separately from the habitat – and the *habitus* – of city dwellers. In line with Hodson and colleagues (2017:1), it argues that “urban transitions are not about technological or social innovation per se, but about how multiple innovations are experimented with, combined and reconfigured in existing urban contexts.”

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Appendix A.1

Table A1. Summary of variables.

Variable	Definition / Operationalisation	Source
Dependent variable		
Number of food growing projects per LSOA population		
Control variables		
Percentage green space	% green space per LSOA in hectares	Generalised Land Use Database 2005
Percentage domestic gardens	% domestic gardens per LSO in hectares	Generalised Land Use Database 2005
Population density	Persons per hectare	Census 2011
Borough sustainability score	Total score obtained by borough (max. 6.5)	Sustain 2013 ('Good for London') ¹²
Independent variables		
Hypothesis 1:		
Gentrifying neighbourhood	Following Freeman (2016), the 'gentry' is defined as people in the following NS-SEC: (1) higher managerial, administrative and professional occupations, (2) large employers and higher managerial and administrative occupations, and (3) lower managerial, administrative and professional occupations. LSOAs are 'gentrifying' if they had a representation of professionals below the median for all LSOAs in 2001 with an increase in the following decade that was at the 75th percentile or above for all LSOAs.	Census 2001 and Census 2011
Percent people working in creative industries	% people working in culture, media, and sports occupations	Census 2011
Percentage change in median income	Household income estimates 2001, 2011	London Data Store ¹³
Hypothesis 2:		
Percentage higher professionals	% people in in the following NS-SEC: (1) higher managerial, administrative and professional occupations, (2) large employers and higher managerial and administrative occupations, and (3) lower managerial, administrative and professional occupations.	Census 2001
Median house price	LSOA median house price in 2009	Office for National Statistics
Hypothesis 3:		
Income deprivation	% people income deprived The 2010 Indices of Multiple Deprivation (IMD), a composite score of neighbourhood-level factors, provide a relative measure of deprivation. As for regression analysis, it is not recommended to use the overall IMD score, this variable is the	Ministry of Housing, Communities and Local Government 2010

¹² Available at https://www.sustainweb.org/publications/good_food_for_london_2013/

¹³ Available at <https://data.london.gov.uk/dataset/household-income-estimates-small-areas>

income domain numerator in per cent of
population deprived.¹⁴

Additional variable

Percentage Non-UK-born

% people born outside the UK

Census 2011

¹⁴ See

<https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiyy9a9n4zYAhUFEVAKHdsOBQ0QFgggMAA&url=https%3A%2F%2Fwww.researchgate.net%2Ffile.PostFileLoader.html%3Fid%3D54ba581dd039b157718b45fa%26assetKey%3DAS%253A273674047819777%25401442260385739&usg=AOvVaw0Q3f9wfZyqH398olZn6Gyi>

Appendix A.2

Table A.2. Descriptive statistics (n=4,730).

		Minimum	Maximum	Mean	S.D.
1	Greenspace area (%)	0.0	15.2	2.05	1.92
2	Domestic garden area (%)	0.0	7.5	3.03	1.58
3	Population density (person per hectare)	1.2	461.2	94.54	58.64
4	Borough sustainability score	0	6	3.31	1.54
5	Gentrifying LSOA (dummy)	0	1	.07	.25
6	Creative professionals (%)	0.0	20.3	4.7	3.56
7	Median income change 2001-2011 (%)	7.8	102.2	41.39	7.43
8	Median house price 2009 (natural logarithm)	11.0	14.6	12.49	.44
9	Higher professional occupations 2001 (%)	1.7	41.0	11.83	6.78
10	Income deprived (%)	0.0	54.3	17.40	10.48
11	Non-UK born (%)	3.6	75.0	35.85	14.49

Correlation matrix

	1	2	3	4	5	6	7	8	9	10
1	--									
2	-.460*	--								
3	-.503*	-.148*	--							
4	-.078*	-.153*	.183*	--						
5	0.001	-.161*	.125*	.065*	--					
6	-.228*	-.184*	.373*	.242*	0.006	--				
7	-.085*	-.146*	.227*	.122*	.278*	.229*	--			
8	-.100*	0.002	.038*	.066*	-0.027	.524*	.197*	--		
9	-.134*	0.024	0.019	.100*	-.173*	.620*	0.005	.710*	--	
10	0.001	-.356*	.400*	.142*	.170*	-.143*	.084*	-.481*	-.614*	--
11	-.224*	-.298*	.452*	.073*	-0.019	.149*	-0.009	.048*	-0.002	.341*

* Correlation is significant at .01 level (two-tailed).

Figure 1. Distribution of Capital Growth food-growing projects (2009-2012).