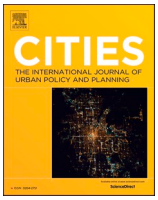
Cities 149 (2024) 104971

Contents lists available at ScienceDirect

Cities

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



Social prescribing of urban agriculture: The importance of minimizing risks from soil contamination

Luke Beesley [a,b], Michael Hardman [b,*]

[a] Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague 6, Czech Republic
[b] School of Science, Engineering and Environment, Peel Building, University of Salford, Manchester M5 4WT, UK

ARTICLE INFO

Keywords:
Urban agriculture
Green social prescribing
Green infrastructure
Planning
Urban soils

ABSTRACT

The value of Green Social Prescribing (GSP) of Urban Agriculture (UA) is well proven, with many cities witnessing a rise in such activities. However, with burgeoning interest, there comes an increased need to understand the potential risks associated with these practices. City officials, from planners to policy makers, are keen to scale-up the concept, particularly through supporting a wide range of urban farms and community gardens to contribute within the built environment. Our opinion piece highlights potential barriers associated with a legacy of heavy metal enriched urban soils which underpin many UA activities in post-industrial regions, signposting the need for greater awareness of their use and management. In doing so, we provide a series of recommendations for increasing knowledge exchange around urban soils and risk in the context of GSP.

1. Introduction

Interest in Green Social Prescribing (GSP) is at an all-time high, with an array of actors, from health professionals to planners, government officials and academics advancing the concept (Howarth et al., 2021; Kiely et al., 2022). GSP involves contact with a range of Nature-Based Interventions (NBIs), such as parks, gardens and other green assets, with proponents arguing that the approach can significantly improve the health and wellbeing of participants involved (Howarth et al., 2020; Leavell et al., 2019; McGuire et al., 2022). Inevitably, there is much discussion around the impact of such schemes and their place within the wider context of more conventional health interventions (Bell et al., 2018).

In the UK, GSP has received strong policy and funding support, alongside significant investment to mainstream the practice (Mitchell et al., 2021), particularly due to pressure on conventional health services, which have been strained during and post pandemic (Fixsen & Barrett, 2022). Further afield, Baska et al. (2021) revealing how the practice has also received support in Europe: from over a decade's investment in Catalonia, to burgeoning support in Italy, Ireland and elsewhere. Examples exist from outside Europe, such as in South Korea, in which programs have been effective in reducing depression and loneliness in elderly people' in predominantly rural areas (Kim et al., 2021). Not surprisingly there is evidence of investment in GSP in the USA, Japan and elsewhere (see for example Leavell et al., 2019).

2. Urban agriculture and social prescribing

At the centre of the nascent GSP movement is Urban Agriculture (UA), with allotments, community gardens and urban farms forming the focal point of this practice as convenient and accessible green spaces within dense urban settings (Howarth et al., 2020). There has been a rapid rise in funding and policy support in this sphere, in part due to its significant impact during the pandemic enabling populations to have access to fresh produce, bringing together fragmented communities and acting as an important green asset during repeated lockdowns (Schoen & Blythe, 2020). Indeed, there are now an array of radical masterplans looking to upscale the concept, from large-scale edible rooftops to peri-urban farms (see for instance Northern Roots, 2023). Key actors, such as planners, are increasingly fuelling the concept's growth in the Global North and Global South. In the UK for instance, the recent Biodiversity Net Gain legislation could lead to a further rise in support for the practice (see for example DEFRA, 2024). Adding to this, a call for 'Right to Grow' legislation has also received significant support, with some cities and regions interested in implementing this, leading to more UA spaces being created, including those practising GSP (Incredible Edible, 2024).

Within the UA movement, GSP allows for sites to diversify their

* Corresponding author.
E-mail address: m.hardman@salford.ac.uk (M. Hardman).

https://doi.org/10.1016/j.cities.2024.104971
Received 8 December 2022; Received in revised form 11 March 2024; Accepted 18 March 2024
Available online 27 March 2024

activities, whilst potentially generating new forms of revenue and impact. In this sense, the growth of GSP on UA spaces can be seen in part due to intense competition for funding elsewhere and a need to generate more support to enable operations to continue (Mitchell et al., 2021). Many UA sites now view GSP as core to their deliverables, with smaller and macro sites ensuring that the concept is at the centre of their practices. Howarth et al. (2021) highlight how major organisations, smaller sites and a host of other providers are investing heavily in GSP practice, particularly with regards to targeting vulnerable and often marginalised populations. McGuire et al. (2022) however argue that, although GSP practices in UA spaces can have significant impact on the individuals involved, there is some concern around medical terminology that is entering dialogue. They reflect on the mainstreaming of community gardens into the practice and how GSP funding models, public health agendas and other elements could have a potential negative impact on the future of these spaces.

In this piece, we highlight how all actors need to be aware of not only the health benefits, but the potential risks associated with GSP practices reflecting on the example of urban soil as a risk pathway; in this sense, we are raising awareness of potential risks associated with regular in-depth contact with urban soils at UA sites that are scaling-up GSP. We highlight how advocates and users of UA sites should be aware of their soils, to ensure that potential harms to GSP participants may be balanced with benefits. Our focus here is not to critique GSP practices, but rather to raise awareness and encourage dialogue. This is especially important for urban decision-makers, who are powerful actors advancing these concepts in cityscapes witnessing an upscaling of UA and GSP. Therefore, planners and other urban actors may increasingly find themselves gatekeepers to safe practices within the urban environment.

3. Risk in the context of urban agriculture

Healthy soils are the backbone of productive, safe and sustainable UA (Salomon & Cavagnaro, 2022). Our concept of safety in this context is ever-evolving as the risk profile of present and future food contaminants residual in the soils of our post-industrial conurbations are investigated and unravelled (Qvarforth et al., 2022). The heavy metal lead (Pb) is a much documented and studied neurotoxin when accumulated above safe levels in the human body. Wortman and Lovell (2013) reflect on the scale of the issue posed by soil Pb in older cityscapes in USA revealing how, for example, some 88 % of Boston's urban gardens are above the USDA's threshold for safe Pb concentrations (Clark et al., 2006 cited in Wortman & Lovell, 2013). In a systematic review of heavy metals in urban topsoils in Europe, Pb was found to be in occurrence at the highest concentrations in soils sampled in UK sites (Binner et al., 2023).

Indeed, Pb has been the subject of much interest amongst researchers evaluating risk versus benefit of UA activity in the UK, with most studies describing its abundance in soils and its behaviour under a range of management typologies (Dennis et al., 2020). Advancing this approach, Stubberfield et al. (2022) surveyed UA participants through questionnaires as well as measuring soil Pb concentrations at their sites, establishing that health benefits of UA activity outweighed the risk from Pb exposure in mildly contaminated soils. Recognizing the inherent benefits of UA activities, many sites across the globe have had to adapt their operations to high heavy metal concentrations in soils in order to comply with statutory guidance, with raised beds and other tools used to mitigate contact with extant soil (Hardman et al., 2022). Whilst this reduces direct contact of vegetation to contaminated soils, recent research to measure contaminants on the surface of vegetation, from dust and soil dispersion at UA sites, suggests that only 50 % of Pb (and $<$ 10 % of cadmium, by way of additional example) was removed from vegetable surfaces by regular household washing (Augustsson et al., 2023). Thus, even without consumption of vegetation and without contact to soil itself, the touching of vegetation and hand-to mouth contact could be a risk pathway previously overlooked. This is important in the context of UA sites involved in GSP because evidence shows that the majority of activities revolve around planting, cultivating and harvesting produce as well as highly variable, though sometimes minimal, consumption of food grown (Howarth et al., 2021; Schoen & Blythe, 2020).

4. The way forward

With many UA GSP spaces focussing on disadvantaged individuals and those with severe health conditions, there is a need to pause and reflect on the extent to which prescription of contact with potentially contaminated soils and vegetation may unduly weigh on disadvantaged populations, particularly those with disabilities who are often involved in UA GSP projects (Howarth et al., 2020). In this opinion piece we acknowledge the benefits of GSP but merely open the call for more investigation and support from key actors to enable projects to understand the risks versus benefits associated with their sites. With the championing of UA and GSP by planners and city authorities, we are now seeing additional support being formalised; an exemplar is the newly created Office of Urban Agriculture, established by New York City's Mayor which aims to mainstream UA activities in a safe and healthy manner (see for example NYC Office for Urban Agriculture, 2022). We call for universities and other not-for-profit organisations to enable soil testing at much lower costs to allow UA practitioners to understand their sites in finer detail, allowing them to implement GSP activities in lower risk zones. Given that a significant number of UA sites are often temporary, other measures, such as moveable raised beds, may be a more efficient solution within meanwhile spaces. Here we call for more knowledge exchange between academics in the fields of health, society and environment to work jointly with UA practitioners so that GSP may grow safely and create maximum benefit for minimum risk.

CRediT authorship contribution statement

Luke Beesley: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Writing – original draft, Writing – review & editing. **Michael Hardman:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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