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Pathways to Scaling Agroecology in the City Region: Scaling out, Scaling up and Scaling Deep through Community-Led Trade

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Abstract: Scaling agroecology has the potential to support more sustainable and just food futures. This article investigates a case of community-led trade operating in the city region of London. Drawing upon interviews with stakeholders and practice-based ethnographic fieldwork, challenges and opportunities for agroecology are examined. Three dimensions of scaling agroecology are identified as pathways to sustainable and just food futures in the city region: scaling out, scaling up and scaling deep. Findings suggest scaling out agroecology requires access to secure, affordable land and infrastructure for agroecological communities of practice, alongside investment in capacity building for agroecological communities of practice via learning platforms (such as training programmes) and knowledge exchange (such as farmer-to-farmer and trader-to-trader learning). Second, scaling up agroecology requires transformations in policy, planning and legislation that value and invest in agroecological practices and divest in unsustainable and unjust food systems, supported via translocal networks for exchange of good practice. Third, scaling deep agroecology requires investment both in transformative learning opportunities and networks that support agroecological communities of practices, including those with lived experience of food injustice. Findings have implications for the question regarding scaling agroecology in the city region.

Keywords: agroecology; city region; scaling up; scaling out; scaling deep; sustainable food systems; practice-based

1. Introduction

Amidst growing understanding of the links between industrial food systems (which tend to include input-intensive agriculture; concentrated livestock production; mass marketing of highly processed foods; and deregulated commodity chains [1]), ill-health (including occupational hazards; environmental contamination; contamination, alteration and unsafe food; and food insecurity [2]), environmental damage (including air, water and atmospheric pollution; soil depletion; and biodiversity loss [3]) and injustice (ranging from exploitation, oppression and race- and class-based inequalities [4–6]), a widening international community recognises agroecology as a leverage point to improve environmental and human health outcomes [2] and as a pathway to sustainable and just food systems [7–11].

Agroecology can be understood as a science, a practice and movement [12]. As a science, agroecology applies ecology and the study of biological interactions, alongside research on traditional farming systems, to agriculture [12]. Over the last two decades, agroecology as a scientific discipline has shifted from the scale of field or agroecosystem to whole food systems thinking [13,14]. It has thus been described as "the integrative study of the ecology of the entire food system, encompassing ecological, economic and social dimensions" [13] (p. 100). As an assemblage of practices, agroecology offers techniques that aim to enhance ecological processes and beneficial interactions,

reduce dependence upon external inputs and promote resource efficiency within agroecosystems [10,15]. Whilst context-specific, agroecological practices converge in terms of soil, water and biodiversity management regimes that maintain and enhance the resources upon which they depend [16]. As a movement, agroecology encompasses a wide range of aims largely centred around achieving "healthy, sustainable and equitable food systems" [17] (p. 2). As agroecology scholars, practitioners and activists acknowledge, change in food systems cannot be promoted without transformations in social, political, cultural and economic arenas [13,18–20]. Agroecology as a movement highlights the important role of horizontal forms of knowledge exchange and farmer-to-farmer learning in food system transformation [21].

The urban environment, including the city region, is a critical site to consider the scaling of agroecology as a pathway towards sustainable and just food futures. In 2018, an estimated 55% of the world's population were living in urban environments [22]. By 2050, estimates suggest around two in every three people in the world will be living in urban environments [22]. Whilst cities cover 3–4% of the world's surface area, they account for approximately 80% of the world resources [23]. For many cities, the difference between the "urban footprint" (the land surface that cities occupy) and the "ecological footprint" (the area required to supply cities with resources) is intensifying at unprecedented rates [24]. Cities have thus been described as "entropy accelerators", whereby resources are extracted and degraded at a faster rate than they are replaced [24].

Largely sustained by global supply chains [25], urban food systems can be disconnected from surrounding environs and producing communities, leading to "placeless" [26], "invisible" foodscapes [27]. Neo-liberalisation in the form of "deregulation and other neo-liberal trade policies" has predominantly left urban food supplies "in the hands of vast conglomerates and supermarket chains" [24] (p. 110). The urban food environment can be a toxic place, particularly for those living in areas of socio-economic deprivation [28], perpetuating inter-generational cycles of ill-health and disease. Unhealthy foods, for example, are often cheaper than fresh fruit, vegetables and wholefoods [29] and more likely to be in promotions, particularly in discount stores [30]. Francis et al. suggest "in current urban culture, food may be the only remaining connection to nature" [13] (p. 102). Yet, for many urban dwellers, food lacks connection to healthy, sustainable agroecosystems.

As has been documented extensively, current dominant industrial food systems are failing to meet the needs of people equitably [31,32]. Tornaghi suggests the "capitalist city" is "deeply involved in the reproduction of food injustice", both epitomizing and accelerating extractive and oppressive food systems [33] (p. 793). A food justice lens problematises oppression and race- and class-based inequalities within food systems, highlighting the need to attend to multi-scalar, inter-sectional approaches—"extending from the macro scale of national policy to the micro scale of the intimate daily performances of culture, community and individual bodies through food" [6] (p. 8). It further highlights the risk of equating specific scales or approaches as necessarily more "sustainable" or "just". Born and Purcell, for example, warn of the "scalar trap", emphasising it "is the content of that agenda, not the scales themselves, that produces outcomes such as sustainability or justice" [34] (p. 195). As Allen asserts, "without a focus on creating social justice, local food systems may embody the same power dynamics as global food systems, albeit on a different scale" [35] (p. 159). Guthman further documents neo-liberal co-optation of organic farming, highlighting limitations of organic certification [36]. Food justice scholarship highlights the need for epistemic, contributive and distributive justice within sustainable food systems [37,38].

Whilst urban environments can be places of stark inequality and injustice, they can also be spaces of possibility for amplifying social change. Scaling agroecology could play a role in supporting transition of urban communities from extractive relations and fossil dependence to more regenerative practices based on "local innovation, resources and solar energy" [39] (p. 588). Altieri and Nicholls suggest there is a role for agroecology in supporting urban agriculture productivity, as well as ameliorating urban environmental problems, including conservation of plant and insect biodiversity, carbon dioxide uptake and resilience to weather variability [40]. Tornaghi and Dehaene further propose

urban agroecology, as a "political praxis", could help enact deeper social-ecological changes to realise food justice in the city [41]. With techniques for food production within "safe operating spaces" for environmental systems and processes that contribute to the stability and resilience of the Earth system [42], informed by participatory, horizontal and democratic methods, agroecology offers a toolkit for urban food system transformation.

Drawing upon Moore et al. [43], this article considers three dimensions of scaling agroecology: scaling out, scaling up and scaling deep. Scaling out is understood as a horizontal form of scaling, both increasing the number of people or communities impacted or involved and expanding geographical reach through replication or diffusion [43,44]. Capacity building is one of the main strategies for "open scaling", whereby approaches or principles are shared and adapted to new contexts via knowledge exchange and learning platforms [43]. Scaling up is understood as a vertical form of scaling, based on understanding that many social-ecological problems are embedded in law, policy and institutions and that transformations require institutional change "at the levels of policy, rules and laws" [43] (p. 75). The main strategy for scaling up is policy and legal change, as well as resource flows and expanding institutional capacity [45]. Scaling deep is centred upon acknowledgement that "culture plays a powerful role in shifting problem-domains, and change must be deeply rooted in people, relationships, communities and cultures" [43] (p. 77). Strategies for scaling deep include investment in transformative learning, networks and communities of practice [43]. Moore et al. highlight the need to attend to all three dimensions of scaling to achieve durable and profound change [43]. As Westley et al. [44] note, sudden transformation can be the result of cross-scale processes.

The remainder of this article presents findings of a case of community-led trade operating in the city region of London, UK. Section 2 provides a contextual overview of the city region of London and case background. Section 3 presents the methodological approach. Drawing upon semi-structured interviews and practice-based ethnographic fieldwork, Section 4 identifies three key challenges for agroecology and corresponding opportunities. Based upon case study findings, Section 5 considers how attending to three dimensions of scaling (scaling out, scaling up and scaling deep) can build understanding of pathways to amplifying agroecology. The article concludes highlighting lessons around the question of scaling agroecology in the city region.

2. Context

2.1. London City Region

With an estimated population of 8.9 million [46], London is the largest city in the UK and one of the largest cities in Europe [47]. Covering an area of 159,472 hectares (ha), Greater London includes twelve inner and 20 outer London boroughs, alongside the City of London Corporation [48]. An international hub for scientific and creative industries [49] and "global financial centre" [50], London is also one of the world's most culturally diverse cities. Over 300 languages are spoken in the city [51] and around one in three of the population are foreign-born—the highest proportion of all European cities [47]. As the most ethnically diverse region in the UK, 40.2% of London residents identify with either the Asian, Black, Mixed or Other ethnic groups, 44.9% with White British [52].

Whilst London is a global confluence for commerce, culture and innovation, it remains a site of relative poverty for many. One in four working age adults and two in five children live in relative poverty, after housing costs are taken into account [49]. There is a clear link between housing costs and relative poverty within the city. Following the restructuring of social housing in England in the 1980s [53], the private renting sector has significantly increased—an estimated one in four households in London privately rent [54]. A recent study suggests 43% of Londoners experiencing in-work poverty were private renters, whilst 55% of children growing up in private rented housing were found to be living in poverty [55]. The London Living Wage [56] and rent schemes including the London Affordable Rent [57] and London Living Rent [58] attempt to address some of the financial challenges of living in London. Yet, at present, a combination of high living costs, changes to the welfare system

and rising food prices are contributing to widening inequalities and food insecurity [59]. Around one in five adults in London experience low or very low levels of food security, with the majority in work (60%) and in the lowest income quintile (44%) [60]. Further evidence suggests those living in the most deprived areas of London are more exposed to poor air quality [61], greater fast food outlet density [62], as well as having less access to green space [63]. Such environmental inequalities can have long-term impacts upon physical and mental health. Children growing up in the most deprived areas of London, for example, are twice as likely to leave primary school obese as those growing up in the least deprived areas [64].

As Lang et al. reflect, the UK food system is "highly vulnerable to the rising costs of diet-related ill-health, ecosystems damage, economic dependency, and social reliance on migrant and relatively low-waged labour" [65] (p. 6). These challenges are compounded in a city region largely dependent on a complex range of global interactions including "just-in-time distribution systems, complex contracts and labyrinthine supply systems" [65] (p. 6). In the UK, four multiple retailers account for approximately two-thirds of grocery retail spend [66]. Estimates suggest the "big four" multiple retailers account for an even greater proportion of grocery retail spend in London [67]. At present, the UK is heavily reliant upon food imports, with fruit and vegetables amongst the highest value imported commodity groups [68]. Domestic production accounts for around 60% of food consumed [68], including 57% of vegetable supply and 16% of fruit supply (2017 figures) [69]. In the UK, horticulture accounts for a very small proportion of utilised agricultural area (less than 1%), with the majority of utilised agricultural area grassland (63%) and arable crops, particularly cereals (17.9%) [68]. Meanwhile, the proportion of land farmed agroecologically in the UK is marginal (estimated at less than 3%) [70].

Whilst the food sector accounts for an estimated 10.5% of jobs in London [71], agriculture remains largely marginalised from the city region. Approximately 7% of London's land (11,000 ha) is actively farmed, comprising of around 200 farms employing around 3000 people [72]. An estimated 500 ha is used for fruit and vegetable cultivation [73]. According to the London Assembly Planning and Housing Committee, "farmers in and around London are operating under intense economic pressures—from cheap imported produce, competition from housing, the high cost of labour and transport, low farm gate prices, a shortage of skills and grants to improve their land" [73] (p. 22). It is further estimated 10–15 ha green space in Greater London is lost per year [74].

The current gap between food produced in London and that consumed presents both a challenge and opportunity for amplifying sustainable and just food futures in the city region, requiring profound changes in the way food is produced, distributed, traded and valued [75]. The social enterprise Growing Communities is identified as a case offering insight into the challenges and opportunities of agroecology through community-led trade and potential pathways towards more sustainable and just food futures in the city region of London through scaling agroecology.

2.2. Community-Led Trading: Growing Communities

Growing Communities began in 1995 as a community supported agriculture (CSA) scheme linking 30 households living in East London to a farm in Buckinghamshire. In exchange for a weekly fee and occasional weekend of volunteering, families were provided with a weekly share of vegetables. Over time, this fledgling scheme evolved into a social enterprise that began coordinating London's first community-led veg scheme. The veg scheme offers a weekly "selection of seasonal, organic fruit and veg" [76] to over 1600 homes in East London, distributed via 12 pick-up points across the London Borough of Hackney [77]. Alongside the veg scheme, Growing Communities set up the first all-organic farmers' market in Stoke Newington, Hackney in 2003. The farmers' market aims to prioritise local producers and processors, with the furthest producers located 130 miles from the market [78]. For the veg scheme and farmers' market, Growing Communities require that all producers are certified organic or biodynamic, or in conversion [78].

Two key principles guide the work of Growing Communities: community-led trade and agroecological subsidiarity. First, Growing Communities operate according to a principle they

describe as "community-led", defined as working "together with farmers and growers" [79]. Through community-led trade, Growing Communities aim to support the livelihoods of small-scale agroecological growers whilst providing Hackney residents with healthy, affordable agroecological produce. Second, Growing Communities operate according to a principle of "agroecological subsidiarity", based upon the principle that agroecological produce is sourced "as locally as practicable" [80]. In following this principle for the veg scheme, Growing Communities prioritise the sourcing of perishable crops such as salad within close proximity to Hackney. The remaining majority of produce is sourced from around 25 small-scale agroecological growers, most of which are located within 100 miles of London. Brassicas, roots, potatoes and seasonal fruits are mainly sourced from the peri-urban and rural hinterlands of London. Other produce not currently available within the rural hinterlands is sourced from further afield, including hungry gap vegetables and tropical fruit. In 2018, 85% of vegetables packed for the veg scheme were derived from the UK and 34% of the fruit [80]. In the "Food Zones" model, outlined in Figure 1 below, Growing Communities share their vision of a sustainable city region food system informed by the principle of agroecological subsidiarity, roughly based on figures from the veg box scheme [81].

Figure 1. Growing Communities "Food Zones" model, based on Growing Communities [81].

The principle of agroecological subsidiarity has informed development of an urban farming network. Since 1997, Growing Communities have developed a network of growing sites within the Hackney borough equating to approximately two hectares of organically certified land, managed by a part-time head grower, supported by five patchwork farmers, four trainees and volunteers [82]. In 2012, Growing Communities further acquired a 1.4 acre ex-council nursery site for the Starter Farm in the East London Borough of Barking and Dagenham, leased from Barking and Dagenham Council, managed by two growers. These sites grow crops for the veg scheme, as well as providing training and employment opportunities in agroecological food growing.

3. Materials and Methods

Informed by the case study research design [83], the qualitative methodological approach applied includes 10 semi-structured interviews and 75 hours (h) of practice-based ethnographic research, responding to calls amongst sustainable food scholars for a focus upon practice [84]. Fieldwork was guided by two research questions: first, how can agroecological practices find space within the London

city region? Second, what are the challenges and opportunities of scaling agroecology within the London city region?

3.1. Case Study Approach

Qualitative methods can be applied to investigate "experience, meaning and perspective, most often from the standpoint of the participant" [85] (p. 499). As an intensive qualitative approach that seeks to "understand processes as they are grounded in the experiences and narratives of those who are directly involved in living with the wider political, economic and social context" [86] cited in [87] (p. 4), the case study can play an important role in sustainability science. First, it can support context-dependent knowledge creation; second, it can support learning around processes in context, whilst still allowing complexity to be present [88]. As Hammersley and Gomm outline, "case study" usually "refers to research that investigates a few cases, often just one, in considerable depth" [89] (p. 3). The aim of the intensive qualitative case study is not empirical generalisation, but the interrogation of "uniqueness" [89]. Within the case study research design, generalisability is not necessarily the goal. Rather, it is the lessons that can be learned from "thick" [90], "clear and detailed" description [91], that may be applied elsewhere. Thus, rejection of generalisability is "not a rejection of the idea that studies in one situation can be used to speak to or to help form a judgement about other situations" [92] (p. 76). Schofield, for example, highlights how case studies can be useful in providing unique insight into "the leading edge of change" or the possibilities of "what could be" [92]. The case presented in this article, whilst small, offers unique insight into the possibilities of "what could be" regarding operationalising and scaling agroecology in the context of the city region. Although not generalisable, lessons could be applied elsewhere.

3.2. Semi-Structured Interviews

A series of 10 semi-structured interviews were carried out with identified stakeholders including: two producers supplying the Growing Communities farmers' market and veg scheme (Producers 1 and 2); one representative of Growing Communities; two representatives from civic society groups; four representatives from other community-based growing groups in London; and one representative from Hackney Council. Interview guidelines were adapted according to the role of the stakeholder, although there was a consistent focus on practice.

With Producers 1 and 2 and the Growing Communities representative, the interview framework covered:

1. Guiding principles informing practices (including approaches to pest and disease management, range of crops/varieties grown, quality control, sales and, in the case of Growing Communities, guiding principles of the community-led trading mechanism and farming network);
2. Temporal and spatial dimensions of operations (including how operations are designed and managed spatially and temporally, including in relation to the growing year and seasonality);
3. Key challenges and opportunities facing operations;
4. How policy, planning and legislation could help or hinder operations.

With local authority, civic society and community-based organisation representatives, the interview framework covered:

1. Views on the present London city region food system;
2. Key challenges and opportunities for sustainable food systems in London;
3. Views on the role of policy, planning and legislation for sustainable food futures in London.

Whilst the interview framework formed the basis of the interview, the specific ordering of questions was participant-led, adapted according to what interviewees said [93]. Where possible, interviews were recorded and transcribed. In cases where this was not possible, detailed written notes were made. Ethical guidelines were followed as set out by the British Sociological Association [94] and

Cardiff University [95]. The research received ethical approval by Cardiff University Research Ethics Committee. Informed consent was sought from all those interviewed.

3.3. Practice-Based Ethnographic Approach

Alongside semi-structured interviews, the researcher spent 75 h doing practice-based ethnographic research. This included: a guided tour of two of the production sites supplying the Growing Communities veg scheme and farmers' market and participation in harvest at both sites for a total of 24 h; participation in garden sessions at three of the Growing Communities patchwork farm sites for a total of 45 h; and accompanying one of the producers at the farmers' market for 6 h. During these periods of practice-based engagement, growers and trainees shared their expertise through showing, demonstrating and guiding. Talking through and participating in practices such as weeding, composting, seed sowing, planting, harvesting and trading fostered engagement with a more non-verbal, embodied, tacit form of knowledge generation and understanding of the research environment. Extensive fieldnotes were kept during these engagements with practice, aiming for "thick description" [90]. The process of writing, reading and re-reading field notes can aid reflection on impressions and experiences in the field, supporting the iterative analytical process of being in the field and analysing data [96].

As Nelson et al. note, the "choice of research practices depends upon the questions that are asked, and the questions depend on their context" [97] (p. 2). Since the research focus was that of agroecological practice, a practice-based ethnographic approach was considered advantageous. Informed by scholarship on situated learning and communities of practice [98,99], the methodological approach applied identifies practice as a "loci of learning"—"the loci in which tacit knowledge is constructed, harbored, and transmitted to newcomers" [100] (p. 354)**.** This approach is based upon the premise that knowledge is generated through the process of being guided around by practitioners [101], in place. As Anderson [102] explores, "conversations in place" can be useful for "excavating" particular types of knowledge. Cheshire et al. [103], for example, highlight the value of the "farm tour" and accompanying farmers as they work and take breaks, whilst Riley suggests mobile interviewing with farmers "offers devices, contexts, and instances that support and enhance the interview process, and also open up an appreciation of other forms of knowledge and narration" [104] (p. 651). In the context of the community garden, Pitt notes how techniques of "walking, talking, doing and picturing" encourage guides "to share their expertise" [101] (p. 48), whilst Warren [105] and Pottinger [106] demonstrate how working alongside practitioners supports a richer understanding of practice less likely to emerge in interviews.

3.4. Iterative Approaches to Data Analysis

Following the Grounded Theory approach [107], interviews and field notes were iteratively read, coded and thematically analysed. The researcher returned to a number of interviewees with further questions and clarifying points following initial analysis of interview transcripts and field notes. Interpretations of key discussions were further corroborated with interviewees. This iterative approach to data collection and analysis supports exploration of emerging themes [107–109], whilst the dual forms of corroboration (follow-up interviews and interpretation checks) support research credibility [110]. As Roulston and Choi highlight, iterative approaches can support "feedback as to whether interpretations adequately reflect participants viewpoints" [93] (p. 240). Continuous reflexivity was also a critical component of the research process. All quotations included in this article are excerpts from interviews, most of which have been corroborated with interviewees.

4. Results

Drawing upon fieldwork, this section identifies three key challenges facing agroecology in the city region through the case of community-led trade: accessing and securing land for growing, distributing and trading; sustainable livelihoods; and the policy environment, as outlined in Table 1

below. Interviews with stakeholders and practice-based ethnographic fieldwork further support identification of nine corresponding opportunities to address these challenges.

Table 1. Key challenges and opportunities for agroecology in the city region.

Challenge #1: Accessing and Securing Land	Challenge #2: Sustainable Livelihoods	Challenge #3: Policy Environment
	Opportunities	
1.1. Long-term access to affordable land and infrastructure for AE [1] COP [2], particularly for growing;	2.1. TMs [3] that value AE produce and practice, support producer-led decision-making and foster connection with AE producers and practices;	3.1. Policy, planning and legislation that value AE practices;
1.2. Safeguarding public land for growing, particularly greenfield land;	2.2. Training and job opportunities for new entrant AE producers;	3.2. Exchange of good practice in governance across multiple scales;
1.3. Distributed access to land for AE COP across city regions, (including inner city areas).	2.3. Access to affordable housing for AE COP, particularly for new entrants.	3.3. Citizen engagement in policy-making processes.

[1] AE: agroecological; [2] COP: communities of practice; [3] TMs: trading mechanisms.

4.1. Accessing and Securing Land

Access to land has been essential for Growing Communities operations, enabling the development of growing sites and distribution points for the veg scheme and the weekly farmers' market. Four of the market gardens are located within public parks and commons and one is located on the grounds of a Hackney Council housing estate, whilst the Growing Communities organisation headquarters are leased from Hackney Council for what the Growing Communities representative interviewed describes as a "peppercorn rent". Although highly dependent upon the local authority for access to space for operations, Growing Communities also work with other landowners, including the Church of England. Four other sites on plots of land (up to 150 m^2) make up the remainder of the patchwork farm, three of which are located on church grounds and one located on privately owned land. Access to land is further critical for distribution and trading. Packing for the veg scheme is done within the organisation headquarters, whilst distribution points for the veg scheme tend to be located within community-based settings including community centres, community gardens and cafes. With a wide geographical spread of veg-bag pick-up points across Hackney, the Growing Communities representative explains they "avoid putting all our eggs in one basket". The farmers' market is held on the grounds of a church.

Access to land at affordable rates has depended upon the goodwill of Hackney Council and the other organisations and individuals enabling the use of land. Most of the market garden and patchwork sites on council-owned land are on five to ten-year leases from Hackney Council, whilst the Starter Farm in Barking and Dagenham is on a ten-year lease from Barking and Dagenham Council. As the Growing Communities representative reflects, longer-term leases would be preferable, providing more security of tenure and safeguarding of land. Indeed, Growing Communities have experienced the pitfalls of insecurity of tenure. One of the market garden sites had to be relocated as a result of the land being sold for housing, whilst another of the market gardens had to be relocated as a result of park development plans.

As the Growing Communities representative reflects, "pressure on metropolitan areas is incredible" yet, "allowing communities to have space to grow and trade food is absolutely key." The representative expresses concern at how Growing Communities will continue in an urban environment where land is increasingly difficult to access and living costs are rising at unprecedented rates. They suggest the local authority could do more by providing more spaces for growing and trading at affordable rates and with longer-term leases. They further highlight the critical need to safeguard the public estate, particularly county farms and agricultural land. The loss of public and private greenfield land combined with rising land prices presents major challenges for those seeking suitable land to grow.

4.2. Sustainable Livelihoods: Skills, Training and Jobs

According to Growing Communities, the veg scheme and farmers' market are community-led trade mechanisms that aim to both enable access to affordable agroecological produce within Hackney and support the livelihoods of agroecological producers. Based on producer-led approaches to production and harvesting, the veg scheme and farmers' market offer flexibility around harvest timings, durations, volumes and crop and varietal range. Such producer-led approaches hinge upon forms of trade that value agroecological practice, as well as agroecological produce. Producers interviewed suggest trade mechanisms that foster consumer connections with producers and practices are key in determining the success of producer-led approaches to producing and harvesting. Conversations at the farmers' market and veg scheme newsletters provide opportunities for communication with consumers around growing practices, seasonality and crop diversity. For example, Producer 2 encourages farmers' market customers to taste different apple varieties, building awareness of apple diversity. As they explain:

> *"People taste the fruit and get very excited as the texture and taste is so very different to a supermarket apple..."*

For the two producers interviewed, selling direct via farmers' markets and box-schemes makes agroecological farming more viable. As Producer 1 states:

> *"If we didn't sell direct, it [farming] wouldn't sustain us...wholesale prices just wouldn't sustain."*

Direct forms of supply such as the farmers' market and veg box scheme can support producers through processes of diversification, as well as negotiating unpredictable aspects of farming such as harvesting timings and crop volumes. Growing Communities, for example, encouraged Producer 1 to diversify crops grown and integrate livestock into the farming system, and Producer 2 to diversify their product range, including the processing of fruit into preserves and juice.

However, whilst diversification processes may support agroecological functions of the growing site, in the case of the producers interviewed, they were not enough to cover livelihoods alone. Producer 1 explains that in order to achieve a sustainable livelihood, they depend upon a number of other trade routes, alongside the farmers' market and veg scheme. According to Producer 2, it is very difficult to make much of a profit from the farmers' market alone when factoring in the salary of a growing assistant, preparation, transport and stall hire. For Producer 2, other streams of income are essential, including forest school sessions and horticultural consultancy. As Producer 2 reflects, agroecological producers currently face a number of major challenges largely influenced by the national policy landscape:

> *"I think it is also about the internalisation of costs ... the organic grower carries out multiple roles-wildlife habitat, nitrate management, building soil matter, carbon sink, but you get a lower yield for not splashing around chemicals and fertilizers... I don't get any subsidy yet if I farmed chemically I would... subsidy is the only reason most farmers stay in business."*

Producer 2 highlights the need for wider valuing of sustainable horticultural production as a profession, suggesting this could support producers in attaining sustainable livelihoods.

Through community-led trade and the emerging urban farming network, Growing Communities are creating training and job opportunities for new entrant agroecological producers within London. Within Hackney, the Growing Communities urban grower trainee scheme provides training in market gardening for four people each year, with a focus on salad production. Trainees work alongside the head grower and assistant grower one to one on a half-day per week between April and September, receiving practical training as well as classroom-based learning. Whilst unpaid, trainees receive support in terms of finding future work and further training. Several of the trainees have gone on to secure work with Growing Communities and other food growing sites. There are also opportunities to

volunteer at the patchwork farm. Beyond Hackney but within London, the Starter Farm also offers training and volunteering opportunities.

Findings, however, highlight challenges new entrant producers face in attaining sustainable livelihoods. As one of the growers at the Growing Communities patchwork farm acknowledges, surviving as an agroecological grower can be particularly challenging within London. Whilst Growing Communities employees are paid the London Living Wage, several growers acknowledged how it is increasingly difficult to afford to live within Hackney as the cost of living increases. Meanwhile, trainees are unpaid. Several growers and trainees have relocated to more affordable areas within London, whilst a number of ex-growers and ex-trainees have left London due to the cost of living in the city. Affordable housing is identified as a key challenge facing agroecological producers, particularly in inner city areas such as Hackney.

4.3. Policy Making Environment

Agroecology is currently marginalised in the UK policy context, whilst agriculture is scarce within the London city region. Representatives from Growing Communities have been involved in lobbying, campaigning and contributing to city-level and, increasingly, national-level policy with the aim of raising the profile both of urban agriculture and agroecology. They have contributed to training provision for Capital Growth (a London-based food growing network) and co-produced a number of publications on urban farming and traineeships with Sustain (the UK alliance for food and farming) [111,112]. This work has raised the profile of urban farming and agroecological practice in London, not only amongst practitioners, but also amongst policy-makers. According to the Growing Communities representative interviewed, the *Cultivating the Capital* report [73], Capital Growth (a network supporting food growing across the city) and the *Good Food for London* reports (annual reports coordinated by Sustain which aim to "shine light on which boroughs are demonstrating strong leadership and which are lagging behind" [113]) made for "fertile ground" when Growing Communities approached Dagenham Council with their proposal for the Starter Farm since the council had signed up for objectives to increase food growing within the borough. Civic society alliances and networks such as Sustain and initiatives such as the *Good Food for London* report can amplify the voices of community-based organisations, as well as informing and influencing local authority and city-wide policy change. Exchange of good practice between local authorities is identified as a key factor in raising awareness of agroecology and creating opportunities for agroecological communities of practice within the context of London, supported via benchmarking such as via the *Good Food for London* reports.

Citizen engagement in governance processes is identified as key for raising awareness of the issues facing agroecological communities of practice. Building a profile within London as an organisation has presented representatives from Growing Communities opportunity to participate in policy advocacy at the city and national scale. The Growing Communities director stands on the London Food Board (an advisory group with the aim of advising the Mayor of London and the Greater London Authority (GLA) on the delivery of the *London Food Strategy* [71]). The director is also involved in the Department for Environment, Food and Rural Affairs (DEFRA) Edible Horticultural Roundtable, which aims to outline how the government and its agencies can best help grow the value of fruit and vegetables in the UK [114], and is a founding member of the Fruit and Vegetable Alliance, which aims "to create a united voice from the edible horticulture sector to lobby for increased UK production of fruit and veg" [115] (p. 9). Participation in these forums enables voicing of some of the obstacles Growing Communities face as an organisation to policy-makers at a city-wide and national level, as well as presenting some of the wider challenges communities of agroecological practice encounter. The UK Landworkers Alliance and international food sovereignty movement further provide platforms where Growing Communities can amplify their voice around policy, planning and legislative issues, whilst building translocal networks and communities of practice.

As findings highlight, until agroecology is valued within the policy environment and unsustainable agriculture is devalued, operationalising agroecology within the city region and surviving and thriving as an agroecological producer will remain a struggle.

5. Discussion

Drawing upon lessons from the case of community-led trade, this section considers three dimensions of scaling—scaling out, scaling up and scaling deep—as pathways to scaling agroecology in the city region, as summarised in Figure 2 below.

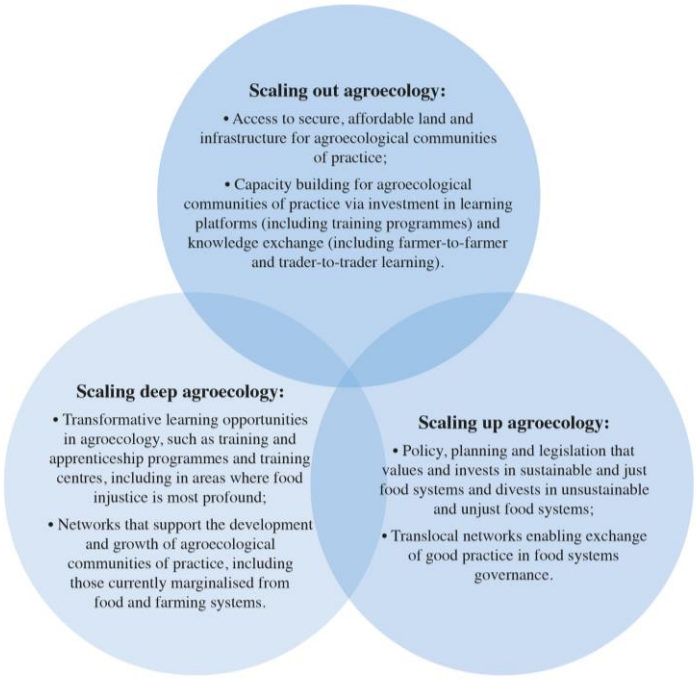

Figure 2. Pathways to scaling agroecology in the city region, drawing upon Moore et al. [43].

5.1. Scaling out Agroecology

Access to land, training and start-up costs are identified as the major obstacles to entering farming in Europe [116–118], alongside developing a market [116]. These obstacles further constitute a significant challenge to the scaling out of agroecology, understood as involving or impacting more people or communities. As outlined in Section 4.1, Growing Communities have worked with local councils and private landowners to access land and, in turn, develop agroecological training and employment opportunities via the patchwork farm network and Starter Farm. The veg scheme and farmers' market trading mechanisms further address the third identified obstacle to entering farming—developing a market. As Growing Communities support other groups to set up community-led trading mechanisms via the Start-Up Programme (launched in 2011), connected via the Better Food Traders network (launched in 2020), they are further increasing the number of people and communities involved and impacted. In the case of community-led trade considered, safeguarding of public land (particularly greenfield land) and assets has been crucial for the scaling out of the patchwork farming network. In contrast, insecurity of tenure and lack of safeguarding of public land, particularly of greenfield land, are identified by the organisation as major threats to the survival and expansion of agroecological production and community-led trade.

City region strategies that safeguard public land and provide long-term, affordable access to public land for agroecology and community-led trade can play an important role in supporting open scaling of agroecology. In the case of OrganicLea, a community food growing project located in Waltham

Forest, North East London, the local authority agreed to lease a nursery and land to the project for 30 years at a "reasonable rate" because they recognise their relationship with OrganicLea part of their food-growing strategy [119]. Other community growing projects within London demonstrate potential for longer-term leases. Hackney City Farm, for example, secured a 100-year lease from Hackney Council, whilst Capel Manor College, an organic farm and horticultural training centre, secured a 99-year lease from Enfield Council.

Capacity building is further identified as critical for scaling out agroecology. This includes investment in training programmes (with funded traineeships and apprenticeships) and knowledge exchange opportunities (such as farmer-to-farmer and trader-to-trader learning). As highlighted by the Growing Communities representative interviewed, Growing Communities received valuable funding from the GLA for the Start-Up Programme to support other groups to set up community-led veg schemes. Funding for start-up costs (such as infrastructure, equipment and certification) and for networks that share start-up costs (such as farm starts) is also recognised as beneficial, particularly for new entrants.

Case study findings suggest city regions could play an important role in the scaling out of agroecology through enabling access to secure, affordable land for agroecological communities of practice and by investing in capacity building for agroecological communities of practice via learning platforms and knowledge exchange. However, in order for "open scaling" to amplify, wider policy, planning and legislative support is further critical. The case of Rosario, Argentina offers an example of how agroecology in the city region can be supported by policy, planning and legislation. Collaboratively developed by the Municipality of Rosario, the Centre for Studies of Agroecological Productions (CEPAR), the Pro-Huerta Food Security Program and the Ministry of Development, the Urban Agriculture Programme aims to provide healthy, agroecological food for Rosario inhabitants; support access to land for agroecological horticulture within the city; and develop trading pathways for agroecological produce cultivated within the city [120]. Through the programme, an estimated 24 ha of unused land in the city has been made available to residents, including those experiencing food insecurity [121]. There are now over 600 growing groups in the city, alongside seed production centres, demonstration sites, a nursery and an agroecological innovation centre [121,122]. The programme supports the delivery of agroecological training for new entrant producers, including young people, across these sites and their own growing plots [122]. Rosario's Green Belt Project further safeguards 800 ha of peri-urban land from development in the city region; provides technical and financial support for existing producers in the green belt area to convert to agroecological production; and develops trading pathways, including direct sales, within the city region [123]. Multi-scalar, cross-sector collaboration between government, civil society and private sector has been key to the success of these programmes [124].

5.2. Scaling up Agroecology

Case study findings highlight some of the limitations facing agroecological producers within the UK context. As Producer 2 highlights, operating as an agroecological farmer can be a struggle when it costs more to farm sustainably than it does to practice environmentally degrading farming. Findings highlight the need for trading systems that provide sustainable livelihoods for producers. At present, agroecology remains largely marginalised in terms of local and national policy, planning and legislative frameworks within the UK. For agroecological communities of practice to both thrive and amplify, changes in the policy, planning and legislative environment are critical. As Moore et al. [43] and Pitt and Jones [45] highlight, scaling up requires policy and legislative change, as well as expanding resource flows and institutional capacity.

At a local authority scale, Hackney Council emerges as key in terms of enabling Growing Communities operations. Without access to public-owned land and infrastructure at "peppercorn rates", the community-led trade scheme could be compromised, particularly within an inner city area such as Hackney, where land and living costs are increasing at unprecedented rates and both

public land and green space are at risk of being sold for development. There are piecemeal examples of support from Hackney Council for more sustainable and just food system futures, for example, the Hackney Council *Markets Strategy* protects markets from development [125]; the *Inclusive Economy Strategy* commits to offering affordable workspace rates for local businesses and social enterprises, particularly those initiated by Black, Asian and minority ethnic communities [126]; and the *Sustainable Procurement Strategy* aims to procure "healthy and sustainable food" and support local small and medium suppliers "where possible" [127]. However, at present, there is no explicit Hackney Council commitment to invest in sustainable agriculture whether via policy, strategy or institutional resource flow. Hackney Council remain largely silent on the stronghold multiple retailers have on food supply for the borough. In part, this is the result of the limited local authority capacity to influence a largely deregulated national food system.

At a city region scale, the GLA does indicate some level of protection for sustainable agriculture. *The London Plan*, the development strategy for Greater London, commits to protect the London Green Belt from "inappropriate development" and "extension in appropriate circumstances" [49] (p. 312), whilst in the *London Food Strategy*, "growing organically and incorporating areas for biodiversity" is to be "encouraged" and "supported" [71] (p. 44). However, as highlighted by the London Assembly Environment Committee, "good farm-land is at risk of permanent loss from building over" and there is no protection of high-grade agricultural land from development in the *London Plan* [72] (p. 5). At present, there is no explicit strategy for scaling sustainable agriculture at the city region scale, although the benefits for biodiversity arising from sustainable agriculture and multiple environmental, social and health benefits of community growing are acknowledged [71] (p. 12). Moreover, within the *London Plan* and *London Food Strategy*, there is no city region-wide strategy to address the current market dominance of industrial food system, aside from moves towards encouraging existing retailers to improve healthy eating provision [49,71]. Although there are GLA schemes supporting local authority development of *Good Food Retail Plans* and *Food Poverty Action Plans,* and financial support for local schemes, such as the Growing Communities Start-Up Programme funded via the *Urban Food Routes* scheme [128], these initiatives have been operationalised at a piecemeal borough level. Instead, the *London Plan* largely focuses on facilitating a "successful, competitive and diverse retail sector" [49] (p. 164). Whilst there are recommendations for the counterbalancing of new large retail developments with the provision of affordable spaces for small and independent retailers, there is no indication of policy or legislation that regulates the stronghold the industrial food complex has on the London food system. As noted in Section 4.2, commitment to affordable housing within policy, planning and legislation is also critical for communities of agroecological practice to operate and amplify.

At an international level, growing numbers of organisations are recognising the role of agroecology for sustainable and food futures. Yet, at a national scale, farming policy in the UK currently largely incentivises large-scale monoculture and cheap food culture. The current national government approach to food systems has been described as a "two-pronged" strategy based upon an agri-technological push to increase productivity, and a desire to increase UK food exports [65] (p. 11). Although there are plans to support sustainable farming through the *Environmental Land Management* scheme, pathways to sustainable farming are framed largely via investment in technology and equipment, with the aim of increasing profitability and production [129]. Agroecology remains marginalised from national policy with little acknowledgement or incentive within the *Agriculture Bill* for agroecological practice [130]. Transformations in policy, planning and legislative frameworks at multiple scales are critical in order to amplify agroecology.

City region governance can play an important role in scaling agroecology. Public procurement is identified as a key tool for leveraging sustainable and just food systems [131]. In New York City, US, legislation requires governmental bodies to prioritise cooperatives when entering contracts for goods and services [132] and promotes the purchase of New York State food products [133]. As Cohen and Ilieva further highlight, "policy tools such as taxation, financial incentives, zoning incentives, land use regulation or educational programs can be deployed to foster sustainable and just everyday urban

practices" [133] (p. 214). They demonstrate how, through deployment of some of these policy tools, a series of municipal initiatives in New York City has improved access to healthy, agroecological produce for residents on a low income and viability of farmers' markets in low income neighbourhoods [133]. First, municipal investment in the installation of electronic benefits transfer terminals at farmers' markets and mobile produce carts across the city has enabled residents eligible for Supplemental Nutrition Assistance Program (SNAP) benefits to spend benefits at these sites [133]. Second, provision of trading sites, elimination of permit fees and investment in a programme to open farmers' markets in community gardens by the municipality has supported viability of farmers' markets in low income neighbourhoods [133]. Third, the "Health Bucks" programme—providing those eligible for SNAP benefits a USD 2 coupon for every USD 5 spent—encourages spending of SNAP benefits at farmers' markets in the city [134]. These interventions have created enabling conditions for community-led trade within the city. Food justice NGO, Just Food have, for example, set up 28 community-based farmers' markets and 119 CSA distribution sites across the city, including in low income areas [135].

Prioritisation of sustainable and just food systems requires profound changes not only to the ways in which city region food systems are operationalised but also to the ways in which they are governed. Exchange of good practice in governance can be supported by city-level and national networks for sustainable food practitioners, such as the Sustainable Food Cities network in the UK [136], as well as translocal networks, such as the Milan Urban Food Policy Pact [137]. Alongside building institutionally supportive environments for sustainable and just food systems, there is further need for institutional changes in policy, planning and legislation so that unsustainable and unjust food systems are disincentivised and penalised.

5.3. Scaling Deep Agroecology

Since emergence, Growing Communities have incrementally increased the number of people impacted through their work. Subscriptions have increased from 700 veg bags in 2011 [138] to 1600 veg bags in 2019 [77]. Via the patchwork farm network, 44 individuals have completed a traineeship, whilst at the Starter Farm, another 15 individuals have completed a traineeship [139]. The Start-Up Programme has supported 10 organisations in setting up other community-led trading mechanisms across the UK and, through the Better Food Traders network, Growing Communities are forming a fledgling national network of community-led traders. Growing Communities are making further attempts to reach out to those living in food insecurity within Hackney. Healthy Start vouchers (means-tested vouchers to support mothers with children under four years of age and pregnant women to buy some basic foods including fresh fruit and vegetables, milk and infant milk formula) [140] and Rose Vouchers (coupons helping families on low incomes to buy fresh fruit and vegetables) [141] are accepted as full or part payment for the veg scheme. Pensioners are offered a 20% reduction on the veg scheme [80], whilst a Food Credit Scheme uses donations to purchase organic produce for those in need, including via a Hackney foodbank. Any leftover produce from the veg scheme is distributed to local partners, including a homeless centre and the Hackney Migrant Centre. However, as the Growing Communities representative reflects, uptake of the Healthy Start vouchers is low and there is little local authority promotion of the scheme.

The case of Growing Communities demonstrates how community-led trade can begin to address some of the challenges facing small-scale agroecological producers and the challenges of producing and trading agroecological food in the UK. Scaling deep, however, requires further pro-active confrontation of structural inequalities and oppression within UK food systems. In the UK, farming is one of the whitest professions—an estimated 98.6% of farmers in the UK identify as British White [142]. As a community-led trade initiative operating in one of the most culturally diverse boroughs of London, Growing Communities are well positioned to support new entrant producers from diverse backgrounds. Initiatives such as Soul Fire Farm, a community-supported agriculture scheme operating in a low income neighbourhood in Petersburg, New York State, demonstrate ways of working to address food injustice through community-led trade. They operate a sliding-scale "solidarity schemes" for payment;

raise funds to support vulnerable groups most in need of nourishment, including those recently incarcerated, refugees and asylum seekers and those living in areas with poor access to fresh produce; and deliver outreach and training programmes for young African American and Latinx people [143]. As Slocum and Cadieux outline, food justice entails democratic processes and participation, paying particular attention to the involvement of people experiencing (food) injustice [144]. They highlight the need for strategies to repair past injustices, and for recalibration of structural relations of power [145].

Whilst the case of Growing Communities highlights how community-led trade has the potential to amplify agroecology within the city region, it also highlights current limitations. Although a significant number of people have been impacted by the work of Growing Communities over the last 25 years, at present, the community-led trade mechanism reaches a small proportion of Hackney residents—the current population of Hackney is 279,700 [146].

Scaling deep in agroecology requires investment in transformative learning—including agroecological training and apprenticeship programmes and training centres, particularly in neighbourhoods where food insecurity and food injustice are most profound—alongside investment in networks that support development of agroecological communities of practice, including participation of those individuals and communities currently marginalised from the UK farming and food system. Furthermore, as highlighted in Section 4.3, there is identified need for citizen involvement in policy-making processes, including representatives from agroecological communities of practice, as well as those with lived experience of food injustice.

6. Conclusions

This article makes a contribution to agroecology scholarship through analysis of three components of scaling agroecology (scaling out, scaling up and scaling deep) via a case of community-led trade operating in the city region of London. Case study findings identify three challenges to agroecology encountered by stakeholders. First, attaining secure, affordable access to land for growing, distributing and trading; second, achieving sustainable livelihoods for agroecological producers and pathways to them, including for new entrant growers; and third, a policy, planning and legislative landscape whereby agroecology is currently largely marginalised. Amidst these challenges, the article demonstrates how attending to the three dimensions of scaling—scaling out, scaling up and scaling deep—can indicate pathways for amplifying agroecology.

Drawing on the case of Growing Communities, with insight from other city regions, the article highlights three pathways to scaling agroecology in the city region. First, scaling out, via strategies enabling access to secure, affordable land and infrastructure for agroecological communities of practice, alongside investment in capacity building for agroecological communities of practice, including via learning platforms and knowledge exchange. Second, scaling up, via policy, planning and legislative change based around investment in sustainable and just food systems, divestment in unsustainable and unjust food systems and the support of translocal networks enabling exchange of good practice in sustainable food system governance. Third, scaling deep, via investment in transformative learning opportunities and networks that support the growth of agroecological communities of practice, including those with lived experience of food injustice.

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