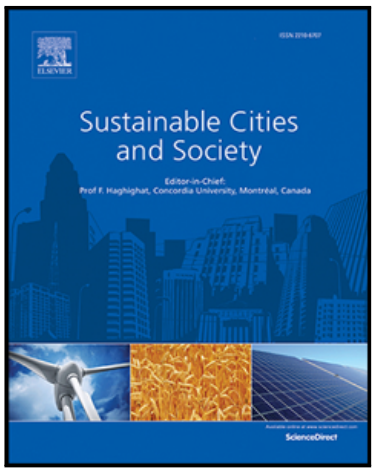

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Urban and Peri-urban Agriculture for Sustainability and Wellbeing: A response

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1. Introduction

The COVID-19 pandemic has highlighted the role of urban and peri-urban agriculture as an important source of good health, livelihoods and wellbeing in the global south, alongside its contributions to sustainability outcomes through increasing green cover, reducing the additional miles traveled by horticultural products from the rural hinterland to large cities, enabling water and waste recycling, amongst others. Several reports have noted the declining consumption of fruits and vegetables by urban households, as jobs were lost and incomes ran out, while at the same time the costs of vegetables and fruits spiked due to a breakdown in supply chains. This was a global phenomenon, but the food security and nutrition costs have been high for the poor in the global south (HLPE, 2020).

This was the context in which we started our research project “Urban and Peri-urban Agriculture as Green Infrastructure”, seeking to understand the sustainability and wellbeing outcomes of urban and peri-urban agriculture in the global south, with in-depth focus on India and Tanzania. Our interactions with stakeholders, both those engaged in grassroots practice (e.g Chennai

Resilience Centre, Garden City Farmers, Bengaluru, People's Resource Centre, New Delhi) and at the policy level, highlighted the recognition of UPA's contributions on the ground (see also the compendium of practices) but equally the confusion in the policy space (Roy and Rao, 2021). As we started exploring the literature, we noted a gap in this area, namely, the recognition of the outcomes of urban and peri-urban agriculture were patchy. We decided therefore to undertake a systematic review of the literature to inform our field research and insights, while at the same time using our experience and engagement to sharpen the analysis of the key themes emerging from the literature.

2. Responding to the critique

The critique of our paper focuses on the technicalities of conducting systematic reviews, raising issues around four key areas, namely, adherence to internationally accepted standards, search sources and strategies, criteria for critical appraisal, inclusion and exclusion, and consistency and replicability of methods. We discuss each of these in turn.

2.1 Adherence to internationally accepted standards

We have followed the PRISMA approach to guide our review and report our search and screening process using the suggested flow diagram (Page et al., 2021). While the expanded checklist was useful in terms of methods, given the large number of included studies, it was not possible to report risk of bias for each included study. We have however explained the assessment criteria, and the classification of articles into three categories [low quality (scores 0-6), medium quality (scores 7-9) and high quality (scores 10-11)] based on risk of bias. The data extraction and risk of bias sheet can be provided on request. We decided to report the results in two parts: a) setting out the landscape of the research in terms of geography and theme based on the articles with medium or low risk of bias (320 journal articles); and b) a thematic qualitative assessment of only the high quality included studies (86 journal articles with scores of 10 or 11).

While advance publication of protocol is specifically relevant to experimental studies in the field of clinical medicine, in this case, as in most social science reviews, we have clearly presented the search protocol, in terms of search strings and databases, and exclusion and inclusion criteria in the paper (Section 2.1, which highlights "four inclusion criteria: articles should have an explicit focus on urban and/or peri-urban agriculture, report on outcomes of UPA, not be review articles, and be in English"). The sustainability substring is central to our research objective.

In the text we note that we have done title, abstract and keyword screening for all 4029 articles. We have however made a reporting error in figure 1, the flowchart of the literature screening process and thank the author of the critique for pointing this out. There were two levels of title, keyword and abstract screening conducted. Given the large number of results for our initial search (n=4853), the first was just to identify the suitability of the paper to the topic we were interested in (Step 2 in figure 1). Part 2 (Step 3 in figure 1) involved a more detailed screening of the abstract along with browsing through the full paper where there was doubt or conflict

between two reviewers. This was then followed by quality scoring (risk of bias assessment) of the full texts and data extraction.

2.2 Search sources and strategies

One of the issues highlighted in the critique (points 2 and 10) is the lack of stakeholder engagement during the preparatory and planning stages of the review to enable consensus on definitions used as well as sources of evidence. While we did not carry out stakeholder engagement to define the scope of this review per se, as part of the wider project we carried out several engagements with multiple stakeholders (e.g., 51 key informant interviews in India and two stakeholder workshops in Tanzania) - which helped us define our problem statement and therefore the purpose of this review. Stakeholders in UPA are often practitioners and as suited to that community of practice, we bring in their expertise to develop a compendium of practices (forthcoming). This review focuses on peer-reviewed articles, published in the English language, and forms part of a larger research initiative where we not only engage stakeholders but coproduce outputs on UPA with them.

As clear in the title of the paper, the purpose of the review was to assess the sustainability and wellbeing related outcomes of all varieties of UPA. This purpose was defined based on our prior research, readings and experience related to the topic (most of the team members have been involved in this field from reputed institutions and have published widely in international peer reviewed journals). The definition of UPA we have used is quite broad and aligns with definitions provided most commonly in the literature (Table A3).

Our search was comprehensive, conducted on three major databases, standard to systematic reviews – Pubmed, Scopus and Web of Science - with a wide reach into all peer-reviewed literature. In fact, following a paper by Gusenbauer and Haddaway (2019), we do not include Google Scholar as a reliable database despite its higher use in the Global South where subscriptions to other databases are restricted.

The search terms used were determined by the objective of the review. While running the initial searches, we checked for the kinds of UPA picked up by our search terms and adjusted and nested the search terms as needed over a few iterations. The final set of search terms do include papers on indoor farming, livestock, home gardens etc. We are confident that they broadly cover the different types of UPA. There was therefore no need to include additional terms to capture different components of UPA. Further, our scope as noted already was not to review all UPA practices, but rather to understand the implications of UPA for sustainability and wellbeing outcomes, hence the search terms were fit for purpose rather than reflecting bias.

It is important to reiterate that rather than a review of all UPA practices across the world, in a context of climate change and growing food insecurity, with heightened evidence of poor nutrition due to supply chain breakdowns during the covid-19 pandemic, we specifically sought to explore and better understand the role of UPA in meeting sustainability and wellbeing goals. As presented in our paper, there are clear gaps in terms of social inclusion and sustainability,

but also food security and livelihood outcomes, especially for low-income communities. While it would be ideal to search in multiple languages, most SRs are restricted to English language publications due to researcher time and resource constraints, as were we. Despite this limitation, we included 448 papers, a very large number for systematic reviews of this nature, for the quality scoring and risk of bias assessment. We welcome other researchers to take up reviews of grey literature and non-indexed journals, as well as materials in other languages and databases. While this could be called publication bias, our strategy ensured the inclusion of high-quality, peer-reviewed articles in the first instance.

2.3 Criteria for critical appraisal, inclusion and exclusion

As stated in the paper, “this systematic literature review examines the geographical landscape of the peer-reviewed literature on UPA and assesses its reported outcomes on sustainability and wellbeing” (p 2). We therefore explicitly chose not to include grey literature including thesis repositories, UN Reports, as while valuable, key insights from these sources are usually also published in peer-reviewed journals. For our countries of interest, India and Tanzania, we did review some of the grey literature for the wider project, and welcome others to focus on these sources. We also excluded review papers from our analysis, though have referenced them in the introduction to frame and inform our search and analysis. Examples are Wendelboe-Nelson et al. (2019) and Soga et al. (2017). A relevant review mentioned in the critique by Evans et al. (2022) was published after the submission of our paper. We acknowledge that there will always be gaps, however, we have sought to focus this review on the contribution of urban and peri-urban agriculture to sustainability and wellbeing.

The scoring criteria for risk of bias are presented in Table A1. We have fine-tuned a ‘risk of bias’ tool, based on principles of research quality such as conceptual framing, transparency, internal and external validity, cultural sensitivity amongst others, applicable to social science research. Developed by other researchers (Yosef et al., 2015 based on DFID guidelines), this tool has been applied in several reviews already (special issue of Food Policy 2019). We have applied it consistently across the articles shortlisted for full text review to ensure consistency of evidence. No article has been excluded arbitrarily at any stage of the screening and review process.

A question has been raised about the risk of geographical bias due to the inclusion of only English language articles. We disagree that this is likely to have excluded articles from the global south. In fact, a focus on English language is much more likely to have excluded articles from Europe and Latin America, rather than Sub Saharan Africa or South Asia. Through our localised literature reviews, we can confirm that good quality research on the theme of UPA is still in its infancy in the global south, especially since most countries here don’t have an explicit policy on UPA, or this is just emerging as an important sector worthy of policy attention.

2.4 Consistency and replicability of methods

While not applying statistical tests for sensitivity, confidence or robustness, multiple reviewers scored the same articles to ensure consistency and applicability of the review methods. The SR

was conducted as a collective exercise, with the research/authors team meeting online every two weeks for almost a year, to double-check each step of the exercise before moving to the next. Each set of methods was applied to a random subset of records by at least two reviewers independently at every stage of the review to ensure consistency across articles. Where there was any conflict, these were discussed by the team and collectively resolved through additional reviews of the abstract in the early stages of screening and full text later. This is as per standard procedure. This process also enabled the identification of key themes across the papers for the thematic review undertaken.

Rather than a quantitative meta-analysis, we undertook a thematic analysis of the literature reviewed (Xiao & Watson, 2019). Statistical tests are more useful for meta-analysis, than for analytical thematic reviews, which depend on coordination between the researchers and application of the same criteria. Instead of reporting results in binaries of positive and negative, we have taken care to present a nuanced analysis, pointing to the trade-offs and often mixed results across outcomes. For instance, livelihood strengthening goals for low-income groups often do not result in improved nutrition, as markets are found for the fresh produce in higher income neighbourhoods (Section 3.2.6 of Rao et al. 2022). The same is the case with environmental outcomes, with benefits in terms of mitigating urban heat island effects, flood and stormwater overflow, or recycling household waste, confronted by heightened soil and water pollution due to the use of chemical fertilizers and pesticides, or improper disposal of animal waste (Section 3.2.1. Environmental sustainability). Our thematic qualitative analysis brings nuances to numbers in terms of trade-offs and synergies associated with UPA and the non-tangible wellbeing outcomes of UPA.

3. Conclusion

We have tried to be as transparent as possible in our methodology. Search terms, inclusion criteria, the screening process, quality scoring for risk of bias, have all been presented in the paper as well as the databases searched. We have noted our inclusion of only peer-reviewed literature in the first instance (see abstract), and the exclusion of grey literature, unpublished reports and papers in languages other than English. These are all in line with SR reporting protocols. In terms of the research objectives, our approach is fit for purpose, and our results are trustworthy. Beyond this, given word limits, there was little scope for dwelling on limitations extensively. We hope readers of the paper focus on the key messages of the paper: that there are (1) mixed and regionally diverse outcomes of urban and peri-urban agriculture, (2) inadequate empirical data on UPA outcomes, especially in the global south, and (3) knowledge gaps on examining the gendered and socially differentiated outcomes of UPA.

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Figure 1: Flowchart of literature screening process